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ICBIM 2025

THE 8th INTERNATIONAL CONFERENCE ON BUSINESS, INFORMATICS AND MANAGEMENT

“Research and Innovation Ecosystem”



30th MAY
2025



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King Mongkut Institute of Technology Ladkrabang (KMITL)
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Topic “Research and Innovation Ecosystem”**

On 30th May 2025, Onsite Conference

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King Mongkut’s Institute of Technology Ladkrabang
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MESSAGE FROM DEAN



Dear Colleagues,

It is my great pleasure to extend a warm welcome to you to The 8th International Conference on Business, Informatics and Management hosted by the KMITL Business School, King Mongkut's Institute of Technology Ladkrabang, together with our academic partners. This academic event takes place on May 30, 2025, under the theme of “Research and Innovation Ecosystem”. We aim to provide a platform for academic scientists, researchers, and scholars to exchange valuable insights and experiences related to this theme. We believe that this conference holds the potential to mark a significant milestone in reshaping the landscape of business, informatics, and management at the global level.

We have received a total of 45 paper submissions and 39 papers have been accepted for presentation and publication in the Proceedings. I extend my gratitude to the audience who have taken the time to join us and make this conference a fruitful and memorable event. Thank you all for making this event a fruitful and memorable event.

Assoc. Prof. Dr. Singha Chaveesuk
Dean of King Mongkut's Institute of Technology Ladkrabang Business School

MESSAGE FROM CONFERENCE CHAIR



The 8th International Conference on Business, Informatics and Management under the theme “Research and Innovation Ecosystem” is organized on May 30, 2024, at the KMITL Business School, King Mongkut's Institute of Technology Ladkrabang. This conference is considered a significant platform for students, academics, and researchers to exchange knowledge and experiences in the topic of “Sustainable”, “Technology”, and “Business”, disseminate research findings, and foster collaborative networking.

On behalf of the organizing committee, we have great hopes that this conference will be successful and beneficial for the development of academic and research endeavors.

A handwritten signature in blue ink that reads "Saravane P." on a white background.

Asst. Prof. Dr. Saravane Phuengpunum
Conference Chair

The 8th International Conference on Business, Informatics and Management

30 May 2025

1. Conference Objectives

The 8th International Conference on Business, Informatics, and Management (ICBIM 2025) are interdisciplinary conferences that aim to bring together leading academic scientists, researchers, and scholars to exchange and share their experiences and research results about all aspects of Business, Informatics, and Management. It also provides the premier interdisciplinary forum for researchers, practitioners, and educators to present and discuss the most recent innovations, trends, concerns, practical challenges encountered, and the solutions adopted in the fields of Business, Informatics, and Management. ICBIM 2025 “Research and Innovation Ecosystem” scheduled on 30 May 2025.

2. Call for Contributions

All honorable authors are kindly encouraged to contribute to and help shape the conference through submissions of their research abstracts and papers. Also, high-quality research contributions describing original and unpublished results of conceptual, constructive, empirical, experimental, or theoretical work in all areas of Business, Informatics, and Management are cordially invited for presentation at the conference. The conference solicits contributions of abstracts and papers that address themes and topics of the conference, including figures, tables, and references to novel research material. Topics of interest for submission include, but are not limited to:

Business	Sustainability	Technology
1. Business Management	1. Sustainable Economic Development	1. Technology Innovation and Entrepreneurship in the Age of AI and Knowledge-Economy
2. Economics/ Managerial Economics	2. Circular Economy	2. Digital Technologies and Management
3. Business plan	3. Corporate Governance and ESG	3. Information Security & Risk Management
4. Start-Up	4. Sustainable Finance	4. Business Transformation
5. Marketing management	5. Circular Economy & Supply Chains	5. E-commerce and E-society
6. Consumer behavior management	6. Sustainable Cities & Mobility	6. IT Investment and Management
7. Innovation management	7. Social Equity & Societal Innovation	7. Human-Computer Interaction
8. Digital Business	8. Professional Development	8. Data Science and Analytics
9. Entrepreneurship in the New Digital Era	9. Corporate Social Responsibility	9. Mobile Technology and Developments
10. Organizational Communication	10. Intellectual Property	10. Platform Technology and Developments

3. Lead Host



- King Mongkut's Institute of Technology Ladkrabang Business School (KBS)



- King Mongkut Institute of Technology Ladkrabang (KMITL) Bangkok, Thailand

4. Co-Host



- Mahidol University, Kanchanaburi Campus, Thailand
- Srinakharinwirot University, Thailand
- Silpakorn University, Thailand
- Burapha University, Thailand
- Kanchanaburi Rajabhat University, Thailand
- Rajamangala University of Technology Thanyaburi, Thailand
- Panyapiwat Institute of Management, Thailand
- Rangsit University, Thailand
- Vongchavalitkul University, Thailand
- College of Innovation and Industrial Management, KMITL
- King Mongkut's Institute of Technology Ladkrabang, Prince of Chumphon Campus

5. Organizer



- King Mongkut's Institute of Technology Ladkrabang Business School (KBS)

6. Important Dates

Deadline for full paper submission	Now – 7 May 2025
Camera-Ready Paper Submission	19 May 2025
Acceptance Notification	20 May 2025
Registration Fee for ICBIM 2025 Conference	25 May 2025
Conference Dates	30 May 2025

7. Venue

- King Mongkut's Institute of Technology Ladkrabang Business School (KBS)

8. Paper Submission

Submission of an abstract or article implies that the work described has not been published previously (except as part of a published lecture or academic thesis), that it is not under consideration for publication elsewhere, that its publication is approved by all authors and tacitly or explicitly by the authorities responsible where the work was carried out, and that, if accepted, the abstract or article will not be published elsewhere in the same form without the written consent of the publisher. The editors reserve the right to edit or otherwise alter all contributions, but authors will receive proofs for approval before publication.

Copyrights for articles are retained by the authors, with the first publication rights granted to the publisher. The publisher is not responsible for subsequent uses of the work. It is the author's responsibility to bring an infringement action if so desired by the author.

The publisher has a zero-tolerance plagiarism policy. All submissions will be checked by editors before being sent to reviewers.

Authors permit the publisher to archive them in databases and indexes such as Google Scholar.

Manuscripts should be prepared in Microsoft Word format and submitted via the conference's website <https://icbim.kmitl.ac.th>. If you have any questions, please contact the editor.

9. Paper Selection and Publication Process

1. Upon receipt of a submission, the editor sends an e-mail of confirmation to the submission's author within one to three working days. If you fail to receive this confirmation, your submission e-mail may have been missed.

2. Peer review. We use a double-blind system for peer review; both reviewers' and authors' identities remain anonymous. The paper will be reviewed by at least two experts: one editorial board member and at least one external reviewer. The review process may take two to three weeks.

3. Notification of the result of review by e-mail.

4. If the submission is accepted, the authors revise the paper.

5. After publication, the corresponding author will receive one set of the Conference Abstract Book free of charge. If you want to keep printed proceedings, please contact the editor before making an order.

General Requirements

1. Language: Submissions in English .

2. Length: Each paper is limited to 12 pages normally (including all figures, tables, and references), additional pages will be charged.

10. Proceedings

All papers submitted in the conference will undergo a rigid double-blind peer review process. Only excellent papers that will pass the review process will be accepted and published in the conference proceedings (with ISBN) as one volume.

11. Registration

Registration fee of presenter included

- Electronic Proceedings
- Electronic presenter certificate

Registration Fee for ICBIM 2025 Conference

Types	Registration (baht) (May,30,2025)
Non Co-Hosting Institution Authors	2,000
Co-Hosting Institution Authors	1,000

<http://incbim.org/>



- Call for paper
- Paper Submission Guidelines
- Submission System
- For more information

12. For more information, contact us:

KMITL Business School (KBS)

Website: <https://icbim.kmitl.ac.th/>

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AGENDA

**International Academic Conference in collaboration
with 12 institutions Year 2025**

The 8th International Conference on Business, Informatics and Management

Theme: “Research and Innovation Ecosystem”

**Venue: KMITL Business School, King Mongkut’s Institute
of Technology Ladkrabang**

30 May 2025 Morning

Event conducted by :

Time	Activities/Meeting Rooms
09.00 – 09.30 AM	Registration at 1st floor, KMITL Business School
09.30 – 09.45 AM	The event from 09.30 am to 09.45 pm will take place at Auditorium Hall, 2nd floor, KMITL Business School - Joint report by the 3 main organizers: KMITL Business School and the network of 12 collaborative institutions, KMITL School of Industrial Education and Technology, and KMITL School of Liberal Arts 1. Assoc. Prof. Dr.Singha Chaveesuk Dean of KMITL Business School and the network of 12 collaborative introduces the 12 institutional collaboration network. 1) Faculty of Business Administration, Panyapiwat Institute of Management 2) Burapha Business School, Faculty of Business Administration, Burapha University 3) Faculty of Business Administration, Rangsit University 4) Faculty of Social Business Administration, Srinakharinwirot University 5) Business Administration Program, Mahidol University, Kanchanaburi Campus 6) Faculty of Business Administration, Vongchavalitkul University 7) Faculty of Information and Communication Technology, Silpakorn University 8) Faculty of Business Administration, Rajamangala University of Technology Thanyaburi 9) Faculty of Management Sciences, Kanchanaburi Rajabhat University 10) KMITL Business School, King Mongkut's Institute of Technology Ladkrabang 11) College of Innovation and Industrial Management, KMITL 12) King Mongkut's Institute of Technology Ladkrabang, Prince of Chumphon Campus

Time	Activities/Meeting Rooms
09.45 – 10.10 AM	2. Prof.Dr.Pariyaporn Tungkunan Dean of KMITL School of Industrial Education and Technology 3. Asst. Prof. Ekkarat Suwannakul Dean of KMITL School of Liberal Arts 4. Asst. Prof. Surapong Siripongdee Dean of College of Innovation and Industrial Management - Opening Speech by: Assoc. Prof. Komsan Maleesee President of King Mongkut's Institute of Technology Ladkrabang - The three main organizers jointly organized the opening ceremony: 1. KMITL Business School and the network of 12 collaborative institutions 2. KMITL School of Industrial Education and Technology 3. KMITL School of Liberal Arts
10.10 – 10.15 AM	Take photos together
10.15 – 10.30 AM	Coffee Break (Morning)
10.30 – 11.30 AM	Keynote Speech and Special Lecture “Research and Innovation Ecosystem” The event from 10.30 am to 11.30 pm will take place at 301 Room, 3rd floor, KMITL Business School By Keynote speaker : Mr. Surasak Wanichwatphibun CTO of Huawei Thailand Cloud Business, Huawei Technologies (Thailand) Co., Ltd. Keynote Speech and Special Lecture “Research and Innovation Ecosystem” The event from 10.30 am to 11.30 pm will take place at Auditorium Hall, 2nd floor, KMITL Business School By Keynote speaker : Prof.Dr. Soottiporn Chittmittrapap
11.30 AM – 01.00 PM	Lunch Break at 1st floor, KMITL Business School; 102 and 103
30 May 2025 Afternoon	
01.00 – 02.30 PM	- Oral research presentation will be held at KMITL Business School on the 2nd floor .Rooms 202 – 206 will be used for the presentations. Peer reviewer experts and commentators will provide feedback in each room.
02.30 – 02.45 PM	Coffee Break (Afternoon)
02.45 – 04.00 PM	- Oral research presentation will be held at KMITL Business School on the 2nd floor .Rooms 202 – 206 will be used for the presentations. Peer reviewer experts and commentators will provide feedback in each room. (continued)
04.00 – 05.00 PM	All are invited to attend the event at the KMITL Business School Convention Hall, 4th floor. - Announcement of Best Oral Presentation Award and Best Paper Awards Ceremony • Best Presentation Award • Best Research Award
05.00 - 07.00 PM	- Have dinner together at the KMITL Business School Convention Hall, 4th floor.
07.00 – 07.30 PM	- Q&A session will be held in the Auditorium Room on the 4th floor of KMITL Business School. - Closing of the International Academic Conference

Remark : The schedule is subject to change.

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1. Asst. Prof. Pornpawee Worasatepongsa	Mahidol University, Kanchanaburi Campus
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2. Dr. Kanitta Richkamroph
3. Dr. Sirivalaya Kachathan
4. Dr. Yuvarinthorn Chaichotchuang

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Keys to Sustainable Success in Community Based Tourism in Thailand

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Abstract

This study investigates the critical success factors influencing sustainable Community-Based Tourism (CBT) in Thailand. In response to the challenges of mass tourism—such as environmental degradation, cultural erosion, and unequal benefit distribution—CBT has emerged as a viable alternative that empowers local communities while preserving cultural and natural assets. Using a qualitative, grounded theory approach, the research draws on semi-structured interviews, field observations, and participatory workshops conducted across five CBT sites in Thailand. The findings reveal seven interrelated dimensions essential for sustainable CBT: local engagement, leadership ability, authenticity, effective resource utilization, sustainable practices, branding and marketing, and policy support. A conceptual model is developed to illustrate how these factors interact in dynamic, context-specific ways. The study contributes to sustainable tourism literature by highlighting the importance of community empowerment, inclusive leadership, and adaptive policy frameworks. It concludes with practical recommendations for stakeholders and suggests pathways for scaling CBT in Thailand and similar tourism-dependent economies.

Keywords: Community-Based Tourism, Sustainable Tourism, Local Engagement, Thailand, Grounded Theory, Cultural Heritage, Policy Recommendations

Introduction

Tourism has long been a cornerstone of Thailand's economy, generating substantial revenue while showcasing the country's rich cultural and natural heritage. In 2019, Thailand welcomed over 41.1 million tourists and generated approximately THB 2.21 trillion in revenue, highlighting the industry's economic significance (Ministry of Tourism and Sports, 2020). However, the rapid expansion of tourism has raised pressing concerns regarding its sustainability—particularly in terms of environmental degradation, cultural commodification, and unequal benefit distribution. As a response to these challenges, Community-Based Tourism (CBT) has emerged as a sustainable alternative that aims to empower local communities while preserving their cultural and environmental assets.

CBT emphasizes inclusive participation, allowing local residents to take an active role in the planning, management, and sharing of tourism benefits (Pongponrat, 2011). Successful examples such as the Hua Takae Old Market demonstrate how CBT can help communities preserve cultural heritage while also promoting economic development (Ubonsri & Daungtima, 2024). Moreover, the integration of digital technologies has significantly altered the landscape of tourism in Thailand. E-services and social media platforms now serve as essential tools for destination marketing and service delivery, making tourism more accessible and efficient while also reducing environmental impact (Bazazo & Alananzeh, 2022).

In addition to cultural heritage, Thailand's natural resources—ranging from pristine beaches to biodiverse forests—are major tourist attractions. However, unmanaged tourism poses threats to these ecosystems. Promoting eco-tourism and adopting environmentally responsible practices are essential to mitigating these impacts (Suwannarat et al., 2023). For example, CBT initiatives in areas like Chachoengsao and Chai Nat Province have leveraged cultural and environmental assets to offer meaningful travel experiences while supporting conservation and community welfare (Rattanamanee, 2024; Suwannarat et al., 2023).

Despite widespread acknowledgment of CBT's potential, challenges persist. Many communities lack sufficient decision-making power, access to digital tools, and effective collaboration among stakeholders. Local tourism businesses often struggle to optimize their assets or form productive partnerships, which can lead to cultural dilution, environmental degradation, and project discontinuity. Furthermore, communication gaps and weak policy support hinder the long-term sustainability of many CBT initiatives (Pourabedin, 2021; Rattanamanee, 2024).

This paper draws from a qualitative, grounded theory approach, involving fieldwork at multiple CBT sites across Thailand. By integrating theoretical frameworks with stakeholder perspectives, the study contributes to the existing body of knowledge on sustainable tourism and offers actionable insights for policymakers, community leaders, and tourism entrepreneurs. The ultimate goal is to promote a model of tourism that is economically inclusive, environmentally responsible, and culturally respectful—ensuring that Thailand's tourism industry remains vibrant and sustainable for generations to come.

Research Objectives

This study aims to investigate the key drivers of success in Community-Based Tourism (CBT) in Thailand using a grounded theory approach. Specifically, it seeks to:

1. Identify the core success factors that influence sustainable CBT outcomes across selected Thai communities.
2. Explore stakeholder perceptions and community-level experiences in planning, operating, and sustaining CBT initiatives.
3. Develop a conceptual model that captures the interaction between leadership, engagement, authenticity, sustainability, and policy.
4. Recommend actionable strategies for community leaders, tourism marketers, and policy-makers to strengthen CBT systems.

Literature Review and Theoretical Background

This section reviews the conceptual and theoretical foundations of Community-Based Tourism (CBT), both globally and within Thailand. It synthesizes key definitions, frameworks, and case examples from previous literature and identifies critical themes relevant to sustainable CBT development. These themes inform the research focus and guide the development of the grounded theory model in this study.

In Thailand, CBT has gained momentum through government policies, community leadership, and increasing global demand for authentic, responsible tourism experiences (Sukhothai & Phongsavan, 2023; Nopporn, 2023). This section reviews the conceptual and theoretical foundations of CBT, explores relevant global and Thai case studies, and examines the critical success factors and challenges associated with sustainable community-based tourism.

1. Concept and Evolution of Community-Based Tourism

CBT is defined as a tourism approach that places local communities at the center of decision-making, planning, and benefit-sharing (Phongpaichit et al., 2023). It is designed to balance socio-economic development with cultural and environmental conservation. In the Thai context, CBT has been implemented in diverse forms across provinces—ranging from eco-tourism to cultural heritage tours—often supported by NGOs and public-sector agencies (Pongsiri & Wongyai, 2023). For example, Ban Na Ton Chan community combines agricultural life with homestays, while communities in Kalasin province promote Phu Thai cultural traditions (Jariang & Sooksai, 2023; Chanthaphan & Kaewkhong, 2024).

Successful CBT projects generally incorporate four critical factors: (1) active community participation, (2) local leadership and capacity building, (3) strategic partnerships with public and private sectors, and (4) a balance between economic development and environmental protection (Ngamsomsuk & Rujiorn, 2023; Manee & Niyomsilpa, 2024).

Theoretical Framework

Several theories inform the understanding of CBT development and implementation in Thailand:

Core Concepts in Community-Based Tourism

Community-Based Tourism (CBT) rests on several foundational principles that reflect both academic theory and grassroots practice. One of the most critical is **community empowerment**, defined as the process through which local people gain the ability to influence decisions, control tourism resources, and equitably share benefits (Scheyvens, 1999). Closely linked to empowerment is **capacity building**, which involves developing local skills, leadership, governance structures, and knowledge systems necessary to manage tourism sustainably (Telfer & Sharpley, 2008; Manyara & Jones, 2007). Additionally, **sustainable development** underpins CBT by emphasizing long-term socio-cultural, economic, and environmental well-being, rather than short-term profit (Goodwin & Santilli, 2009). These concepts are interconnected and essential in evaluating the success and sustainability of CBT projects, particularly in contexts like Thailand where community cohesion and environmental sensitivity are deeply embedded in cultural values.

Community Leadership Theory

Effective leadership plays a central role in shaping and guiding CBT initiatives. Hollander (1970) emphasizes that leadership is rooted in influence, not authority. Leaders who possess charisma, decision-making ability, and community trust can align local values with tourism goals (O’Leary, 2000; Loetyingyot, 2017). In CBT, leaders act as intermediaries—bridging community needs with external tourism markets and policy environments (Hallinger & Suriyankietkaew, 2020).

Community Participation Theory

Participation theory underlines the importance of local engagement in identifying issues, designing tourism projects, and evaluating outcomes (Michel & Marquardt, 1996). Genuine participation fosters community ownership, improves sustainability, and enhances the alignment of tourism initiatives with local culture (Muhamad, 2022; Intaprom, 2014). High engagement also supports emotional investment and social pride among residents (Peredo & Chrisman, 2018; Mohammad & Hamzah, 2018).

2. Global and Thai CBT Case Studies

Globally, CBT has been successfully implemented in countries like Spain (Alquezar Village), Nepal (Annapurna Conservation Area Project), and Indonesia (Penglipuran Village), where local residents directly manage tourism activities, benefiting from increased income and preserving traditional lifestyles (Gómez et al., 2015; Nyaupane & Thapa, 2004; Ernawati et al., 2017).

In Thailand, projects such as the Sapphaya Community in Chai Nat Province and the restoration of the Sapphaya Old Market highlight how CBT can be both a cultural preservation strategy and a driver for inclusive economic development (Suwannarat et al., 2023; Rattanamanee, 2024). These examples showcase how integrating cultural authenticity with sustainable practices enhances tourism’s contribution to local development.

3. Challenges and Limitations

Despite the promising model, CBT faces several constraints in Thailand. These include lack of digital skills for branding, over-commercialization that threatens cultural authenticity, and inequitable benefit distribution within communities (Peredo & Chrisman, 2018; Loetyingyot, 2017). Sustainability can also be undermined by limited capacity for long-term planning and resource management (Murphy, 1988).

CBT projects are also vulnerable to changing tourist preferences, government policy shifts, and external market fluctuations. As a result, adaptive strategies, ongoing capacity development, and institutional support are essential for long-term viability (Stronza & Gordillo, 2008; Zapata et al., 2011).

Research Methodology

This research adopts a qualitative methodology to explore the key drivers of sustainable success in Community-Based Tourism (CBT) initiatives across Thailand. A grounded theory approach was employed to uncover underlying patterns, develop conceptual models, and generate theoretical insights based on rich, empirical data. This section outlines the research design, population and sampling procedures, data collection methods, and analytical strategies.

1. Research Design

The study utilized a **qualitative case study** design, focusing on five distinct CBT sites across Thailand. This approach was selected to allow for a deep contextual understanding of complex socio-cultural dynamics and tourism practices within real-life settings (MDPI, 2023). The case study strategy was appropriate for capturing stakeholder narratives, uncovering latent themes, and examining how local engagement, leadership, and sustainability practices interact across different communities.

The research focused on key thematic areas drawn from the literature:

- Local engagement and participation
- Leadership ability
- Opportunities from local resources
- Cultural authenticity
- Sustainable consumption practices
- Community ownership and benefit-sharing

These themes guided the formulation of research questions and informed the data collection instruments.

In this study, CBT success was defined using a multi-dimensional framework drawn from literature (e.g., Scheyvens, 1999; Giampiccoli & Mtapuri, 2015) and grounded in field observations. Success was assessed through both perceived impact and observable indicators across three dimensions:

1. **Community Empowerment** (e.g., participation in decision-making, leadership roles)
2. **Economic Outcomes** (e.g., income generation, diversification)
3. **Sustainability Practices** (e.g., environmental management, cultural preservation)

These dimensions were used to guide interview questions, observation criteria, and workshop activities. Stakeholder narratives were evaluated against these themes to determine both the perceived and practical success of CBT initiatives.

2. Population and Sampling

The target population included stakeholders directly involved in CBT initiatives in Thailand. This comprised:

- **Local community leaders** managing tourism efforts
- **Entrepreneurs and service providers** (e.g., homestay operators, guides)
- **Residents and elders** with cultural knowledge or community influence
- **Tourists** participating in CBT activities
- **Policymakers, NGO representatives, and tourism committee members** involved in CBT promotion or support

A **purposive sampling technique** was used to identify information-rich participants. Five CBT sites were selected based on their diversity in geography, size, community involvement, and type of tourism activities offered. Each site yielded between 30–50 respondents, ensuring a total sample size of approximately 150–250 participants. Inclusion criteria required at least two years of involvement in CBT and willingness to share insights through interviews or workshops.

This sampling strategy ensured the inclusion of varied perspectives and fostered a comprehensive analysis of CBT challenges and opportunities across different Thai regions (UNDP, 2022).

While 20 participants were selected for in-depth, semi-structured interviews, the broader group of 150–250 participants contributed through other qualitative methods such as participatory workshops and observational studies. These additional participants engaged in community arts sessions, goal-setting workshops, and public tourism activities at the CBT sites. Their insights—captured through observation logs, visual outputs, and group discussions—provided contextual richness and helped validate themes emerging from the interview data.

Description of Study Sites

The five selected CBT sites represented a cross-section of Thailand's geographic and cultural diversity:

1. **Sapphaya Community, Chai Nat Province** – A riverine heritage town known for its old market and traditional crafts. The site emphasizes cultural preservation and small-scale river tourism.

2. **Ban Na Ton Chan, Sukhothai Province** – A rural farming community offering agricultural tourism experiences, homestays, and local weaving traditions.

3. Hua Takae Market, Lat Krabang, Bangkok – An urban fringe community focused on cultural heritage tourism and revitalization of century-old wooden markets.

4. Phu Thai Village, Kalasin Province – A culturally distinct ethnic community known for its textile crafts and traditional music, engaging in immersive cultural tourism.

5. Coastal Ecotourism Site, Chachoengsao Province – A mangrove conservation area offering eco-tours, seafood experiences, and youth-led environmental activities.

These sites were selected to reflect a range of tourism types (e.g., eco-tourism, heritage tourism, agricultural tourism), community structures, and regional contexts. The variation supported comparative analysis and enhanced the generalizability of the grounded theory model.

3. Data Collection Methods

Primary Data Collection

Data were collected using three qualitative techniques:

- **Semi-Structured Interviews:** Twenty interviews were conducted with community leaders, entrepreneurs, residents, tourism officers, and tourists. The interviews explored themes such as local engagement, sustainability practices, and branding efforts. Open-ended questions allowed participants to elaborate on their lived experiences.

- **Observations:** Both participatory and non-participatory field observations were conducted at the CBT sites. These captured how local communities interacted with tourists, implemented eco-friendly practices, and maintained cultural authenticity.

- **Workshops:** Two types of participatory workshops were held:

- o **Community Arts Workshops** (3 sessions, 30 participants): These sessions used visual storytelling and drawing to express visions for sustainable tourism.

- o **Goal-Setting Workshops** (2 sessions, 20 participants): Facilitated structured discussions on aspirations, values, and long-term tourism goals.

The Community Arts Workshops used participatory visual methods such as storytelling, sketching, and mapping to capture community members' visions, values, and lived experiences related to tourism. Each session lasted 2–3 hours and included 10 participants representing different age and gender groups. Visual outputs (e.g., drawings, diagrams, and collages) were analyzed as qualitative data and coded for themes such as resource identity, cultural pride, and sustainable aspirations.

The Goal-Setting Workshops followed a semi-structured focus group format. Participants engaged in facilitated discussions around community goals, challenges, and success criteria for CBT. These workshops incorporated tools like priority-ranking matrices and SWOT analysis charts. The sessions were audio-recorded and transcribed, with coded insights contributing directly to the formulation of the grounded theory model.

These approaches enabled triangulation of data sources and promoted deeper community engagement in the research process.

Secondary Data Collection

Secondary sources included:

- Academic literature on CBT success factors
- Case studies from government reports and NGO publications
- Content from official CBT websites, social media platforms (e.g., YouTube, Facebook), and local newspapers

These materials provided context for primary data, validated findings, and revealed trends in digital communication and marketing strategies.

3. Data Analysis

Data were analyzed using the **grounded theory** method, supported by qualitative analysis software (e.g., MaxQDA).

The coding process was conducted manually using MaxQDA 2022, which enabled structured code tagging, memoing, and data visualization. Open coding was applied first to generate over 100 initial codes. These were then grouped into categories during axial coding (e.g., "local empowerment," "resource usage"), followed by selective coding to identify the core category—community engagement—as the central phenomenon. Regular analytic memos were maintained to track theoretical saturation and refine code relationships. Peer debriefing and codebook validation were also used to ensure credibility and dependability of the findings (Lincoln & Guba, 1985).

To ensure coding reliability, an inter-coder agreement process was followed. Two independent researchers coded a subset (20%) of the interview transcripts and workshop notes using the same codebook developed during the open coding stage. Cohen’s Kappa coefficient was used to assess consistency, and an agreement level of 0.82 was achieved, indicating high reliability. Any discrepancies were discussed and resolved through consensus. Additionally, theoretical saturation was determined when no new themes emerged from three consecutive interviews and workshop sessions. This point indicated that the dataset was sufficiently rich to support the development of the grounded theory model and that additional data would likely not contribute substantially new insights.

Results and Discussion

This section presents the key findings from the case studies, interviews, observations, and workshops conducted across five Community-Based Tourism (CBT) sites in Thailand. The analysis revealed seven interrelated factors that consistently influenced the success and sustainability of CBT initiatives: **local engagement, authenticity, leadership ability, resource utilization, sustainable practices, branding and marketing strategies, and policy support**. These findings are discussed thematically and supported by data from stakeholders.

CBT success, as analyzed in this study, was not limited to economic gain but encompassed broader outcomes across empowerment, sustainability, and community satisfaction. These were identified based on the presence of democratic planning mechanisms, distribution of tourism benefits, local resource stewardship, and tourist satisfaction—all validated through interviews and participatory workshops.

1. Profile of Participants

Participants included community leaders, entrepreneurs, residents, tourists, and committee members, reflecting diverse perspectives across Thailand’s CBT landscape.

Table 1: Profile of Interview Participants

Participant Category	Number	Percentage
Community Leaders	5	25%
Local Entrepreneurs	6	30%
Residents	4	20%
Tourism Committee	3	15%
Tourists	2	10%

Classification Criteria for Tables

The terms “high,” “medium,” and “low” used in Tables 2, 4, 5, and 6 were based on both qualitative indicators and triangulated scoring from interviews, workshop outputs, and observational data. For each domain (e.g., engagement, sustainability, branding), a set of thematic indicators was defined during the selective coding phase. Participants and sites were then assessed against these indicators. For example:

- High Engagement: Active participation in planning, rotational leadership structures, regular community meetings, and consensus-based decision-making.
- Medium Engagement: Some community consultation and participation, but led primarily by a small group or leader.
- Low Engagement: Top-down decision-making, limited awareness among residents, minimal participatory mechanisms.

Similar rubrics were developed for dimensions such as tourist satisfaction, environmental sustainability, and branding effectiveness. These classifications were not numerical but based on the frequency and strength of themes across sources, supported by coding density in MaxQDA and cross-site comparison during analysis.

2. Local Engagement

Local engagement emerged as the foundational pillar across all five CBT sites. Communities that implemented inclusive structures—such as rotational leadership, participatory meetings, and shared

financial models—demonstrated stronger cohesion, higher tourist satisfaction, and more effective reinvestment of tourism income.

“When we meet monthly, everyone feels involved, even youth and elders. It’s our project, not just the leader’s,” noted a homestay operator from Kalasin.”

Table 2 quantifies the impact of engagement, with high-engagement communities showing 85% tourist satisfaction and strong economic outcomes. Observations confirmed vibrant local participation during community arts workshops and guided heritage tours.

Table 2: Impact of Engagement Levels on CBT Outcomes

Engagement Level	Tourist Satisfaction	Community Satisfaction	Economic Impact
High	85%	78%	Strong
Medium	62%	55%	Moderate
Low	40%	38%	Weak

Figure 2. Resource Utilization vs. Economic Impact Workshop participants illustrated the importance of resource storytelling through drawings and vision boards.

3. Leadership Ability

Leadership in CBT was found to be more relational than positional. Successful sites demonstrated distributed or rotational leadership structures where trust, vision-setting, and conflict resolution were prioritized.

“Our leader isn’t a boss. She listens, guides, and lets others lead too,” said a tourism committee member from Chachoengsao.

This aligns with Hollander’s (1970) theory of influence-based leadership. Participants emphasized the role of “quiet leaders” who built external partnerships while mentoring new generations within the village.

4. Authenticity

Authenticity—defined as the truthful and respectful representation of cultural life—was a strong driver of tourist appreciation and community pride. Across all sites, authenticity was sustained by resisting staged performances and integrating real-life practices such as cooking, farming, and storytelling into the tourism experience.

“We don’t dress up just for tourists. What they see is how we live,” stated an elder from the Hua Takae community.

This was visually evident in workshop drawings where residents depicted their daily lives (e.g., weaving, harvesting) as central to the visitor experience. Authenticity also contributed to the emotional bond between guests and hosts, reinforcing word-of-mouth promotion.

5. Resource Utilization

Communities that creatively leveraged their existing natural, cultural, and human capital outperformed others. For instance, one site developed trekking experiences through local forests guided by traditional herbalists, while another hosted fishing workshops along historic canals.

“We don’t build new things. We make use of what’s already here—our forests, food, and stories,” explained a CBT coordinator from Chai Nat.

Figure 2 illustrates how resource utilization correlates with economic impact. High-resource-use communities had stronger seasonal resilience and diversified income streams.

6. Sustainable Practices

Environmental sustainability practices were most effective in communities with high local buy-in. Techniques included composting, water conservation, renewable energy, and sourcing materials locally. These actions were both symbolic and functional, attracting ecologically conscious tourists while reducing overhead costs.

“Now we compost all kitchen waste, and tourists help us in the garden. It’s educational for them and useful for us,” remarked a local guide in Kalasin.

Table 5 confirms that sustainability practices improved visitor satisfaction and environmental outcomes. Participatory observations also revealed strong youth engagement in eco-projects like solar lighting installations.

CBT communities that developed **clear, authentic brand identities** saw higher visitor engagement. Branding efforts that centred on cultural heritage, environmental stewardship, and community values resonated most with tourists.

Table 4: Branding Elements and Effectiveness

Branding Element	Effectiveness Rating
Cultural Heritage	High
Natural Beauty	High
Sustainability Practices	Medium
Local Cuisine	High
Adventure Activities	Medium

Digital platforms such as Facebook, YouTube, and travel blogs emerged as primary channels. However, **word-of-mouth** remained powerful, driven by visitor satisfaction and emotional connection.

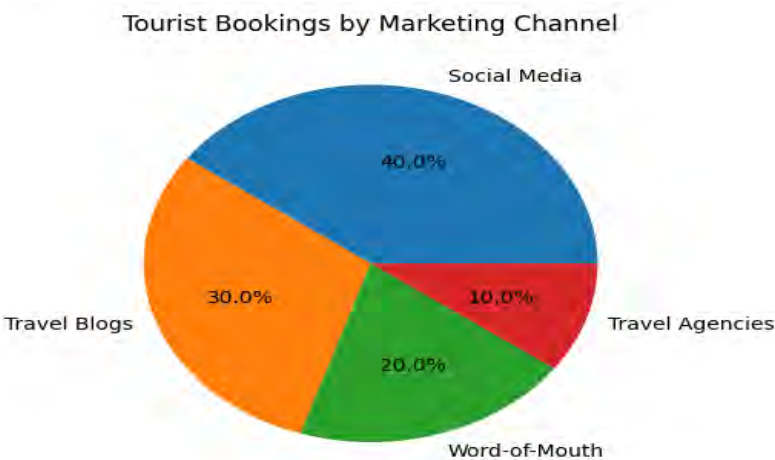


Figure 1: Distribution of Booking Channels

7. Community Involvement and Sustainable Practices

The adoption of sustainable practices—such as eco-waste management, local sourcing, and renewable energy—was higher in communities with **strong community buy-in**. These practices not only reduced environmental impact but also became part of the tourism value proposition.

Table 5: Community Involvement vs. Environmental and Economic Outcomes

Involvement Level	Tourism Offerings Diversity	Visitor Satisfaction	Environmental Sustainability
High	High	85%	Strong
Medium	Medium	70%	Moderate
Low	Low	55%	Weak

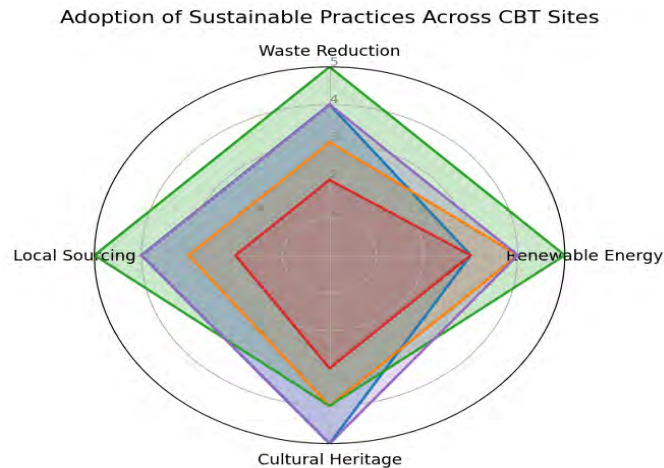


Figure 2: Adoption of Sustainable Practices Across CBT Sites

8. Policy Environment and Gaps

Though several national policies exist to promote sustainable tourism, many participants felt these policies lacked applicability at the grassroots level. Most support was channelled toward infrastructure or large-scale tourism rather than directly assisting CBT groups with funding, training, or digital access.

“We get brochures, not budgets. They teach us tourism theory but don’t help with Wi-Fi,” shared a frustrated CBT operator from Chiang Rai.

Table 6 indicates low effectiveness ratings for economic and infrastructure support. Figure 3 maps the disconnect between government initiatives and local CBT needs, highlighting a top-down approach that often bypasses community input.

Table 6: Effectiveness Ratings of Current CBT Policies

Policy Area	Perceived Effectiveness
Environmental Protection	Moderate
Cultural Preservation	High
Economic Development	Low
Community Empowerment	Moderate
Tourism Infrastructure Support	Low

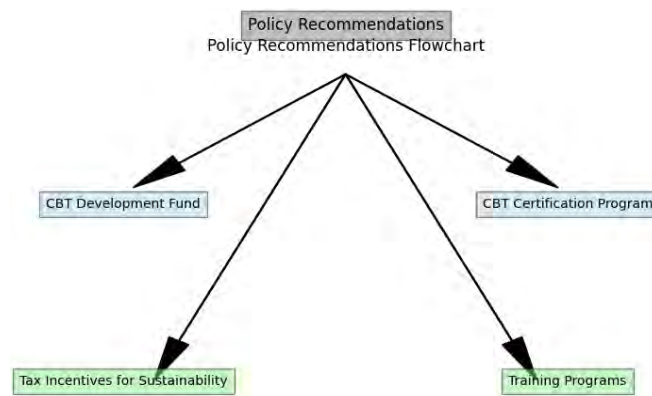


Figure 3: Policy Intervention Flowchart

9. Summary of Findings

The findings reveal a multifaceted web of interactions between community values, strategic decisions, and sustainable outcomes. Local engagement forms the foundation, while leadership and

resourcefulness shape adaptability. When effectively branded and supported by strong policy, CBT has the power to deliver long-term cultural, economic, and ecological benefits.

10. Critical Reflections and Contradictions

While most findings align with existing literature on CBT—particularly around the importance of community participation and authenticity—some unexpected patterns emerged. Notably, several communities with low digital capacity still demonstrated strong tourism outcomes through word-of-mouth networks and returning domestic tourists, contradicting studies that emphasize digital platforms as essential for modern CBT success (Pourabedin, 2021). Additionally, in one case, top-down support from local government led to better sustainability practices, even though much of the literature critiques hierarchical intervention as counterproductive (Giampiccoli & Mtapuri, 2015). These findings suggest that contextual flexibility and hybrid governance models may be more effective than previously assumed. They also indicate that cultural cohesion and informal trust networks can substitute for technological tools in some rural CBT contexts. Further research is needed to explore these anomalies in depth, especially as digital tourism evolves unevenly across regions.

Conclusion and Recommendations

1. Conclusion

This study set out to identify the critical success factors that underpin sustainable Community-Based Tourism (CBT) in Thailand. Through an in-depth, grounded theory approach that included interviews, field observations, and participatory workshops across five CBT sites, the research uncovered seven key interrelated dimensions: **local engagement, authenticity, leadership ability, resource utilization, sustainable practices, branding and marketing strategies, and policy support.**

Findings demonstrate that genuine local involvement is the foundation of successful CBT. Communities that empower residents to actively participate in tourism planning, management, and benefit-sharing are more likely to develop resilient and culturally rich tourism experiences. Moreover, leadership emerged as a vital enabler—particularly in guiding vision, facilitating collaboration, and maintaining balance between tradition and innovation.

Tourism experiences grounded in authenticity, cultural preservation, and locally sourced resources were consistently preferred by tourists. When combined with sustainability practices and effective branding strategies, CBT initiatives not only thrived economically but also fostered pride, social cohesion, and environmental responsibility within communities.

However, structural gaps remain. Many CBT projects face challenges such as limited digital literacy, lack of institutional support, insufficient funding, and fragmented policy frameworks that fail to address the unique needs of small-scale, community-led tourism. As such, an integrated approach involving communities, policymakers, and development partners is essential to scale and sustain CBT in Thailand.

2. Theoretical Implications

The study contributes to the literature on sustainable tourism by proposing a grounded theory model that illustrates the complex interdependencies among CBT success factors. The model confirms the relevance of **community leadership theory, participation theory, and sustainable tourism development theory** in explaining the Thai CBT context. Notably, it reinforces the idea that CBT success is not linear but a systems-oriented process that requires continuous adaptation, collaboration, and capacity-building.

3. Practical Implications

For Community Leaders and Local Entrepreneurs

- Foster inclusive leadership structures and ensure rotational roles to broaden local participation.
- Build tourism offerings around local strengths, including heritage, cuisine, crafts, and landscapes.
- Prioritize long-term sustainability over short-term profits, incorporating eco-friendly practices and intergenerational knowledge sharing.

For Tourism Marketers

- Develop authentic branding that highlights community stories, cultural uniqueness, and sustainable values.
- Utilize digital storytelling via social media, travel blogs, and online platforms to engage modern tourists.
- Encourage satisfied visitors to share their experiences to fuel word-of-mouth marketing.

4. Recommendations

To strengthen and expand CBT's impact in Thailand, the following recommendations are proposed:

Enhance Community Engagement and Capacity

- Conduct regular community forums, capacity-building workshops, and leadership training programs.
- Support youth participation and mentorship to ensure generational continuity in CBT management.

Promote Sustainability in Practice

- Provide subsidies for eco-technology (e.g., solar panels, waste recycling systems).
- Encourage partnerships with environmental NGOs and universities for knowledge transfer.

Strengthen Branding and Digital Marketing

- Offer digital literacy training and storytelling workshops for local tourism operators.
- Create cooperative CBT marketing platforms that aggregate small community offerings into larger tourism circuits.

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The Impact of Currency Fluctuations on Cross-Border Real Estate Investments in Thailand

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Abstract

This study explores the impact of currency fluctuations—specifically the Thai Baht (THB) against the US Dollar (USD) and the Euro (EUR)—on cross-border real estate investments in Thailand. Using a qualitative approach, 15 semi-structured interviews were conducted with industry professionals in finance, law, and real estate. The findings reveal that 80% of the participants (12 out of 15) identified exchange rate risk as a critical factor influencing investment decisions. The majority employ risk mitigation strategies such as forward contracts, currency swaps, and portfolio diversification to stabilize returns. Investors highlighted the significant influence of political and economic stability on currency dynamics and investment outcomes. The study highlights the need for enhanced regulatory transparency and accessible hedging instruments to support foreign investment. It offers practical recommendations for both investors and policymakers to manage currency risks in Thailand's dynamic property market.

Keywords: Currency Fluctuations, Cross-Border Investment, Real Estate, Risk Management, Investment Strategies

Introduction

Exchange rate fluctuation it is widely acknowledged and they are one of the essential factors that decide whether the investment in cross-border real estate is feasible or not. For Thailand investors, changes in the THB against key foreign currencies like the USD and the EUR will affect purchase price in THB, funding packages and the ultimate deliverable. Thailand's consistently growing economy, surging FDI and attractive property market have led it to become one of the key real estate investment hubs in the Southeast Asia. For nonresident investors, however, currency risk represents a critical barrier that can undermine expected returns if not properly managed, and if not managed prudently, can lead to losses. A falling Baht is clearly negative as it would reduce the amount repatriated in home currency but a rising Baht would effectively be an increase in an acquisition cost for a foreign investor. Strong currency risk management is needed by investors to safeguard their investments from fluctuations. World economic situation is another determinant of the direction of currency. Exchange rate fluctuations in Thailand could be caused by political instability, economic depression or the major financial crises in large economy such as the US or the EU. In addition, the USD/THB spot rate is sensitive to hasty exchange rate movements due to speculative trading volumes in the currency markets.

Evaluating how currency changes affect investment decisions is essential given the high amount of international interest in Thailand's real estate sector (CBRE, 2023). According to the IMF (2022) and the OECD (2022), Thailand's exposure to global monetary shifts and regional political developments increases the volatility of the Thai Baht, thereby influencing investor behavior. Recent insights from Deloitte (2023) and JLL (2022) underscore the necessity for robust risk management strategies to navigate these fluctuations.

This study aims to contribute to this discussion by presenting a comprehensive analysis of the strategies investors use to manage currency risk in the Thai real estate market.

Research Objectives

The objective of this study is to:

1. Identify the major currency-related risks affecting cross-border real estate investments in Thailand.
2. Analyze the strategies investors use to mitigate these risks, including hedging and diversification techniques.
3. Provide practical insights for investors and policymakers to enhance investment decision-making and risk management.

Literature Review

Exchange Rate Fluctuations and Investment Returns

Because changes in currency values can have a direct impact on the returns on foreign investments, exchange rate volatility is a significant factor in cross-border real estate investing. Changes in the value of the Thai Baht in relation to their home currency can either increase or decrease profits for investors buying real estate in Thailand. For example, the value of any returns when converted back to the investor's currency decreases if the Baht depreciates following the acquisition. On the other hand, when repatriating profits, a stronger Baht can increase returns (Malladi & Fabozzi, 2020).

Many investors use currency hedging techniques, like forward contracts or options, to control this risk. By enabling investors to lock in exchange rates, these financial products offer protection against possible losses due to adverse currency fluctuations. But hedging comes with extra expenses, which can lower total returns (Liow & Ye, 2020).

Furthermore, exchange rate volatility also affects the timing of investments. Investors might delay purchasing real estate in Thailand if the currency is expected to depreciate, or they may act quickly if a favorable exchange rate is anticipated. This adds another layer of complexity to investment decision-making, especially in volatile markets (Deloitte, 2020).

Financing and Interest Rates

Financing foreign real estate investments in developing markets presents unique challenges, particularly due to limited access to local financing and higher borrowing costs. In markets like Thailand, foreign investors often face restrictions on securing local loans, which can push them to seek financing from international lenders or private equity sources (Savills, 2020). These options, while accessible, typically come with higher costs and more stringent conditions.

Foreign investors find borrowing more expensive in developing markets because interest rates are typically higher there than in more developed ones. The overall profitability of real estate investments may be greatly impacted by this. Furthermore, currency fluctuations present additional risks because if the foreign investor's home currency depreciates, servicing local loans in the developing market's currency may become more costly (World Bank Group, 2021). Investors frequently use hedging techniques or choose foreign currency financing to reduce these risks, but both strategies have extra expenses.

The restricted availability of credit in developing markets as a result of less developed banking and financial systems presents another difficulty. Joint ventures with local businesses are popular among foreign investors because they give them access to local funding and assist them in overcoming regulatory obstacles (PwC, 2020). Such partnerships can mitigate some of the risks associated with foreign investment by leveraging local knowledge and networks.

Economic and Political Stability

Determining the degree of risk connected with international real estate investments depends much on political and economic stability. Strong and stable economies usually translate into more consistent returns on investment since they are less likely to cause abrupt changes in inflation, interest rates, or exchange rates. Economic stability points to a good investing environment in which market forces are rather predictable and investors may more precisely project returns. For foreign real estate investment, Thailand's strong macroeconomic foundations—including consistent GDP growth and reasonable inflation—have made it rather appealing (JLL (Jones Lang LaSalle), 2022).

Equally important is political stability. Foreign direct investment (FDI) is more likely to flow to nations with stable governments and open legal systems because investors are more assured that their property rights will be upheld and that policies will remain consistent. On the other hand, political instability adds a great deal of uncertainty and is characterized by frequent changes in government, civil unrest, or a weak rule of law. Real estate investments are especially vulnerable in such circumstances because of the increased chance of abrupt regulatory changes or even the expropriation of assets owned by foreigners (World Bank, 2023).

In this regard, Thailand offers an intriguing example. Even though the nation has previously seen political upheaval, such as military takeovers and changes in government, it has recently been able to preserve a comparatively stable investment environment. Investors should exercise caution, though, as political changes can still significantly affect the laws pertaining to taxation, foreign investment regulations, and property rights. Furthermore, economic risks like inflation, volatile exchange rates, or abrupt changes in fiscal policy may have a detrimental impact on investment returns (OECD, 2022).

Risk Management Strategies

To mitigate currency risk, investors use:

- Hedging Instruments: Forward contracts, currency swaps, and options (IPF Research Programme, 2018).
- Natural Hedging: Aligning revenues and expenses within the same currency (Corporate Finance Institute (CFI), 2023).
- Diversification: Investing across multiple markets to reduce dependence on a single currency (Aloosh & Bekaert, 2022).
- Multi-Currency Financing: Structuring debt across multiple currencies to hedge against unfavorable exchange rate movements.

Legal and Regulatory Considerations

International real estate investments are subject to complicated legal frameworks that differ greatly based on the target market. Understanding local and international laws that affect property ownership rights, taxes, and currency exchange is essential for investors wishing to participate in cross-border real estate projects in Thailand. Foreign ownership of real estate in Thailand is subject to stringent regulations. Generally speaking, non-Thais are not allowed to directly own land unless they work with a Thai company or are eligible for special exceptions under laws like the Investment Promotion Act (BOI), which gives particular kinds of investors strategic advantages (Luther Law Firm (Thailand) Co., Ltd., 2023).

Moreover, investors must consider international agreements like double taxation treaties (DTTs), which aim to prevent investors from being taxed on the same income in both their home country and Thailand. These treaties play a critical role in optimizing the tax structure of international real estate investments (Beservices Ltd., 2023). Additionally, investor protection is guaranteed through bilateral investment treaties (BITs), which protect against government expropriation and ensure fair access to markets (Konrad Legal Company Limited, 2023).

Anti-money laundering (AML) regulations also require increased transparency from international investors. In recent years, Thailand has implemented stricter regulations to monitor the origin of invested funds and to ensure that these funds do not originate from illegal activities (Mahanakorn Partners Group, 2023). Foreign investors must provide unambiguous proof that their funds are legitimate in order to comply with global anti-money laundering (AML) standards and guidelines. Before investing in Thailand's real estate market, investors must carefully review the complex web of national and international regulations that these frameworks create. In the absence of sound legal advice and appropriate due diligence, foreign investors may encounter legal obstacles and even financial losses in Thailand.

Global Trends in Real Estate Investment and Currency Exposure

In recent years, global real estate investment has seen significant shifts, with currency exposure becoming a central focus for cross-border investors. As the real estate sector becomes increasingly globalized, investors are exposed to a wider range of currency risks, influenced by geopolitical events, shifting economic policies, and fluctuating exchange rates. One notable trend is the rise of emerging markets as attractive destinations for real estate investments, driven by higher growth potential and

lower asset prices compared to mature markets. However, these investments often come with greater currency volatility, which investors must carefully manage (PwC & Urban Land Institute, 2023).

The growing use of real estate investment vehicles, such as global real estate funds and Real Estate Investment Trusts (REITs), which enable investors to diversify their currency exposure across several markets, is another significant trend. By distributing the risk of currency fluctuations, these tools have facilitated investors' access to foreign real estate. Because they provide exposure to income-producing real estate assets across multiple nations, REITs in particular have grown in popularity as a way to manage currency risk. This makes them a natural hedge against fluctuations in individual currencies (EY, 2023).

Technological advancements and data analytics are also playing a crucial role in helping investors navigate currency exposure. With access to real-time exchange rate data and sophisticated risk management tools, investors can now more accurately assess and hedge against currency risks. This is particularly important in markets where currency volatility is heightened by political instability or rapid economic change, such as Thailand and other Southeast Asian countries (Deloitte, 2023).

In addition to financial, legal, and regulatory factors, non-financial aspects such as market transparency and cultural differences also play a crucial role in shaping cross-border real estate investment decisions. High levels of transparency reduce information asymmetry, enabling investors to make better-informed decisions based on reliable market data and clear regulatory frameworks. Conversely, cultural differences can influence negotiation practices, risk perceptions, and partnership dynamics, potentially affecting transaction outcomes. Recognizing and managing these factors is essential for investors seeking to optimize their strategies in emerging markets like Thailand (PwC & Urban Land Institute, 2023).

Conceptual Framework

This study integrates multiple factors affecting cross-border real estate investments in Thailand:

- Operational Variables: Exchange rate fluctuations, financing conditions, and market transparency.
 - External Risk Factors: Regulatory challenges, economic stability, and political risks.
- Investment Management Strategies

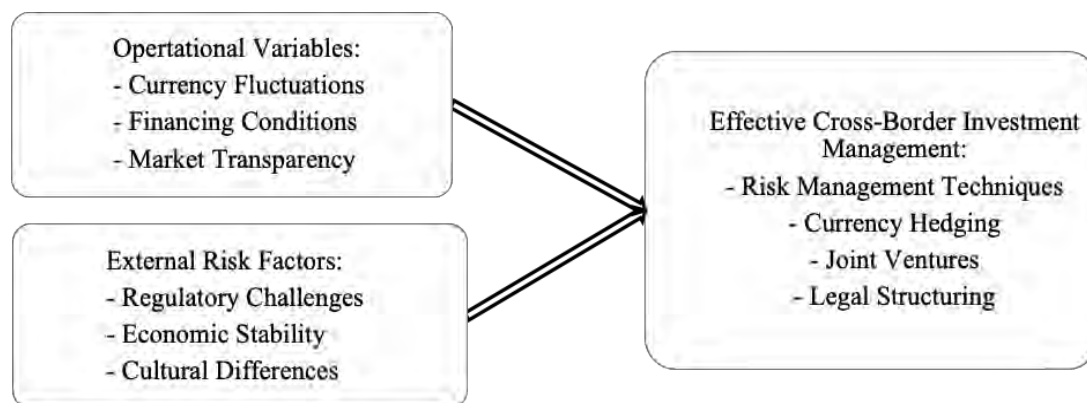


Figure 1: Conceptual Framework

Research Methodology

Research Design

Semi-structured interviews were conducted with finance professionals, lawyers and property professionals, as part of the qualitative research approach for this research. A detailed understanding of the effects of currency fluctuations on cross-border real estate investments and the risk sparing mechanisms used by investors is ensured by the qualitative study design. This method makes it possible to study in detail the reality, delivering fine-grained insights that overshadow purely quantitative models.

Data Collection

The final sample consisted of 15 professionals with direct experience in cross-border real estate investments in Thailand. Participants were selected based on their involvement in managing currency risks and their active roles in international property transactions. To present a comprehensive profile of the participants, the table below categorizes participants not only by their professional role but also by the type and size of their investments, as well as the organizational structure they represent. This categorization ensures that the analysis reflects the perspectives of a broad spectrum of industry stakeholders.

Table 1: Participant Demographics

Role	Frequency	Investment Type	Investment Size	Structure
Real Estate Investors	6	Residential (3), Commercial (2), Mixed-use (1)	Small (< USD 5 million) (2), Medium (USD 5–50 million) (3), Large (> USD 50 million) (1)	Private Individuals (4), Institutional Investors (2)
Financial Analysts	5	Not Applicable	Not Applicable	Financial Advisory Firms (5)
Legal Professionals	4	Not Applicable	Not Applicable	Law Firms specializing in FDI (4)
Total	15			

Data Analysis

All interview transcripts were carefully reviewed and analyzed using thematic analysis. This involved manually coding the data to identify recurring patterns, keywords, and concepts. Key themes such as risk management strategies, macroeconomic influences, investment timing, and legal considerations were systematically categorized. The coding process followed an iterative approach, where initial codes were refined into broader categories and sub-themes through multiple rounds of review. This ensured that the analysis remained data-driven and reflective of the participants' perspectives across different professional backgrounds. To enhance the trustworthiness of the findings, representative quotes from different participant groups were selected to illustrate each identified theme. This process provided a structured basis for interpreting how currency fluctuations impact cross-border real estate investments in Thailand.

Research Findings

Almost all the participants mentioned that currency fluctuation is an important element in taking any investment decision.

Table 2: Key Themes Identified from Interview Analysis

Theme	Description	Example Participant Quote
Currency Risk Awareness	Participants emphasized that currency fluctuations are a major factor in investment decision-making.	"We always monitor exchange rates before committing to any major investment." (Interviewee 3)
Risk Mitigation Strategies	Most participants use forward contracts, swaps, and diversification to manage currency risks	"We use forward contracts to lock in rates for large transactions." (Interviewee 7)

Theme	Description	Example Participant Quote
Political and Economic Factors	Political changes and macroeconomic policies were cited as key drivers of currency volatility.	"Political instability makes us delay or reconsider projects." (Interviewee 5)
Investment Timing Practices	Some participants adjust transaction timing based on favorable or unfavorable currency movements.	"We waited several months for the Baht to improve before closing the deal." (Interviewee 11)
Legal and Regulatory Concerns	Legal restrictions on ownership and capital repatriation were noted as investment challenges.	"Regulatory clarity is essential to minimize compliance risks." (Interviewee 2)

Changes of government or political uncertainty frequently resulted in projects being put on hold or the strategy being changed. Moving investments across regions was a strategy to mitigate exposure.

Macroeconomic conditions, such as inflation, interest rates and monetary policy also shaped affairs. These drivers, participants reported, frequently cause unexpected currency swings which compelled them to adapt their investments or hedges. Taken together, the interviews underscore the need for strategic risk management and the need to keep abreast of political and economic developments. This experience and expertise of the respondents are believed to make their opinions especially relevant for gaining the understanding of the currency-related problems in cross-border real estate. These findings align with Deloitte (2023) and JLL (2022), who also emphasize the growing need for structured risk management practices in volatile real estate markets.

Conclusion and Discussion

"Foreign exchange has a large bearing on the performance of investments in various ways and can determine when and how international investors are coming and leaving the market," the report said. Foreign buyers generally find it cheaper to buy property when the Thai Baht is falling. When their purchasing power increases and they may increase their demand for real estate. This benefit comes with a higher repatriation risk due the Baht continuing to weaken, resulting in less return from rental income and sales profits after being converted back in to the investor's home currency. On the other hand, a stronger Baht increases the upfront cost of buying a property, and may discourage some foreign buyers.

Alternately, for investors that choose to enter the market now, when they do repatriate their capital gains and rental income, long-term profit will be less affected by currency fluctuations while abroad, and more predictable at home. Investors who fail to account for currency exposure risk experiencing volatile and unpredictable returns and potentially steep financial losses, several interviews suggested. For instance, an international investor may perceive an opportunity to generate capital appreciation by acquiring assets at a time of Baht devaluation. But any such benefits from property appreciation or rental income would be wiped out if the value of repatriated earnings is substantially eroded by the currency's further slide. This serves to highlight the importance to actively manage currency risk, with measures such as diversification and hedging, in trying to preserve investment performance in cross-border markets where exchange rates can vary.

Risk Management Strategies Used by Investors

The results suggest that Investors, if they study future contracts and manage mean values, can reduce the risks associated with currency options transactions. Common approaches include:

Forward Contracts and Currency Swaps:

Many institutional investors use financial instruments that hedge their exposure by fixing the exchange rate for a particular transaction at some point in the future.

Natural Balancing:

For example, hotel operators with operations or income streams in Thailand often conduct their transactions in Thai Baht to minimize foreign exchange risk. Portfolio Diversification Strategy: Wealthy investors have invested in many markets by not being dependent on any particular currency or region.

Investment timing:

Some investors strategically adjust their market entry and exit timing – entering and leaving by estimating possible changes in exchange rates, benefiting from temporary exchange rate depreciation.

Role of Interest Rates and Economic Stability

Another important conclusion was the close connection between interest rates and capital inflows. Rates are low in Thailand, which generates an appealing lending environment for people to borrow and also provides a reason for more foreign participants to engage in the market. However, as in many emerging markets, future market conditions in Thailand remain uncertain; the risk with monetary policies is that a change in sentiment — in Thailand or the investors' home countries — can always change things. For instance an increase in interest rates in the US can generate capital outflows from an emerging market such as Thailand, resulting in Baht depreciation and market volatility. A number of the respondents pointed out that, investors that pay close attention on interest rate development can manage their financing costs in a more optimal manner and can also optimize their investment strategy based on that.

Legal and Regulatory Challenges

Several interviewees noted that legal and regulatory factors continue to be an obstacle for foreign investors. Though Thailand does offer several investment structures for foreigners, such as long-term leaseholds and so-called real estate investment trusts (REITs), doing so under the aegis of Thai property laws is a complicating factor. Already foreign ownership restrictions and tax laws have to be managed in order to not incur unexpected costs.

The results also indicate that better regulatory transparency would improve investor confidence. A more stable legal environment as well as regulations on the wind down periods for taking money out of the country, and foreign ownership of land and property in Thailand, would result in Thailand being an even more attractive place to do cross-border deals.

Limitations and future research possibilities

The risk can be managed in future with both financial preemption and market reaction. Up to date on their macroeconomic trends, a well diversified portfolio, and financial planning should work in combination with hedging instruments such as FX forward contracts and currency swaps. Moreover, given the far-reaching influence of these ingredients in determining exchange rate movements and larger market stability, investors must remain attuned to geo-political trends, the policies implemented by central banks, and world trade trends.

Moreover, Thailand's policymakers can also play a critical role in creating a more investor friendly environment by showing willing to enhance financial market transparency, widen access to hedging instruments and strengthening legal rights of the market players. Boosting availability of financial products, such as structured investment vehicles or currency risk insurance, aimed at cross-border investors could also may reduce exposure to exchange rate movements. In addition, fewer restrictions, simplified property purchase procedures and targeted tax incentives could attract even more foreign investment and further entrench Thailand's position as one of Southeast Asia's leading real estate investment destinations.

In the end, the results reinforce the fact that whilst currency movements pose inherent risk, they also offer the hope of reward to those who are prepared. Through sound strategic planning, informed decision making, and risk-management techniques, investors can better manage currency volatility and enhance returns, while also playing a vital role in a more resilient and dynamic real estate market.

Conclusion

The study's conclusions emphasize how important currency fluctuations are in influencing cross-border real estate investments. Investors must take proactive measures to lessen the impact of currency risk, which is an inevitable component of international real estate transactions. Investors must use risk management techniques including hedging, diversification, and multi-currency financing because exchange rate fluctuation affects purchase costs, investment returns, and profit repatriation.

Furthermore, investors should keep a close eye on macroeconomic variables including inflation rates, interest rate differentials, and central bank policies since these are important in determining currency stability.

Regulatory challenges remain a key concern, as foreign investors must navigate Thailand's legal restrictions on property ownership and complex taxation policies. While Thailand offers various investment structures to facilitate foreign ownership, further improvements in regulatory transparency and financial market accessibility could enhance its appeal as an investment destination. Policymakers should focus on expanding access to hedging instruments, streamlining property ownership regulations, and fostering international economic cooperation to promote currency stability and economic growth.

Looking ahead, future research should explore the long-term effects of sustained currency volatility on cross-border real estate investment trends, the role of digital currencies and blockchain in reducing transaction costs and mitigating currency risks, and the impact of geopolitical factors on capital flows into emerging real estate markets.

As global economic conditions continue to evolve, maintaining a robust and flexible investment strategy will be crucial for navigating currency fluctuations and optimizing returns in the Thai real estate market. By fostering a stable regulatory and financial environment, Thailand can further solidify its position as a leading destination for international real estate investors.

In summary, this study offers valuable practitioner-oriented insights by documenting how real estate investors, financial analysts, and legal professionals in Thailand manage currency risks in cross-border transactions. Unlike purely theoretical studies, this research provides empirical evidence based on expert interviews, highlighting real-world strategies such as forward contracts, portfolio diversification, and investment timing. These findings not only contribute to the academic discussion on currency risk management but also deliver practical recommendations for investors and policymakers seeking to strengthen Thailand's position as an attractive destination for international real estate investment.

Suggestions

Because currency movements are so important in determining investment returns, it is crucial to improve hedging tools to allow foreign investors to deal with their foreign exchange risk. Financial institutions, working with regulators, need to embrace and make available tailored foreign currency risk management solutions such as forwards, swaps and options. There needs to be practical and accessible risk management solutions for these tools that are accessible, not just easy to use and effective. It is also strongly recommended that targeted investor education program and advisory services be developed, especially for investors who are not so familiar with the regional financial market. Facilities to offer systematic, clear support, in this way enabling foreign investors, through more hedging strategy would justify investments that would instill the confidence of these investors towards the Thai market.

The other high priority is that of conferring clarity in terms of regulations and transparency on financial markets. Legal advisors and investors are until now still plagued by lack of clarity around local rules (with issues such as foreign condominium ownership, offshore remittance of capital and tax remaining). This problem must be tackled, and Thailand's regulators need to adopt clear, durable foreign-investment laws that are available to the world in multiple languages. In addition, simplifying the procedure of administration and eliminating numerous unnecessary bureaucratic entry barriers to a great extent would remove the perceived legal and compliance risks when doing business in Thailand. Transparent and consistent regulatory environments are essential for creating an environment of trust among investors and for ensuring continued foreign flows of capital.

The stability of macroeconomics is an important factor in creating a secure investment atmosphere. Several participants also stressed the protection of macroeconomic stability, notably against inflation, interest, and exchange rates volatility. Given these considerations, what policymakers need to focus on is creating a transparent, consistent and credible monetary policy. Better communication policies by the central bank and greater access to high-quality and timely macroeconomic data would permit investors to be less irrational and to take uncompensated investment risks. A predictable macroeconomic policy space would not only reduce uncertainty, but also enhance Thailand's investment environment in general perspectives of foreign observers.

The last support is the promotion of multi-currency funding channels as a practical way to hedge against foreign exchange risks. Foreign investors would then have the possibility to match their financing vehicles to the currency in which they earn the revenue streams or maintain investment holdings by having more credit products denominated in major hard currencies, such as the US dollar and the Euro. Investors would also enjoy more financial certainty and less exchange rate exposure by lessening single-currency exposure. In this sense, the Thai banking sector and financial system in general should proactively promote the development of multi-currency credit facilities as part of a wider strategic framework, aiming to establish a more robust, attractive and internationally competitive financial market.

As a whole, the implementation of these measures would strengthen Thailand's competitiveness in attracting and retaining foreign investment and also build investor confidence in the country's economy and its status as a top player on the world's investment stage.

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Factors Affecting Generation Z's Intention to Use Generative Artificial Intelligence Technology in Thailand: The Role of Perceived Usefulness, Perceived Ease of Use, Facilitating Conditions, and Social Influence

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Abstract

This research aims to investigate the effects of perceived usefulness, perceived ease of use, facilitating conditions, and social influence on Generation Z's intention to use generative artificial intelligence technology in Thailand. This research was quantitative research. The sample was 14–29 year-old Generation Z who have stayed in Thailand and have generative artificial intelligence technology experiences. The 384 samples were selected through purposive sampling and convenience sampling processes. Data were collected via online questionnaires and analyzed by descriptive statistics: percentage, mean, and standard deviation. The hypotheses were tested through inference statistics that were analyzed by multiple regression analysis with the enter method. The research findings revealed that the majority of respondents were male, aged between 20 and 24 years, held a bachelor's degree, and were employed in private sector employee with a monthly income between 15,000 and 25,000 Baht. Their behavior regarding the use of generative artificial intelligence technologies indicated usage of approximately two to three times per week, primarily for work-related purposes such as data finding, education/learning, and research, as well as for personal purposes, particularly entertainment. The most popular platform among respondents was ChatGPT. The respondents reported a high level of agreement regarding perceived usefulness, perceived ease of use, facilitating conditions, social influence, and behavioral intention to use generative artificial intelligence technologies. Hypothesis testing results demonstrated that perceived usefulness, perceived ease of use, social influence, and facilitating conditions had a positive effect on behavioral intention to use generative artificial intelligence technologies. Together, these four factors could predict 59% of the variance in behavioral intention.

Keywords: Generative Artificial Intelligence, Technology Acceptance, Generation Z

Introduction

Examples of Generative Artificial Intelligence: Generative AI or Gen AI enerate new outputs and get creative thinking that may be outside the box of human imagination. Generative AI is the system for creating the new output, such as text, images, sound, and video. Furthermore, it helps the human to intelligently answer and correctly interpret the information through learning from the database. These abilities show the difference from older generative AI that focused on analysis or prediction (Feuerriegel, Hartmann, Janiesch, & Zschech, 2024; Fui-Hoon, Zheng, Cai, Siau, & Chen, 2023). BBDO Bangkok Research (2024) said that the reasons 73.84% of Thai people used AI were to increase convenience, save time, and increase work efficiency; especially, AI was mostly used to do the work by Generation Z. While business sectors have used AI to create content, graphics, and

customer' analysis. In addition, technology enterprises have applied AI for developing software (Brynjolfsson et al., 2023). It is evident that generative AI is increasingly popularized due to its ability to reduce both time and cost and increase work efficiency. At the same time, it also offers new opportunities for developing the innovations.

However, generative artificial intelligence indicates the challenges of people who decide to accept technology and intend to use it. Both acceptance and intention to use generative AI may be the key factors leading to actual systems use, but they must be influenced by other factors. The literature reviews indicated the foundational Technology Acceptance Model (TAM) proposed by Davis (1989) identifies two critical determinants of technology adoption: perceived usefulness and perceived ease of use. Subsequent empirical studies have validated these factors in the context of generative AI adoption (Ayuningtyas et al., 2024; Kavitha & Joshith, 2025; Duy et al., 2024). Building on this framework, Venkatesh, Morris, Davis, & Davis (2003) developed the Unified Theory of Acceptance and Use of Technology (UTAUT), which expands the understanding of technology adoption by incorporating additional influential factors. Noticeably, research has demonstrated that both system facilitation and social influence significantly enhance users' intention to adopt generative AI technologies (Hail et al., 2024; Papathomas, Konteos, & Avlogiaris, 2025). However, there are differences in acceptance of technology in each user group, especially Generation Z, the first group in the era of digital, who are called "digital natives." The digital native is defined as people who were born with advanced technology and focus on smartphones and social media. Since they were born in an environment of facilities technology where it is easy to search for information. This environment affects Generation Z, which is open-minded and ready to adapt to the new technology and easily accepts technology (Thongchoojai, 2020; Turner, 2015; Priporas et al., 2017). Moreover, the research, which integrated TAM theory with UTAUT theory, showed the effect of intention to use generative AI of Generation Z in Thailand is still limited.

Additionally, the topic of Generation Z's intention to use generative AI is continuously interesting and increasingly studied. So this research was based on integrating the technology acceptance model (TAM) by adding the unified theory of acceptance and use of technology (UTAUT) conceptual framework to understand the affecting factors on acceptance of generative AI technology. The findings of this research may explain the involved parties understand in acceptance technology behavior of Generation Z for developing specific products and services that support suitable marketing and communication strategies with the target group, additionally, reachable and attractive for increasing intention to use generative AI technology.

Research Objectives

This research aims to investigate the effects of perceived usefulness, perceived ease of use, facilitating conditions, and social influence on Generation Z's intention to use generative artificial intelligence technology in Thailand.

Literature Review

Davis (1989) first proposed the Technology Acceptance Model (TAM). The TAM has been used to evaluate how many aspects affect users' adoption of technology, with a particular emphasis on two important constructs: Perceived Usefulness (PU) refers to the degree to which users believe that using a technology will help them work better or more efficiently, and Perceived Ease of Use (PEOU) refers to the degree to which users believe that using a technology will not be difficult or require much effort. These constructs' characterisation is based on factors that explain users' propensity to embrace or reject new technologies. These two factors influence behavioral intentions, refers to the level of intention or determination of the user to use any technology or information system in the future. It is believed that if the user has high intention to use, there is a tendency to have more actual usage behavior. This is consistent with the research of Ayuningtyas et al. (2024) and Kavitha, & Joshith (2025) found that perceived usefulness of use had a positive effect on intention to use AI technology, Papathomas et al. (2025) and Duy et al. (2024) found that perceived ease of use had a positive effect

on intention to use AI technology services; if the technology was easy to understand, users were more likely to intend to use it.

The Unified Theory of Acceptance and Use of Technology (UTAUT) is a model developed by Venkatesh et al. (2003) to explain and predict individuals' technology acceptance and use behavior in various contexts. UTAUT integrates concepts and variables from the Technology Acceptance Model (TAM) with the aim of creating a model that is more effective in explaining user behavior. Venkatesh et al. (2003) studied the independent variables that affect technology use intention, including Facilitating Conditions (FC), which refer to the infrastructure and support that facilitate the use of technology. The availability of infrastructure, resources, knowledge, skills, and facilities in a system will affect the behavioral intention to use technology (Papathomas et al., 2025). In addition, a study was conducted on the factors of Social Influence (SI), which refers to the influence of people around them on the decision to use technology. Social influence variables are especially important for Gen Z who are often influenced by friends and online society. This is consistent with the research of Hail et al. (2024), who found that recommendations from friends affect Gen Z's behavior in using artificial intelligence technology to support learning more.

Research Hypothesis

Hypothesis 1: Perceived usefulness has a positive affected on the intention to use generative AI technologies.

Hypothesis 2: Perceived ease of use has a positive affected on the intention to use generative AI technologies.

Hypothesis 3: Facilitating conditions have a positive affected on the intention to use generative AI technologies.

Hypothesis 4: Social influence has a positive affected on the intention to use generative AI technologies.

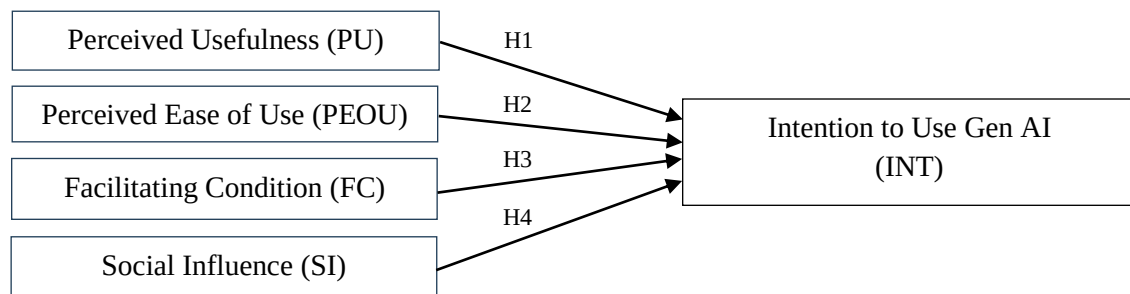


Figure 1: Conceptual Framework

Research Methodology

This research is quantitative research. The data was collected by the online questionnaires that applied Likert's rating scale of 5 levels (Likert, 1960: Strongly Agree, Agree, Neutral, Disagree, and Strongly Disagree). The interpretation of mean scores was based on these levels of agreement. The reliability test results of questionnaires indicated that the overall Cronbach's Alpha coefficient (α) was 0.92, while the coefficients for each subscale ranged from 0.80 to 0.89. All values exceeded the acceptable threshold of 0.70 (Hair et al., 2014). The questionnaire was divided into three sections as follows:

Section 1: The questionnaires collected the respondents' general information: gender, age, educational level, monthly income, occupations, usage behavior, and preferred generative AI technologies. Especially, the questions for the survey were checklist.

Section 2: The questionnaires were collected from the respondents that focused on 9 items of perceived usefulness and perceived ease of use (Davis, 1989; Papathomas et al., 2025), and additionally,

8 items of facilitating conditions and social influence (Venkatesh et al., 2003; Strzelecki, 2024). This section was a rating scale format for all items.

Section 3: The questionnaires consisted of 5 items that focused on behavioral intention to use (Davis, 1989; Strzelecki, 2024). The questions in this section were in a rating scale format.

Data Analysis

The researcher collected data for 5 months: October 2024 to February 2025. The questionnaire was distributed via Google Forms and sent directly to the social media platform, such as Facebook Group, or Line Group of people who are using generative AI for various purposes. To ensure that qualified respondents participated in this study, a filtering question was added at the beginning of the questionnaire: “Are you a Thai national aged between 14 and 29 years?”, and “Do you have experience or interest in using generative AI technology through a website or application? ”. The questionnaires were returned with complete responses. The questionnaires verified the completeness of the returned questionnaires, and data analysis was conducted. The population used in this study consisted of Generation Z aged between 14 and 29 years (Creative Economy Agency, 2024) and had experiences with the intention to use generative AI who have stayed in Thailand. As the exact population size was unknown, it was necessary to determine an appropriate sample size to ensure that the sample adequately represented the target population. The researcher applied the Cochran (1953) sample size calculator, with a confidence level set at 95%, resulting in a required sample of 384 participants. These 384 participants were selected through purposive sampling combined with convenience sampling. The statistical method of this research included frequency, percentage, mean, standard deviation, Pearson’s correlation coefficient, and multiple regression analysis with enter method.

Research Findings

Demographic data

The majority of the sample group were male, aged between 20-24 years, with bachelor’s degree in education levels, working as employees in private companies, and earning a monthly salary between 15,000 and 25,000 Baht. They contributed the Generative AI technology usage behaviors 2-3 times/week, primarily for work-related activities such as data finding, education/learning, research, as well as for personal entertainment. The most popular platform was ChatGPT, as shown in Table 1.

Table 1: Demographic data

Characteristic	Category	Frequency	Percentage (%)
Gender	Male	200	52.08
	Female	184	47.92
Age	14-19 years	126	32.81
	20-24 years	190	49.48
	25-29 years	68	17.71
Academic title	Secondary school	115	29.95
	Undergraduate	244	63.54
	Graduate level or above	25	6.51
Income (Baht/month)	<15,000	120	31.25
	Between 15,000 and 25,000	218	56.77
	>25,000	46	11.98
Occupation	Student	115	29.95
	Private sector employee	202	52.60
	Freelance	50	13.02
	Other	17	4.43

Characteristic	Category	Frequency	Percentage (%)
How frequently do you use Gen AI?	Every Day	39	10.16
	Less than once/week	155	40.36
	2–3 times/week	190	49.48
Objective of Use Gen AI (multiple choices allowed)	Data finding	187	30.71
	Education/learning	165	27.09
	Research	120	19.70
	Personal entertainment	112	18.39
	Other (e.g., coding, gaming)	25	4.11
Type of Gen AI Used (multiple choices allowed)	ChatGPT	192	28.36
	Gemini	86	12.70
	Copilot	84	12.41
	MidJourney	65	9.60
	DALL-E	50	7.39
	Bing	55	8.12
	SUNO	40	5.91
	ChatPDF	60	8.86
	All of above	30	4.43
	Other (e.g., DeepSeek, Claude)	15	2.22

The analysis of the opinion levels regarding the perceived usefulness, perceived ease of use, facilitating conditions, social influence, and intention to use generative AI technology revealed an overall had opinion at high level ($\bar{x}$ = 4.05, S.D. = 0.80). When considering each aspect, it was found that perceived usefulness had the highest average opinion level ($\bar{x}$ = 4.28, S.D. = 0.71), followed by intention to use ($\bar{x}$ = 4.18, S.D. = 0.76), perceived ease of use ($\bar{x}$ = 4.16, S.D. = 0.77), social influence ($\bar{x}$ = 3.93, S.D. = 0.86), and facilitating conditions ($\bar{x}$ = 3.93, S.D. = 0.86) respectively.

The analysis of the correlation between the factors of perceived usefulness, perceived ease of use, facilitating conditions, and social influence affecting the intention to use generative AI technology found that all independent variables had a statistically significant positive correlation at the 0.01 level, as shown in Table 2.

Table 2: Correlation between Independent Variables Affecting the Intention to Use Generative AI Technology

Variable	PU	PEOU	FC	SI	VIF	Tolerance
Perceived Usefulness (PU)	1.00				1.37	0.82
Perceived Ease of Use (PEOU)	0.68**	1.00			1.30	0.77
Facilitating Condition (FC)	0.62**	0.59**	1.00		1.42	0.78
Social Influence (SI)	0.57**	0.53**	0.48**	1.00	1.18	0.85

** Significant at $p < 0.01$

From Table 2, all variables did not present a multicollinearity issue, with VIF values ranging from 1.18 – 1.42, which was less than 10, and Tolerance values ranging from 0.77 - 0.85, which were greater than 0.10 (Hair, Black, & Anderson, 2010). This indicated that all independent variables were independent of each other and could be analyzed against the intention to use generative AI technology, by using multiple regression analysis with enter method.

Table 3: Results of the Multiple Regression Analysis of Independent Variables Affecting the Intention to Use Generative AI Technology

Variable	β	Std.Error	Beta	t	p-value	Decision
Constant	1.18	0.19		6.21	0.00**	
Perceived Usefulness (PU)	0.39	0.07	0.35	5.57	0.00**	Supported
Perceived Ease of Use (PEOU)	0.24	0.06	0.21	4.00	0.00**	Supported
Facilitating Condition (FC)	0.12	0.05	0.10	2.40	0.01*	Supported
Social Influence (SI)	0.14	0.05	0.12	2.80	0.03*	Supported

n=384, R=0.77, R²= 0.60, Adj. R²=0.59, S.E._{est}=0.40, F=72.45,
p-value= 0.000, Durbin Watson = 1.92
**Significant at p<0.01 * Significant at p<0.05

From Table 3, the results of simultaneous multiple regression analysis conducted to test the research hypotheses revealed that perceived usefulness, perceived ease of use, facilitating conditions, and social influence had statistically significant positive affected ($p < 0.01$) on the behavioral intention to use generative AI technology, thereby supporting Hypotheses 1, 2, 3, and 4. Collectively, these four independent variables accounted for 59% of the variance (Adj. R² = 0.59) in the intention to adopt the technology. where all coefficients (β) were significant at the 0.01 level. The predictive regression equation can be expressed as:

$$\widehat{INT} = 0.18 + 0.39 (PU) + 0.24 (PEOU) + 0.14 (SI) + 0.12 (FC); \text{Adj. } R^2 = 0.59$$

Conclusion and Discussion

The purpose of this research was to investigate the effects of perceived usefulness, perceived ease of use, facilitating conditions, and social influence on Generation Z's intention to use generative artificial intelligence technology in Thailand. The findings revealed that perceived usefulness, perceived ease of use, social influence, and facilitating conditions significantly affect the intention to utilize generative AI technology. The model accounts for 59.00% of the variance in the intention to use, which can be discussed as follows:

Perceived usefulness positively affected the intention to use generative AI technology among Generation Z in Thailand. Perceived usefulness was the primary factor contributing positively to the intention to use. This is similar with the Technology Acceptance Model (TAM) proposed by Davis (1989), regarding the strong association between perceived usefulness and intention to use in the acceptance of emerging technologies. The perceived usefulness is a key factor in technology acceptance. Consistent with our study results that Generation Z in Thailand grew up with digital technology. Their technology use behavior is not primarily for experimentation or entertainment, but rather as a tool to efficiently complete tasks. Generative AI technology is therefore viewed as “usefulness” rather than “ease” because they are already familiar with the technology (Digital Natives). Therefore, they are not concerned about the difficulty of use, especially in a highly competitive educational environment with time and resource constraints. Technologies like ChatGPT are therefore viewed as tools to expand the potential for data finding, learning, research, and entertainment, rather than being new innovations used solely out of curiosity. Similar with Ayuningtyas et al. (2024), Generation Z values tangible benefits such as time savings, productivity, and decision-making support. Likewise, Kavitha & Joshith (2025) and Papathomas et al. (2025) found that perceived usefulness significantly influences AI adoption, as its practical advantages encourage more frequent and efficient use. These findings align with the results of other studies on the adoption of technology-based payment methods (Andhini, & Muat, 2025; Ullah, Kiani, Raza, & Mustafa, 2022). Generation Z perceived that utilizing digital payment tools, such as e-wallets, facilitated their task and enhanced their efficiency in conducting payment transactions. However, in the context of the adoption of AI applications in accounting, the connection between perceived usefulness and intention to use was not significant (Krishnanr, & Ismail, 2025). Although students were aware of the potential of AI, they did not perceive that the application of AI in accounting would fully meet their needs.

Perceived ease of use also positively affected the behavioral intention to use generative AI technology among Generation Z in Thailand. It plays the second most important role since generative AI technology. This supports the TAM concept by Davis (1989), that technology should be easy to learn and understand. Our study found that Generation Z expects technology to be easy to use immediately, convenient and straightforward, with a user-friendly interface, especially platforms like ChatGPT with a simple UI (Papathomas et al., 2025). Consistent with the work of Duy et al. (2024), they found that AI technologies presented in easily understandable formats and accessible in various ways foster positive user experiences, thus increasing the intention to use them. A deeper examination shows these results clearly reflect Generation Z's characteristics as digital natives. Having grown up immersed in digital technology, they demonstrate remarkable adaptability to new platforms (Turner, 2015). The high score of perceived ease of use, coupled with its relatively weaker influence suggests that for Generation Z in Thailand, ease of use is no longer a concern but rather an expected baseline feature of any technological product. Cross-cultural comparisons yield several noteworthy observations. In Western nations like the United States where Generation Z shares similar digital native characteristics, Ghimire, & Edward (2024) study on generative AI adoption found identical patterns - Perceived ease of use playing second fiddle to perceived usefulness, aligning perfectly with our findings. However, in developing nations with less robust digital ecosystems like Vietnam, Duy et al. (2024) discovered perceived ease of use remains a primary concern due to users grappling with technological complexity and infrastructure limitations. This contrast suggests, perceived ease of use's role in technology adoption may depend on each country's digital readiness level.

Social influence had positively affected on the intention to use generative AI technology among Generation Z in Thailand. It plays a significant role, albeit less than perceived usefulness and perceived ease of use, but remains statistically significant. This corresponds to the Unified Theory of Acceptance and Use of Technology (UTAUT) by Venkatesh et al. (2003), which asserts that individual perceptions and beliefs reflect their technology usage behaviors. Generation Z, as a new generation, tends to trust individuals around them, following familial and peer influences (Choksawat et al., 2024). The recommendations from friends, celebrities, or influencers they follow could accelerate their willingness to try generative AI technology, particularly when such technologies gain popularity. Hail et al. (2024) echoed that peer recommendations influence Generation Z's behaviors in using AI technologies for enhanced learning. This is consistent with past studies found that social influence affected the usage of ChatGPT among Generation Z (Bilos & Budimir, 2024; Strzelecki, 2024). And consistent with the study findings, which are clearly reflected in the student group, especially when the purpose of use related to learning and personal entertainment is high in this group, reflecting the role of friends, study groups, and social platforms in driving collaborative learning through the use of generative AI. According to previous research, social influence plays a significant role in behavioral intention in a variety of technological contexts, including mobile devices (Hoi, 2020), mobile learning (Ameri, Khajouei, Ameri, & Jahani, 2020), and Google Classroom acceptance (Kumar & Bervell, 2019). However, other studies, like Baig & Yadegaridehkordi (2025), did not find the same level of significance in the area of intention to use generative AI in Pakistani higher education. The adoption of generative AI is still in its infancy in developing countries like Pakistan, where access to technology and digital literacy are limited. As a result, social influence has less of an impact on generative AI adoption.

Facilitating conditions had also positively affected the intention to use generative AI technology among Generation Z in Thailand. This factor, although the least influential, still holds statistical significance. This finding is derived from the sample group being Generation Z, often referred to as Digital Natives, who are proficient in using technology even with limited resources. When they recognize that generative AI technology effectively aids in information retrieval for learning and work, and if they receive support from administrators and organizations, this bolsters the acceptance of technology. This corresponds to the Unified Theory of Acceptance and Use of Technology (UTAUT) by Venkatesh et al. (2003), suggesting that existing technological infrastructure supports system usage. Consistent with our study found that Generation Z in Thailand tends to use ChatGPT for data finding and learning, while private sector employees tend to use it more for research, in-depth analysis, or to enhance work efficiency, especially the high-income group who show their acceptance and proactive use of various types of generative AI tools, such as Gemini, Copilot, MidJourney, ChatPDF etc., which have specific characteristics and require a certain level of

technology skills. The fact that high-income and freelance users have more access to a variety of technologies may indicate that factors such as resources, training, and familiarity with technology are factors that stimulate confidence and more continuous use behavior. This is consistent with past studies that found the state of facilitating conditions affects Generation Z students' behaviors and leads to the use of applications and AI technologies. Establishing adequate facilitating conditions and infrastructure will likely encourage Generation Z to positively engage with these technologies in their studies (Hail et al. 2024; Papathomas et al., 2025). Adequate infrastructure, resources, knowledge, skills, and facilitating conditions will help bridge intentions and the successful actualization of technology usage. However, other studies, like, Strzelecki (2024), found that the facilitating conditions had no significant impact on behavioral intention to use ChatGPT in higher education. Because students perceived the ChatGPT interface as user-friendly and available in multiple languages, they only needed instructions on how to use it, and no additional resources or equipment were required to use ChatGPT. Similarly, Ameri et al. (2020) study of mobile learning acceptance also found that facilitating conditions have no effect on behavioral intention.

The research finding investigated significant roles of perceived usefulness, perceived ease of use, social influence, and facilitating conditions, that influence the intention to use generative AI among Generation Z in Thailand, respectively. Based on the coefficient values, the researcher can interpret in depth that perceived usefulness yielded the highest coefficient among the studied variables. This finding accords with the Technology Acceptance Model (TAM) (Davis, 1989), which focuses on perceived usefulness as the primary predictor of technology acceptance. Especially for Generation Z in Thailand, Generative AI is used as the tool for finding data, heightening work efficiency, reducing task completion time, supporting education and learning, including research activities, and serving personal entertainment. Meanwhile, Generation Z are the digital natives; they tend to search for technologies that support practice rather than mere novelty. Thus, it is unsurprising that perceived usefulness emerged as the most influential factor compared to other variables. Another item, Perceived ease of use is ranked second in terms of influence, but its coefficient was lower than perceived usefulness, indicating that Generation Z views the new technology's ease of use as a "basic requirement", such as the interface of ChatGPT is easy and quick to learn. So perceived ease of use is not the key factor in the first rank. Generation Z has been familiar with new technology from a young age; they are able to adapt to new tools without relying on external resources. Social influence showed a relatively low coefficient, though still statistically significant. Among students, Social influence affects those who intend to use generative AI. They use generative AI the same as their friends or instructors' recommendations. In contrast, employees and freelancers were more likely to use generative AI out of necessity for their professional work. Finally, Facilitating conditions had the least influence among the variables. Nevertheless, Generation Z in Thailand can access generative AI via smartphones and the internet, despite limited income. Most platforms, such as ChatGPT, offer free versions that are immediately usable without institutional support. However, Facilitating conditions may be more important for other populations, such as people who live in remote areas with limited access to high-speed internet or other generation groups that are not covered in this study. Therefore, the use of generative AI by Generation Z in Thailand is not only a matter of leveraging technological tools for education and work but also reflects the broader digital divide that could affect equitable access to innovation in the future. This presents a significant challenge for governments, the education sector, and private enterprises in designing policies and platforms that ensure inclusive and sustainable access to generative AI for all segments of society.

Theoretical Implications

This study provides a significant theoretical contribution to the literature. Previously TAM was frequently used to measure technology adoption. In adoption and acceptance contexts, TAM holds significant importance as a theoretical framework for understanding and predicting users' behaviors toward new technologies. TAM posits that users' intention to use technology is determined by two primary factors: "Perceived Usefulness (PU)" and "Perceived Ease of Use (PEOU)." Meanwhile, the Unified Theory of Acceptance and Use of Technology (UTAUT) provides a more comprehensive model that includes other factors such as "Social Influence" and "Facilitating Conditions". These constructs offer more comprehensive

use intentions to adopt generative AI in the future. The research findings focus on the significant roles of perceived usefulness, perceived ease of use, social influence, and facilitating conditions which positively influence the intention to use generative AI among Generation Z in Thailand. This highlights the importance of continuously developing and enhancing generative AI technologies to increase their acceptance and promote more widespread use across various user groups.

Practical Implications

1. For Governments

1. Governments should prioritize digital literacy policies that extend beyond basic usage to include critical AI literacy, ensuring that citizens, especially young people, understand how generative AI tools function, how to evaluate their outputs, and how to apply them responsibly in academic, creative, or professional contexts. These programs should be integrated into formal education systems and offered through public training channels, particularly for underserved communities. Governments may consider subsidizing or providing institutional licenses for high-potential generative AI tools in public schools, universities, and vocational training centers. Given that income levels can influence access to technology, public investment in AI infrastructure is essential to prevent a widening digital divide, particularly in resource-constrained regions.

2. For Entrepreneurs or Developers of Generative AI Technologies

2. The prominence of perceived usefulness and ease of use emphasizes the necessity for generative AI developers to prioritize the creation of systems that are both functional and user-friendly, including features that support academic productivity, such as AI tutors, automated translation, and research-writing assistance. This involves focusing on intuitive design, rapid task execution, and seamless integration with users' daily tools and platforms, whether for academic, creative, or professional purposes. Incorporating adaptive features and personalization may enhance engagement and perceived relevance over time. In addition, providing clear onboarding tutorials and low-friction experiences for first-time users may help reduce technological entry barriers, particularly for non-tech-savvy Generation Z users.

3. For Marketers

3. Marketers should create campaigns that emphasize the benefits of using generative AI such as time-saving, accuracy, and support for decision-making to Generation Z. Emphasize this with messages that demonstrate individual empowerment and personal productivity. Because Generation Z users are less influenced by peers but more by personal experience, freemium models, interactive demos, and task-based trial campaigns can effectively demonstrate value and drive adoption. Furthermore, segmentation based on occupation and income levels can support personalized marketing. For example, working professionals may respond better to campaigns focused on work efficiency, while students may prefer content related to learning and content creation.

4. For Educational Administrators

4. The study findings indicate that facilitating conditions have the least significant affecting on the intention to use generative AI technologies. However, Generation Z still exhibits a tendency to adopt this technology for learning purposes, given their tech-savviness and ease of adapting to new innovations. Nevertheless, educational administrators should encourage the integration of generative AI technologies in academic systems by designing innovative generative AI applications, incorporating such content into curriculum, including building ethical thinking and AI literacy for learners to be able to understand, use, and work with AI technology critically and effectively, providing supportive environments, infrastructure, and resources, promoting the use of AI to enhance learning experiences and preparing students for the digital future and improving their readiness for the workforce. This also presents an opportunity to promote equity in access, especially for students from lower-income backgrounds, by providing institutional subscriptions or access to premium AI tools.

5. For Consumer

5. Because the intention to use generative AI of Generation Z users are more influenced by the perceived usefulness of a functionality than their contemporaries, they should experiment with generative AI tools with the specific purpose of using generative AI to promote academic success, job growth, or the production of new creative ideas. Knowing the perceived benefits directly promotes

continuing use, which means that users will gain the most from experimenting with features, modifying workflows, and evaluating the results for themselves.

Suggestions

This research focused solely on Generation Z and examined only four factors influencing their intention to adopt generative AI technologies: perceived usefulness, perceived ease of use, social influence, and facilitating conditions. Future studies could expand by investigating other generations (e.g., Millennials, Gen Alpha) and incorporating additional factors, such as perceived enjoyment, trust in AI, and ethical concerns, such as ethical issues in the use of AI by young people, transparency, fairness, and accountability. This approach not only improves the credibility and acceptance of generative AI among users but also establishes a framework for guiding future research and development responsibly and ethically. These variables may collectively explain a higher variance in the adoption intention of generative AI technologies.

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Exploring the Influence Factors of E-commerce Live Streaming on Consumer Purchase Intention

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Abstract

In recent years, more and more people have chosen their favorite products and services in e-commerce live streaming, and this trend is intensifying, especially in China. From the perspective of the three attributes of e-commerce live streaming: live streamer, product, and the field (live streaming platform), the study employs the SOR (Stimulus-Organism-Response) theory and the theory of planned behavior (TPB) as the basis of theory, a model of factors influencing consumers' purchase intention in live streaming marketing was constructed, and empirical analysis was conducted to study the mechanism of the influence of the three elements on consumers' purchase intention. The results suggest that the attributes of live-streaming marketing significantly influence consumers' purchase intention and increase trust and impulsiveness, and trust and impulsiveness also impact purchase intention. Live streaming platforms, streamers, and product in e-commerce live streaming marketing, the relationship between these attributes and purchase intention, scholars lack a holistic authority evidence and a complete theoretical system. The research provides a theoretical foundation and a reference for live-streaming platforms and merchants to effectively employ live-streaming to influence consumers' purchase intention, enhance market sales and promote the prosperity of the live streaming economy in China.

Keywords: E-commerce live Streaming, SOR, Trust, Impulsiveness, Purchase Intention

Introduction

With the continuous evolution of network technology, "live streaming with goods" has emerged as a new marketing model and a key growth driver for the e-commerce industry. The current situation of the live streaming industry in China has seen further development, such as the integration of physical stores and live streaming (Qi Ling, 2023). Physical stores achieve sales conversion through live streaming, forming an "online + offline" interactive model, which promotes the coordinated development of e-commerce and physical business (Center, 2023).

Significant progress has also been made in technological innovation. Technologies like 5G, AI, and VR/AR have enhanced the interactive experience, such as virtual try-on and digital human live streaming, increasing the immersion of consumption scenarios (Lee, 2024).

In addition, live streaming e-commerce has combined with fields like tourism and agriculture, opening up new sales scenarios such as agricultural assistance live streaming and cultural tourism live streaming (Wang & Li, 2022). In China, the percentage of total retail transactions that included e-commerce increased by 1.6 times yearly. Nearly 25% of all international commerce will be online by 2025 (Fokina, 2024). Live streaming is an exceptional method for accomplishing this, particularly for younger individuals. Consumers are also more inclined to pursue products or services recommended or supported by live streamers when making purchases (Huang & Copeland, 2020).

Research on consumer psychology and behavior in live streaming shopping has become a prominent topic in academic circles worldwide, not just in China. Previous study is structured around several core objectives through psychology, marketing, and information systems, to explore and analyze the influencing factors that drive consumer engagement and buying intention in the context of

e-commerce live streaming and to explore the implications of these factors for the future of online retail and e-commerce (Zhu et al., 2023). With minimal information loss and strong relevance, live streaming effectively reduces consumers' perception of uncertainty (Xu & Ye, 2020).

The development of e-commerce live streaming has accelerated the digital transformation of physical businesses, but there are also various problems in its development process. As more and more merchants and live streamers enter this field, the competition has become increasingly fierce (Wang et al., 2024). This leads to the market gradually approaching saturation, and the growth rate of transaction scale will naturally be affected to a certain extent (Tao et al., 2024). Therefore, it is highly urgent to study which factors in e-commerce live streaming can influence consumers' purchase intention and enhance user stickiness. Live streaming platforms, streamers, and product, these attributes of live streaming marketing, scholars lack a holistic authority structure and integral system, from which to build a more holistic understanding and strategy in live streaming marketing.

The findings will reveal how to improve and develop consumers' intention to purchase in live-streaming platforms. It will benefit the long-term development of academic researchers, enterprises, and live streaming platforms.

Research Objectives

The specific research objectives in the study are as follows:

- 1) To explore whether the e-commerce live streaming will affect consumers' purchase intention.
- 2) To investigate what factors would affect consumers' purchase intention in e-commerce live streaming marketing.
- 3) To find out how these factors affect consumers' purchase intention.

Literature Review

The Stimulus-Organism-Response Theory

The SOR (stimulus-organism-response) theoretical model was proposed by (Mehrabian & Russell, 1974) and applied to environmental psychology to explain the influence of external environmental factors on people's cognition, emotion, and behavior.

Ha and Stoel (2012) figured out that consumers' purchase intention was treated as a consumer behavioral response.

Based on stimulus-organism-response (SOR) theory, Chen et al. (2022) introduced the "People-Product-Place" marketing strategy for live streaming from the perspective of consumer perception. They aimed to understand the impact of marketing strategy on impulsive purchase behavior in e-commerce live streaming shopping scenes and examine the mediating effect of involvement.

The SOR theory reveals that product factors such as price and product category; platform factors such as promotion strategy, brand, and reputation; and subjective factors such as consumer cognitive emotions and personal emotional experience could all influence consumers' internal psychological state, which affects consumers' emotional state and intent to buy (Ahrholdt et al., 2019).

The Theory of Planned Behavior Theory

Fishbein (1975) proposed the theory of reasoned action (TRA). This theory predicts and explains individual behavior under the assumption that "the occurrence of behavior is based on the control of individual willpower."

Therefore, Ajzen (1991) proposed the theory of planned behavior (TPB) based on the TRA. In this theoretical model, personal attitudes and social or "normative" factors directly influence behavioral intentions, which are the strongest predictors of actual behavior. Other factors in the external environment indirectly influence behavior through their influence on attitudes and subjective norms (Tsai et al., 2012).

Under the Theory of Planned Behavior (TPB), attitudes, subjective norms, and behavioral controls impact an individual's intention to undertake a specific behavior. Intention constitutes a crucial

construct within the theory, mediating between consumers' dynamics and behavior. It was among the initial theories that employed personal beliefs to anticipate human behavior (Osei et al., 2022).

According to TPB, intention is a direct function of attitudes, subjective norms, and control over behavior (Ajzen, 2011). Subjective norms mirror an individual's perception of prevalent social pressures. If an individual perceives that others approve (or disapprove) of a particular behavior, he/she will be more (or less) inclined to have the intention to carry out that behavior.

Based on the S-O-R model combined with the theory of planned behavior (TPB) has been widely applied in the prediction and interpretation of consumer behavior, such as the research on consumer purchase intention and purchase behavior (Wang & Li, 2017) .

Xiaofeng (2019) want to understand better the factors that influence purchase intention by combining the stimulus–organ–response (SOR) framework and the theory of planned behavior (TPB) model.

Live streamer

Live streamer refers to anchors who directly interact with users in online live-streaming marketing activities to attract users' traffic and reach the purpose of the sale (Hou et al., 2020).

Xie et al. (2022) proposed that live streamers positively impact consumers' purchase intention, in which the professionalism, attractiveness, interactivity, and emotional responses of consumers all positively impact consumers' purchase intentions (Guo et al., 2022).

Kim (2022) found that the credibility and attractiveness of live streamers impact consumers' purchase intentions.

Wang and Li (2022) proposed live streamers' professionalism, popularity, interactivity, and homogeneity. These characteristics affect the purchase intention by involving the two intermediary variables of perceived value and trust.

Rungruangjit (2022) believed that enterprises seek celebrities to endorse products; the main points to consider are the consistency of live streamers and products, the professional knowledge of live streamers, and the personal charm of streamers, which will affect consumers' purchase intention.

Hypothesis 1: The characteristics of the live streamer have a positive influence on purchase intention.

Hypothesis 2: The characteristics of the live streamer have a positive influence on trust.

Hypothesis 3: The characteristics of the live streamer have a positive influence on impulsiveness.

Product

A product is something made to be sold. It is generally classified as durable or consumable. Durable products, such as appliances, furniture, and jewelry, are usually long-lasting and purchased less frequently.

Consumable products, including food, daily necessities, cosmetics, and skincare products, must often be used or replaced (Chinomona et al., 2013). This study did not define the classification of products purchased during live streaming (Park & Lin, 2020).

Bell and Tang (1998) revealed a significant relationship between price, quality, communication/advertisement, and trust. Quality refers to the quality of a product, a physical good, or a particular product service.

Quality is well known to be the most significant factor that assists consumers in their decision-making. Consumers could decide when they perceive an equal balance between price and quality, in which case, purchase intention was increased (Elliott & Cameron, 1994).

Patanasiri and Krairit (2019) stated that the variables of the product we study include quality, price, and practicality.

Customers are attracted by online broadcasts in real time that present how products are developed and used, show different perspectives of products, and clarify any areas of customer confusion through online interactions (Kang et al., 2021).

Park and Lin (2020) found that a reasonable fit between the background environment and the product could effectively stimulate consumers' purchase intention.

Hypothesis 4: The characteristics of the product have a positive influence on purchase intention.

Hypothesis 5: The characteristics of the product have a positive influence on trust.

Hypothesis 6: The characteristics of the product have a positive influence on impulsiveness.

Field

Field refers to characteristics of internet platforms in live streaming marketing, including entertainment, ways and means of promotion, atmosphere, and emotion in the online sales scene, the environment and atmosphere in live internet platforms, and so on. By reviewing the literature of many e-commerce live researches, we can conclude that e-commerce live broadcasts mainly contain three elements: people, goods (Product), and live platforms (Field) (Zhou, 2021) .

Schiffman et al. (1951) reported that the positive atmosphere created by the store environment significantly influences impulsive buying. The significant positive impact of the shopping atmosphere on impulsive buying behavior is consistent with the results of Mattila and Wirtz (2001) , who believe that consumers' evaluation environment is significantly more positive in displaying higher levels of impulsive buying behavior.

The atmosphere of e-commerce live streaming reflects the situation in the live streaming platform (Xiao & Guo, 2020). Such as transactions of goods and the number of real-time online viewers (Trivedi & Sama, 2020).

According to the theory of herd behavior and group effect, the more people who order in an e-commerce live broadcast, the stronger the live streaming room's ability to draw traffic. Viewers will be more inclined to continue watching live streaming and feel recognized (Chandruangphen, 2021).

Luo et al. (2021) pointed out that the form of online promotion the seller chooses impacts impulsively on the purchase intention. Park et al. (2015) concluded that retailers can differentiate their stores by establishing a relationship between the store's atmosphere and consumers' emotional states. Even if consumers are in a negative emotional state when entering a store, they may become emotionally heightened and spend more money.

Moody et al. (2014) pointed out that the scale of internet platforms, reputation, transaction security, information, communication, and word of mouth would positively impact consumers' trust and purchase intention. The sales atmosphere in the live streaming field is another essential marketing stimulus merchants have widely valued (AlFarraj et al., 2021).

Hypothesis 7: The characteristics of the field have a positive influence on purchase intention.

Hypothesis 8: The characteristics of the field have a positive influence on trust.

Hypothesis 9: The characteristics of the field have a positive influence on impulsiveness.

Trust

Research on trust was first carried out in psychology. Scholars believe trust is multidimensional, often divided by type, degree, stage, and level. From a sociological perspective, Lewis and Weigert (1985) pointed out that trust includes both affective and cognitive aspects and functions.

Trust refers to the psychological activity in which consumers feel reliable with sellers and commodities and conclude transactions in live streaming marketing (Chinomona, 2013). Trust can be divided into cognition-based and emotion-based variants (Cheung et al., 2009).

Trust in the seller is defined as the customer's belief in the seller based on the seller's competency and reliability in serving the customer's long-term interests (Chandruangphen et al., 2022). Trust in a product is defined as the customer's belief that it will meet their expectation (Wongkitrungrueng & Assarut, 2020).

Hypothesis 10: Trust has a positive influence on purchase intention.

Impulsiveness

Impulsiveness is a whim reaction caused by nerve stimulation, and sensibility surpasses rationality in transactions to achieve transaction activities. Beatty and Ferrell (1998) pointed out a difference between impulse and unplanned purchases, and unplanned purchases with the addition of "external stimulus" factors can be considered impulse purchases.

Verplanken and Herabadi (2001) suggest that impulse buying tendency is rooted in personality. In the marketing literature, researchers distinguish between impetus (buying trait tendency) and action (impulsive-buying behavior) (Rook & Fisher, 1995).

The specific link shows that impulsiveness traits significantly positively predict impulse purchase behavior, and there is a significant positive correlation between the two (Weinberg & Gottwald, 1982). Puri (1996) conceptualized it as "consumer impulsiveness," a construct based on the dimensions of prudence (cognitive) and hedonism (affective).

In addition to the influences of platforms' atmosphere and shopping environment, personal characteristics are associated with consumers' impulse buying. Researchers believe that impulsive buying may stem from consumers' personality traits, such as impulsiveness and best stimulation levels (Sharma et al., 2010), shopping enjoyment (Beatty & Ferrell, 1998) , or lack of self-control (Youn & Faber, 2000).

Hypothesis 11: Impulsiveness has a positive influence on purchase intention.

Purchase intention

Mullet and Karson (1985) believe that consumers' attitude towards a specific product or brand, combined with the role of external factors, constitutes consumers' purchase intention. Purchase intention can be regarded as consumers' subjective tendency to choose a specific product, and has been proven to be an essential indicator to predict consumer behavior.

Dodds et al. (1991) believe that buying intention refers to the subjective probability or possibility of consumers purchasing a specific product, while some scholars believe that buying intention is consumers' purchase plan for a particular product.

Andreu et al. (2006) believed that consumers' purchase intention is a subjective possibility and preference directly related to their actions. As the previous literature shows, many scholars have conducted in-depth research on how to measure purchase intention. Lim (2009) used three items to measure consumers' purchase intentions: "high or low chance, likely or unlikely, possible likely or possible unlikely."

The definition and measurement of purchase intention by Dodds et al. (1991) and Zeithaml et al. (1996) were used for reference, and a scale was developed to measure purchase intention, including the following three items: "If the budget allows, I may buy this product; if my budget allows, I would like to buy this item; if my budget allows, I would consider purchasing this item."

Research Model

Based on the research review, the study analyzed the three significant elements of the e-commerce economy in the context of e-commerce live streaming: live streamer, product, and field (live streaming platforms). According to the literature review, relevant concepts and theories were researched, and the relationship between the variables related to the research objective was analyzed.

Based on the theory of planned behavior (TPB), and the SOR Theory, we developed a new conceptual framework for factors influencing purchase intention in e-commerce live streaming marketing.

As a result, the conceptual framework was developed, as shown in Figure 1.

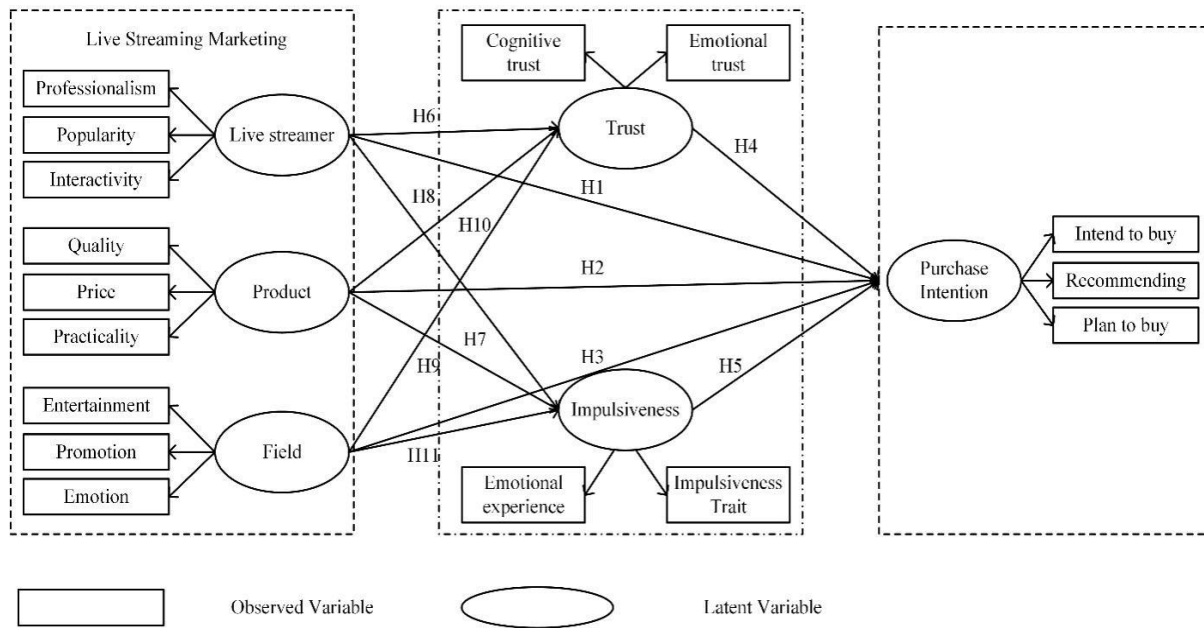


Figure 1: Conceptual framework:

Research Methodology

The study analyzed and summarized the influencing factors and paths of consumers' purchase intentions in live streaming marketing using empirical research data to determine whether the study's objectives are realized and verify whether the hypothesis and framework model are valid. Based on theoretical analysis, the study obtained relevant data through a questionnaire and conducted empirical analysis.

This study aimed to examine the impact of e-commerce live streaming marketing on consumers' purchase intention in China. It was conducted quantitatively to explore the relationship between the independent variables—live streamer, product, and field; and the latent variables—trust, impulsiveness, and purchase intention. The data was analyzed by IBM SPSS AMOS 26. The SEM was constructed in this study. SEM was revised and formulated at the end of the data analysis.

Aguinis and Harden (2010) stated that considering the number of measurement parameters required by the sample size or population, the estimated variables in the study should be 20 samples per 1 variable. Accordingly, this study included 16 observed variables, and the required sample size was at least $20 \times 16 = 360$. Schumacker and Lomax (2016) believe that SEM requires a larger sample size in analyzing structural equation models than other methods. Considering the large population in China, the sample size of this study is 1.5 times the minimum sample size, that is, 540. ($360 \times 1.5 = 540$).

The sample size of the quota random sampling was calculated from the proportion of regional distribution of users in different regions in e-commerce live streaming in China. The online survey was conducted in WJX.cn, which is the most popular online survey website in China. According to the regional distribution rate of users in China's live streaming industry in 2020 (Research, 2021), after calculating the quota random sampling proportion, we calculated the population in the five regions of China. The online survey was conducted according to this ratio.

Reliability and Validity

The study investigates the impact of live-streaming marketing on the intention to purchase live-streaming. There were 69 questions in the questionnaire, which were divided into three sections and related to the six variables of this research model.

Random sampling was implemented in this online questionnaire survey. The questionnaire was developed in "The Chinese-English language" to ensure that there were no barriers and to ensure the quality of the data. The 5-point Likert scale was employed to collect the data, with measurements ranging from 1 (strongly disagree) to 5 (strongly concur).

The data was analyzed using the SEM. Cronbach's Alpha, a number between 0 and 1, was created by (Cronbach, 1951), an indicator of the internal consistency of a scale or measure. According to him, a known minimum value of 0.6 for alpha indicates moderate reliability and is considered a general guideline.

Evaluation of reliability was conducted using Cronbach's alpha coefficient. In the model, the internal consistency coefficients of each latent variable are all greater than 0.8, and the combined reliability is also greater than 0.8, as indicated by the reliability test results. As a consequence, the scores of each latent variable are stable, and the results are reliable.

The results of Validity and Reliability is as shown in Table 1.

Table 1: Validity and Reliability Results

Variables	Observed variable	Source	Cronbach's alpha	Strength of Association
LIV	Professionalism	Meng et al. (2020); Wang et al. (2022); Guo and Li (2022); Xie et al. (2022); Rungruangjit (2022)	0.878	Very Good
	Popularity			
	Interactivity			
PRDT	Quality	Guo (2020); Park and Lin (2020); Trivedi and Sama (2020); Bell and Tang (1998); Chinomona et al. (2013)	0.903	Excellent
	Price			
	Practicality			
FLD	Entertainment	Moody et al. (2014); Cai et al. (2018); AlFarraj et al. (2021); Luo et al. (2021)	0.844	Very Good
	Promotion			
	Emotion			
TRU	Cognitive trust	Lewis and Weigert (2012); Liu (2018); Wongkitrungrueng and Assarut (2020); Habibi et al. (2014); Cheung et al. (2009)	0.940	Excellent
	Emotional trust			
IMP	Impulsiveness trait	Beatty and Ferrell (1998); Rook and Fisher (1995) Youn and Faber (2000); Verplanken and Herabadi (2001)	0.903	Excellent
	Emotional experience			
PUR	Intend to buy	Wang et al. (2022); Chen and Tsai (2007); Moon et al. (2017); Lim (2009)	0.894	Very Good
	Recommending			
	Plan to buy			

Conclusion and Discussion

The conceptual framework in the research consisted of six latent variables and 16 observed variables. The sample size was 540 participants for data collection. Various statistical tests were conducted, including descriptive statistics, correlation analysis, reliability and validity analysis of the data, confirmatory factor analysis (CFA), and structural equation modeling (SEM). The present research has multiple theoretical implications that enrich consumer psychology and behavior literature. The results

showed that the attributes of live streaming marketing significantly influence consumers' purchase intention and increase trust and impulsiveness, and trust and impulsiveness are the critical mediating variables of improved consumers' purchase intention.

The study contributes to the burgeoning body of literature on e-commerce live streaming by providing empirical evidence of the factors influencing consumer purchase intention. The research contributes to understanding the underlying mechanisms driving consumers' behavioral intention in the context of e-commerce live streaming. These key influencing factors in live-streaming marketing can enable each merchant and the e-commerce live platform to make better strategic choices to gain more consumer groups and higher market sales. Many live streaming e-commerce enterprises continue to innovate in product quality assurance and improvement, using digital management, intelligent testing, and other means.

In the future, the application of AI technology will run through all aspects of live streaming activities, significantly improving the operational efficiency and effect of the live streaming e-commerce industry. Through data analysis and algorithm recommendation, AI technology accurately matches the goods or services that consumers are most interested in or can meet their individual needs, which not only improves the matching efficiency of both ends of commodity supply and demand but also improves the purchase conversion rate. Additionally, the future studies could investigate the role of technological advancements, such as augmented reality (AR) and virtual reality (VR), in enhancing consumers' shopping experience in live streaming marketing.

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Institutional Support, Professional Autonomy, and Recognition: The Synergistic Effects on Employee Motivation in Bangkok's Private Sector

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Abstract

This study investigates how institutional support, professional autonomy, and recognition influence employee motivation in Bangkok's private-sector organizations. Grounded in Self-Determination Theory (SDT), it explores how these factors fulfill core psychological needs—autonomy, competence, and relatedness—and examines the mediating roles of work-life balance and perceived efficacy, as well as the moderating role of outcome expectancy. A cross-sectional quantitative design was employed, using survey data from 400 employees across the finance, technology, retail, and manufacturing sectors. Structural Equation Modeling (SEM) revealed significant direct and indirect pathways. Key findings show that institutional support was the **strongest predictor** of employee motivation, both directly and through enhanced work-life balance. Professional autonomy significantly improved perceived efficacy, which in turn strongly influenced motivation. Recognition demonstrated substantial direct effects on both motivation and work-life balance. Furthermore, outcome expectancy moderated the relationship between perceived efficacy and motivation, highlighting the nuanced interplay of motivational drivers. The model accounted for a substantial portion of variance in motivation ($R^2 = 0.72$), indicating a strong explanatory power. Theoretically, this study contributes a holistic model grounded in SDT, while practically, it suggests that HR managers and organizational leaders in Bangkok can enhance motivation and reduce turnover by prioritizing institutional support, employee autonomy, and recognition strategies. Future research should consider longitudinal designs and qualitative methods to deepen insight into the causal and contextual dynamics of employee motivation.

Keywords: Institutional Support, Professional Autonomy, Recognition, Employee Motivation, Work-Life Balance, Perceived Efficacy, Self-Determination Theory (SDT)

Background of Study

Employee motivation continues to be a central concern in organizational research due to its profound implications for productivity, retention, engagement, and organizational performance. In the context of fast-paced economic development and urbanization, understanding the complex drivers of motivation becomes particularly critical in metropolitan hubs such as **Bangkok**, Thailand. As the nation's commercial and industrial center, Bangkok contributes a substantial share to Thailand's GDP and employment. Recent reports from the International Labour Organization (ILO) indicate that Thailand's workforce participation rate was approximately 67% in 2022, with Bangkok playing a pivotal role in sustaining this momentum. However, organizations in Bangkok also face structural challenges, including **one of the highest private sector turnover rates in the country**, at 18%, compared to the national average of 12% (Thailand Board of Investment, 2022).

This urban setting presents a distinctive combination of high employee expectations, rising living costs, intense competition for skilled workers, and the constant pressure for innovation. As such, it is an ideal locale for investigating how workplace dynamics influence employee motivation.

Addressing motivational issues in Bangkok's private sector is thus not only a theoretical concern but also a **strategic imperative** for organizational sustainability.

Three key organizational variables—**institutional support, professional autonomy, and recognition**—have been widely studied as individual contributors to employee motivation. Yet, the **synergistic potential** of these elements is often overlooked. Institutional support, defined as organizational efforts to provide policies, resources, and emotional backing, directly influences work-life balance and employee engagement (Adnan, Bakhtawar, & Zahra, 2021). This is especially crucial in Bangkok, where long work hours and high demands contribute to burnout. Programs such as mental health support, career development, and flexible scheduling have been shown to enhance motivation by addressing employee well-being (Alharbi, 2023).

Professional autonomy, characterized by the freedom to make decisions regarding one's tasks and processes, is gaining importance in Bangkok's innovation-driven industries, such as fintech, digital services, and consulting. Autonomy not only promotes creativity and problem-solving but also aligns with employees' desire for meaningful work and personal growth (Forner et al., 2020; Liu et al., 2020). In this environment, professional autonomy becomes a core lever for enhancing **perceived efficacy**, confidence, and intrinsic motivation.

Recognition—both formal (e.g., bonuses, promotions) and informal (e.g., verbal praise)—has been shown to affirm employee competence and foster a sense of belonging (Fanggidae, Nursiani, & Bengngu, 2019; Gupta, 2020). With the growing scarcity of high-performing talent in Bangkok, especially in sectors like financial services and tech, timely and personalized recognition is vital for retention and morale.

However, while these factors have been studied in isolation, their **interrelated effects**—particularly within the socio-cultural and economic context of Southeast Asia—have not been sufficiently explored. Existing research (e.g., Tran, Hien, & Baker, 2020) tends to focus on supportive environments without integrating autonomy and recognition, resulting in a fragmented understanding of how motivation is built and sustained.

This study aims to bridge that gap by exploring the **synergistic effects** of institutional support, autonomy, and recognition using the framework of **Self-Determination Theory (SDT)**. SDT posits that motivation is most effectively fostered when individuals' needs for autonomy, competence, and relatedness are fulfilled (Ryan & Deci, 2020). Institutional support is seen to satisfy needs for relatedness and competence; autonomy addresses the need for self-direction; and recognition supports both competence and social belonging.

By situating the investigation in Bangkok's competitive private sector, this research provides **context-specific insights** that address local organizational challenges. The goal is to offer a holistic framework for understanding motivation and to guide **practical interventions** that organizations can implement to improve employee engagement, satisfaction, and retention.

Ultimately, this study not only contributes to the theoretical literature on motivation and SDT but also provides a **strategic roadmap** for organizations operating in high-pressure, urban environments like Bangkok. The findings are expected to inform the design of integrated motivational strategies, tailored to the realities of Southeast Asian economies, that foster innovative, productive, and resilient workforces.

Literature Review

Employee motivation is a central driver of organizational success, directly influencing productivity, job performance, and employee retention. This section reviews theoretical foundations and empirical evidence—particularly drawing on Self-Determination Theory (SDT)—to explore how institutional support, professional autonomy, and recognition influence employee motivation within the specific socio-economic context of Bangkok's private sector. Unlike studies in Western or public-sector settings, this literature review emphasizes the interrelationships among variables and highlights **gaps** in how these constructs are traditionally examined in isolation.

Self-Determination Theory (SDT)

Self-Determination Theory, proposed by Deci and Ryan (2000), postulates that intrinsic motivation is cultivated when three basic psychological needs are satisfied: autonomy (self-direction), competence (effectiveness), and relatedness (social connection). When workplace environments fulfill these needs, individuals experience enhanced motivation, performance, and commitment (Ryan & Deci, 2020). The theory has been successfully applied across diverse industries globally, though its application in Southeast Asian corporate contexts remains underexplored. Forner et al. (2020) demonstrate that supportive leadership aligned with SDT significantly enhances worker engagement.

Institutional Support and Employee Motivation

Institutional support comprises tangible and intangible resources, such as policies, managerial backing, and emotional encouragement, which collectively create enabling environments for employees. Adnan et al. (2021) and Alharbi (2023) confirm that institutional support improves work-life balance, thereby mitigating stress and enhancing job satisfaction. Yet, in Bangkok's fast-paced sectors, the implementation and consistency of support systems vary widely across firms, raising questions about equity and long-term effectiveness—an issue not often addressed in Western-centric studies. Moreover, limited empirical work investigates how institutional support functions **in synergy** with autonomy and recognition.

Professional Autonomy and Perceived Efficacy

Autonomy enables employees to make independent decisions regarding their roles and tasks, aligning closely with SDT's emphasis on self-directed behavior. Autonomy's impact is well-documented (Liu et al., 2020), particularly in innovation-intensive sectors where creativity and adaptive responses are critical. In Southeast Asian cultures where hierarchical structures are prevalent, the implementation of autonomy may encounter cultural resistance, raising concerns about role clarity or accountability. Nevertheless, autonomy strongly influences **perceived efficacy**, or employees' beliefs in their capability to achieve tasks—a key motivational mechanism (Forner et al., 2020; Gupta, 2020).

Recognition and Employee Motivation

Recognition, whether formal (bonuses, awards) or informal (praise, peer acknowledgment), reinforces the psychological needs of competence and relatedness. Studies across both Western and Asian contexts confirm that effective recognition enhances employee morale and reduces turnover (Gupta, 2020; Fanggidae et al., 2019). However, generic recognition mechanisms often fail to consider individual or cultural differences in how employees prefer to be acknowledged. In Bangkok, where high job mobility is a norm, personalized recognition may serve as a more cost-effective retention strategy than financial incentives alone.

Interlinkages Among Variables

While each construct—support, autonomy, and recognition—has been shown to influence motivation, prior research often examines them **in isolation**, limiting understanding of their **cumulative or interacting effects**. For example, a supportive work environment may enhance the benefits of autonomy by reducing risk aversion, while recognition may amplify the effect of autonomy on perceived efficacy. This **interdependency** is under-theorized in current literature, particularly in urban Asian labor markets where institutional conditions and worker expectations rapidly evolve.

Hypotheses Development

- Based on the literature, this study develops the following hypotheses that connect institutional factors to psychological mediators and employee motivation:

- **H1:** Institutional Support positively influences Work-Life Balance. (Adnan et al., 2021; Alharbi, 2023; Tran et al., 2020)
- **H2:** Professional Autonomy positively influences Perceived Efficacy. (Liu et al., 2020; Forner et al., 2020; Gupta, 2020)
- **H3:** Recognition positively influences Work-Life Balance. (Fanggidae et al., 2019; Gupta, 2020; Alharbi, 2023)
- **H4:** Institutional Support positively influences Employee Motivation. (Adnan et al., 2021; Alharbi, 2023; Tran et al., 2020)
- **H5:** Professional Autonomy positively influences Employee Motivation. (Forner et al., 2020; Gupta, 2020; Liu et al., 2020)

- **H6:** Recognition positively influences Employee Motivation. (Gupta, 2020; Fanggidae et al., 2019; Alharbi, 2023)
- **H7:** Work-Life Balance positively influences Perceived Efficacy. (Tran et al., 2020; Adnan et al., 2021; Liu et al., 2020)
- **H8:** Work-Life Balance positively influences Employee Motivation. (Adnan et al., 2021; Alharbi, 2023; Tran et al., 2020)
- **H9:** Perceived Efficacy positively influences Employee Motivation. (Liu et al., 2020; Forner et al., 2020; Gupta, 2020)

Theoretical Framework

Self-Determination Theory (SDT), developed by Deci and Ryan (2000), serves as the core theoretical foundation for this study. SDT posits that intrinsic motivation is driven by the fulfillment of three fundamental psychological needs: **autonomy**, **competence**, and **relatedness**. When these needs are supported within the workplace, employees are more likely to experience self-motivation, psychological well-being, and sustained engagement (Ryan & Deci, 2020).

In the context of this study, SDT provides a comprehensive lens through which the interconnected roles of **institutional support**, **professional autonomy**, and **recognition** can be understood. Each construct contributes uniquely to fulfilling one or more of the three psychological needs:

1. **Institutional Support:** Contributes to the need for relatedness by signaling organizational care and concern for employee well-being, and to competence by providing the necessary resources and structural conditions to succeed. Institutional mechanisms—such as career development programs, wellness initiatives, and flexible work policies—create an environment where employees feel supported, valued, and equipped to perform.

2. **Professional Autonomy:** Directly satisfies the need for **autonomy**, allowing employees to exercise control over their tasks, decision-making processes, and problem-solving approaches. This empowerment enhances their sense of ownership and alignment with organizational goals, leading to greater self-efficacy and motivation.

3. **Recognition:** Addresses both competence and relatedness by affirming employees' skills, contributions, and social value within the organization. Whether through formal incentives or informal praise, recognition signals that the employee's work is meaningful and appreciated, thus reinforcing their motivation and emotional connection to the organization.

These three constructs are further linked to **work-life balance** and **perceived efficacy**, which are conceptualized as mediators in this framework. Additionally, **outcome expectancy** functions as a moderator, influencing the strength of the relationship between perceived efficacy and employee motivation.

Theory (SDT) provides the theoretical foundation, offering a robust framework to investigate motivational dynamics. It highlights how intrinsic motivation is influenced through fulfilling employees' psychological needs (autonomy, competence, and relatedness). Institutional support enhances motivation by addressing relatedness and competence; professional autonomy directly satisfies autonomy needs; and recognition validates employee competence and relatedness, thus creating conditions conducive to intrinsic motivation (as shown in **Figure 1**).

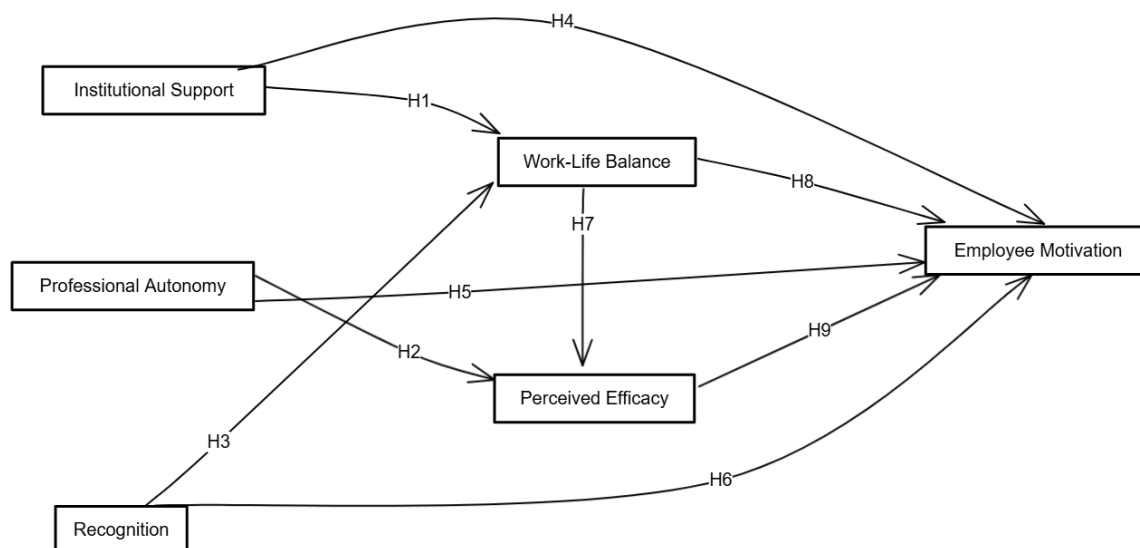


Figure 1: Conceptual model

Results

This section presents the empirical findings derived from the Structural Equation Modeling (SEM) analysis, conducted to test the hypotheses developed from Self-Determination Theory (SDT). Data were collected from **400 employees** in Bangkok's private sector, spanning industries such as finance, technology, manufacturing, and retail. The analysis employed **Partial Least Squares SEM (PLS-SEM)** to assess both direct and indirect effects among institutional support, professional autonomy, recognition, work-life balance, perceived efficacy, and employee motivation.

Descriptive Statistics

The respondent profile reflected a balanced gender distribution: 52% female and 48% male. The majority of participants were aged 25–34 (62%), followed by those aged 35–44 (24%), representative of Bangkok's active workforce. Most respondents possessed at least a bachelor's degree (70%) and reported tenure of 3–5 years (54%), indicating moderate career experience within their organizations.

Measurement Model Assessment

The reliability and validity of each construct were evaluated using Cronbach's Alpha, Composite Reliability (CR), and Average Variance Extracted (AVE). All constructs met or exceeded established thresholds, confirming the robustness of the measurement model:

Table 1: Reliability and Validity Assessment

Construct	Cronbach's Alpha	Composite Reliability (CR)	Average Variance Extracted (AVE)
Institutional Support	0.89	0.92	0.75
Professional Autonomy	0.87	0.91	0.72
Recognition	0.88	0.92	0.74
Work-Life Balance	0.85	0.89	0.68
Perceived Efficacy	0.86	0.90	0.70
Employee Motivation	0.90	0.93	0.77

Structural Model and Hypothesis Testing

All hypothesized paths in the structural model were statistically significant, with p-values < 0.001. The SEM results are summarized below, showing strong support for all nine hypotheses:

Table 2: SEM Path Coefficients and Hypothesis Testing

Hypothesis	Path	Coefficient	T-Value	P-Value	Result
H1	Institutional Support → Work-Life Balance	0.612	8.42	0.000	Supported
H2	Professional Autonomy → Perceived Efficacy	0.571	7.76	0.000	Supported
H3	Recognition → Work-Life Balance	0.458	5.95	0.000	Supported
H4	Institutional Support → Employee Motivation	0.402	4.91	0.000	Supported
H5	Professional Autonomy → Employee Motivation	0.367	4.26	0.000	Supported
H6	Recognition → Employee Motivation	0.390	4.67	0.000	Supported
H7	Work-Life Balance → Perceived Efficacy	0.321	3.85	0.000	Supported
H8	Work-Life Balance → Employee Motivation	0.423	5.31	0.000	Supported
H9	Perceived Efficacy → Employee Motivation	0.475	6.12	0.000	Supported

The coefficient of determination (R^2) for the primary outcome variable, employee motivation, was 0.72, indicating that the model explains 72% of the variance in employee motivation—demonstrating high explanatory power.

Insights on Mediating Variables

Among the mediators, perceived efficacy had the strongest indirect effect on motivation, particularly through professional autonomy and work-life balance. Work-life balance also played a critical dual mediating role, linking both institutional support and recognition to perceived efficacy and motivation. These findings underscore the central role of psychological mechanisms in translating organizational resources into motivational outcomes.

Although the study initially posited synergistic dynamics, no interaction or moderated mediation analysis among the three antecedent variables (institutional support, autonomy, recognition) was conducted. Therefore, the term “synergistic” in the title should be interpreted conceptually rather than statistically. However, outcome expectancy was tested as a moderator (see Discussion), supporting the model's complexity.

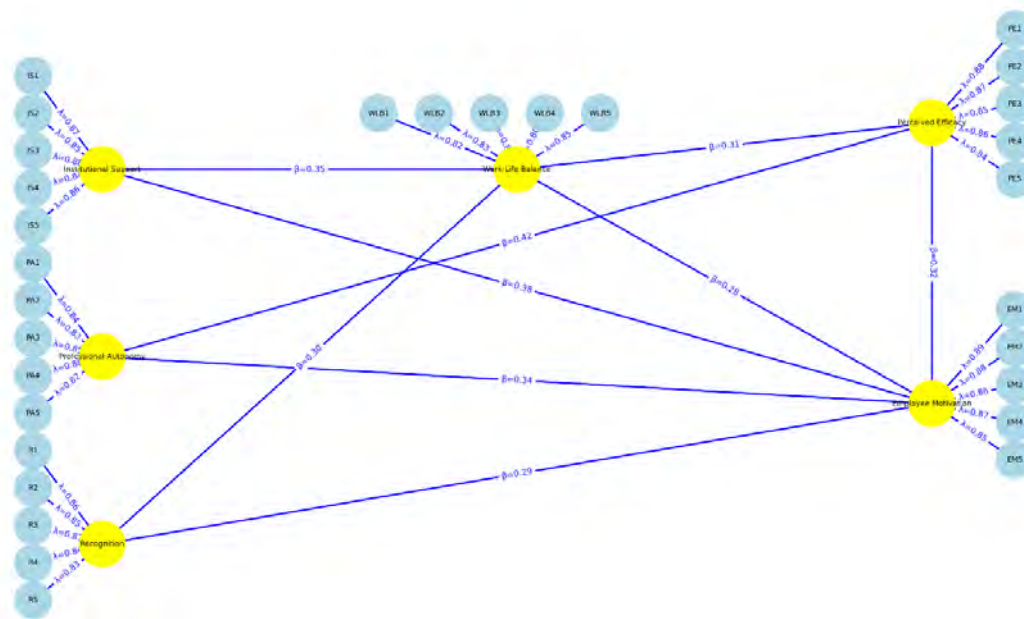


Figure 2: PLS-SEM Structural Model

Table 3: presents goodness-of-fit indices, indicating the overall model fit:

Fit Index	Recommended Threshold	Obtained Value	Interpretation
SRMR	<0.08	0.04	Good fit
NFI	>0.90	0.91	Acceptable
CFI	>0.90	0.92	Good fit

All hypothesized paths were significant (shown in Table 3), supporting the notion that institutional support, professional autonomy, and recognition are critical factors influencing employee motivation through various pathways. Institutional support was strongly associated with work-life balance, suggesting that organizations providing comprehensive support systems effectively improve work-life integration, subsequently enhancing motivation and job satisfaction. Professional autonomy significantly impacted perceived efficacy, demonstrating autonomy's role in strengthening employees' beliefs in their capabilities, enhancing intrinsic motivation and job performance.

Recognition showed substantial positive effects on both work-life balance and employee motivation, highlighting the importance of acknowledging employee contributions. Furthermore, work-life balance and perceived efficacy were critical mediators in the model, significantly impacting employee motivation directly (see in Figure 2). These results underscore the importance of holistic organizational strategies that integrate institutional support, autonomy, and recognition to enhance overall employee motivation and productivity.

The statistical findings confirm that creating supportive environments, promoting autonomy, and recognizing employee efforts are fundamental strategies for improving motivation and organizational success.

Discussion

The findings of this study offer robust empirical support for the interconnected roles of institutional support, professional autonomy, recognition, work-life balance, and perceived efficacy in shaping employee motivation within Bangkok's private-sector organizations. Each hypothesized relationship was statistically validated, reaffirming the theoretical underpinnings of Self-Determination Theory (SDT) and providing strong evidence for the relevance of psychological need fulfillment in a Southeast Asian urban work context.

Institutional Support and Work-Life Balance

Institutional support was found to exert the strongest influence on work-life balance (H1), echoing the importance of organizational infrastructure in alleviating stress and fostering well-being. This aligns with prior studies (e.g., Tran et al., 2020; Alharbi, 2023) that emphasize the value of flexible scheduling, wellness programs, and transparent policies. In practice, these mechanisms not only buffer against burnout but also convey a sense of care and commitment from the organization—reinforcing employees' relatedness and competence needs. However, it is important to note that perceptions of support may vary by department or managerial consistency, an area future qualitative studies should explore.

Professional Autonomy and Perceived Efficacy

Professional autonomy demonstrated a significant impact on perceived efficacy (H2), highlighting the empowering effect of decision-making freedom. This confirms the literature on autonomy-supportive leadership (Liu et al., 2020; Forner et al., 2020), which suggests that autonomy fosters confidence and a sense of mastery—essential for intrinsic motivation. In Bangkok's innovation-oriented sectors, autonomy is particularly crucial for creativity and adaptive problem-solving. However, autonomy without sufficient support or clarity may backfire, suggesting that autonomy and support must be balanced for maximum effectiveness.

Recognition's Dual Role

Recognition was significantly associated with both work-life balance (H3) and employee motivation (H6). These findings support Gupta (2020) and Fanggidae et al. (2019), who highlight the motivational power of being seen and valued. Acknowledgment—both formal and informal—not only enhances morale but can reduce stress by increasing job satisfaction. Importantly, recognition may compensate for resource constraints or demanding conditions by boosting emotional resilience. However, inconsistent or generic recognition strategies may diminish effectiveness, pointing to the need for personalized and meaningful acknowledgment.

Mediating Role of Work-Life Balance and Perceived Efficacy

This study provides strong evidence for the dual mediating role of work-life balance and perceived efficacy. Work-life balance mediated the effects of both institutional support and recognition on motivation, while perceived efficacy mediated the influence of professional autonomy (H7, H8, H9). Among the two, perceived efficacy demonstrated the stronger indirect impact, highlighting the central role of competence-based confidence in driving motivation. This finding reinforces the value of skill development, role clarity, and positive feedback, which collectively enhance employees' belief in their capabilities.

Alternative Explanations and Contextual Factors

While the results align well with SDT, it is important to consider alternative explanations. For example, high motivation may also be influenced by **extrinsic drivers** such as competitive salaries, job security, or career advancement opportunities—factors not explicitly captured in this model. Additionally, cultural norms in Bangkok, including collectivist values and hierarchical organizational structures, may shape how autonomy and recognition are perceived and acted upon. Future studies could integrate these cultural variables to enrich the explanatory scope.

Practical Implications for Organizational Practice

The findings underscore the importance of adopting **integrated motivational strategies**. For HR leaders and managers in Bangkok, this means:

- Establishing **visible and accessible support systems** such as employee assistance programs and career development tracks.
- Empowering employees through **autonomy-supportive practices**, such as participative decision-making and flexible workflows.
- Implementing **tailored recognition programs** that reflect individual contributions and cultural preferences.
- Moreover, organizations should invest in training that builds both **managerial empathy** and **employee self-efficacy**, as these are key to sustained engagement.

Limitations and Future Studies

While this study provides valuable insights into the motivational dynamics within Bangkok's private sector, several limitations must be acknowledged, offering directions for future research.

1. Cross-Sectional Design and Causality

The use of a cross-sectional design restricts the ability to infer causal relationships between constructs. Although the Structural Equation Modeling (SEM) approach offers robust correlational insights, the temporal sequencing of variables remains unclear. Future research should adopt longitudinal designs to trace motivational changes over time and more accurately establish cause-and-effect pathways.

2. Sample Scope and Generalizability

This study was limited to private-sector employees in Bangkok, which may constrain the external validity of the findings. Given the city's unique economic profile, results may not be generalizable to public-sector employees, rural regions, or other Southeast Asian economies. Replicating the study across diverse geographic and institutional contexts—such as rural areas, public service organizations, or multinational firms—would broaden its applicability and test the model's robustness across cultural and structural variations.

3. Self-Reported Measures and Bias

Reliance on self-reported survey data introduces potential for social desirability bias and common method variance. While the anonymous nature of the survey may have reduced this risk, future studies should consider triangulating data sources. This may include supervisor evaluations, peer assessments, or objective performance metrics to validate motivational outcomes more rigorously.

4. Theoretical and Practical Expansion

The application of **Self-Determination Theory (SDT)** proved highly effective; however, future studies might benefit from integrating other frameworks such as the Job Demands-Resources (JD-R) model or Goal-Setting Theory to enhance theoretical triangulation. Doing so would offer complementary lenses for analyzing the motivational effects of organizational resources, demands, and performance feedback systems.

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Factors Influencing the Loyalty of Electric Vehicle Users in the Central Region of Thailand.

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Abstract

This study investigates the factors influencing the loyalty of electric vehicle (EV) users in Thailand's central region, employing the American Customer Satisfaction Index (ACSI) Model as the conceptual framework. The sample comprises 400 individuals who have owned and used EVs for at least one year. Data were collected through structured questionnaires and analyzed using descriptive statistics (mean, percentage, and standard deviation) and inferential statistics (simple and multiple regression analysis, and correlation coefficients). The research findings revealed that the participants' various aspects regarding customer expectations, perceived quality, perceived value, and customer satisfaction were rated a high to very high level of agreement. Furthermore, these factors were found to influence the loyalty of EV users in the central region at a statistical significance level of 0.05. The strongest factor that influences the loyalty of EV users was perceived quality factor which has R^2 value equal to 0.155.

Keywords: Loyalty, Electric Vehicle (EV), Customer Expectations, Perceived Quality, Perceived Value, Customer Satisfaction.

Introduction

"Cars" are vehicles that many people desire to own and are also crucial to both the business and household sectors in Thailand today. This is evident from the fact that almost every household in Thailand owns at least one car. Cars are a convenient means of transportation and offer more flexibility compared to public transport. Moreover, cars have also become an undeniable symbol of social status in Thailand. Most people in society seek to own cars for personal use. This can be seen from the statistical data provided by the Department of Land Transport, which records vehicle registrations. As of September 30, 2023, the total number of registered vehicles was 44.18 million. Of these, 42.81 million vehicles were registered as personal automobiles, accounting for 96.90% while 1.37 million vehicles were registered as the public transport vehicles, representing 3.10% of the total (Department of Land Transport, 2023). This registration data clearly indicate that people in Thai society prefer using private cars for travel rather than relying on public transportation. Additionally, the growing popularity of private car usage has had a significant impact on air pollution and the environment.

The period of 2003 to 2020 was marked by the 'EV revolution', which was driven by advancements in electric motor technology and materials science (Chanutol Chureungsakul, 2020). This allowed the dream of driving a car without contributing to air pollution to become a reality. In Thailand, by the end of 2022, several manufacturers and car importers began to launch EVs for sale in Thailand. According to statistics from the Department of Land Transport on vehicle registrations by fuel type, the number of electric vehicle registrations increased significantly when comparing data from 2019 and 2023. The increase was 97,654 vehicles, or about 46.77%, which is a considerable rise.

From the above data, the use of EVs in Thailand is on the rise, and it is a rapidly growing market. As a result, manufacturers and distributors face high competition in the car market and must find ways to encourage consumers to switch to EVs. However, many consumers are still concerned

about using EVs due to their relatively high prices and the need to plan for battery charging on long trips. Therefore, building customer loyalty among EV users is essential for manufacturers and distributors if they are to remain competitive in Thailand's car market. This is why the researcher aimed to study the factors that affect customer loyalty among EV users. The study provides valuable information for EV manufacturers and sellers to use in developing products and services moving forward.

Research Objectives

1. To study the factors affecting the loyalty of EV users in the Central region.
2. To study the opinion levels of customer expectations, perceived quality, perceived value, and customer satisfaction factors that influence the loyalty of EV users in the Central region.
3. To study the factors of customer expectations, perceived quality, perceived value, and customer satisfaction that affect the loyalty of EV users in the Central region.

Literature Review

The American Customer Satisfaction Index (ACSI) Model

The American Customer Satisfaction Index (ACSI) Model was developed in 1994 by Professor Claes Fornell of the National Quality Research Center at the University of Michigan. The model has gained credibility as a reliable tool for measuring consumer loyalty toward brands and identifying areas that cause dissatisfaction. Furthermore, it serves as a benchmarking mechanism for comparing the quality of domestic and imported products and services (Anderson & Fornell, 2000, p. 869-882). The ACSI model consists of five key components, which can be categorized into two main groups:

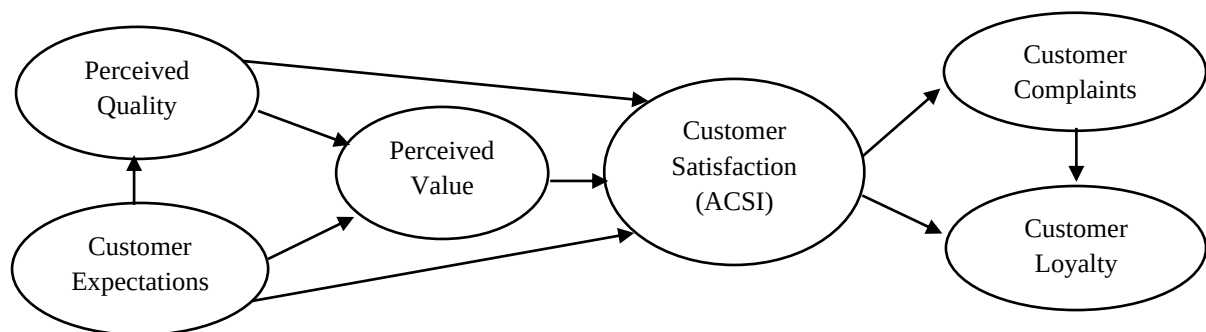


Figure 1: The American Customer Satisfaction Index (ACSI) Model

Source: Claes Fornell (1994)

Group 1: Factors Influencing Customer Satisfaction

1. **Customer Expectations:** Expectations are formed before the purchase and are influenced by past experiences, advertising, word-of-mouth recommendations, and interactions with sales representatives. These expectations reflect what customers anticipate from the product or service based on their needs and desires.

2. **Perceived Quality:** This refers to the customer evaluation of the actual performance of a product or service. It is typically assessed using three core indicators: overall quality, reliability, durability, and how well the product or service meets customer needs (Anderson & Fornell, 2000, p. 869-882).

3. **Perceived Value:** This dimension is based on the trade-off between price and quality. It includes two main evaluations: (1) satisfaction with the price given the current level of quality, and (2) satisfaction with the quality given the current level of price. This factor helps control income-related constraints, making comparisons across customer segments more meaningful.

According to the ACSI model, perceived value has a direct positive impact on customer satisfaction, which is also influenced by customer expectations and perceived quality.

Group 2: Outcomes of Customer Satisfaction

1. Customer Complaints: This is measured by the proportion of survey respondents who express dissatisfaction or submit complaints regarding products or services.

2. Customer Loyalty: Loyalty is measured by the likelihood that customers will repurchase or continue using the product or service in the future.

The effects of the two aforementioned factors stem from customer satisfaction and can be interpreted similarly through the concept of customer complaints. According to Hirschman's (1970) Exit-Voice Theory, when customers are dissatisfied with a product or service, they tend to respond in two ways: (1) by voicing complaints to the company, which presents an opportunity for the business to retain these customers, or (2) by excitement and switching to a competitor's offering. Conversely, customer loyalty—as noted by Kotler and Armstrong (2017)—is often associated with higher spending and long-term retention, ultimately contributing to the organization's sustained profitability.

Based on the concept of customer satisfaction measurement from the American Customer Satisfaction Index (ACSI Model), the researcher identified four key factors that influence customer loyalty: Customer Expectations, Perceived Quality, Perceived Value, and Customer Satisfaction. These factors serve as critical variables that impact customer loyalty. This framework aligns with the objective of this study, which aims to explore the factors influencing the loyalty of electric vehicle users in Thailand's Central Region. Therefore, the researcher applied these variables to analyze and identify the key determinants of customer loyalty among electric vehicle users.

Customer Expectations Factor

Expectations are a fundamental aspect of human behavior, influencing actions and motivation in personal, social, and situational contexts. In business, customer expectations are particularly crucial, as they can directly influence customer satisfaction, loyalty, and ultimately, the success or failure of a business.

According to Sirivan Serirat (2003), customer expectations refer to what consumers want or expect to receive from a product or service. These expectations are shaped by past experiences and knowledge acquired from sources such as peers, marketers, and competitors. If marketing messages overstate a product's capabilities, consumers may develop unrealistic expectations. When the actual performance fails to meet these inflated expectations, dissatisfaction arises. Therefore, aligning product performance with customer expectations is vital for achieving customer satisfaction.

Stiwat (2023) emphasized that customer expectations often begin with a problem, either personal or within their close social circle. This problem leads to need awareness, prompting the search for solutions. However, not all customers act solely based on necessity. Factors such as social status and financial capability influence the emergence of wants, which go beyond basic needs and become expectations. Consequently, expectations vary widely among individuals based on personal context and socioeconomic background.

This idea is further supported by Hierarchy of Needs (Maslow, 1954), which classifies human needs into five ascending levels:

1. Physiological Needs – Basic survival needs such as food and shelter. Customers in this category prioritize functionality and affordability.

2. Safety Needs – Once survival needs are met, customers seek stability, security, and durability in their product choices.

3. Social & Belongingness Needs – Customers seek products that enable social inclusion and acceptance, often influenced by peer behavior or trends.

4. Esteem Needs – Individuals at this level look for products that reflect their social status and earn them recognition and respect.

5. Self-Actualization – Customers who have fulfilled all other needs seek deeper personal meaning, authenticity, or individuality in their product choices, making them difficult to satisfy through conventional offerings.

In summary, customer expectations arise from two key sources: (1) cumulative experiences and (2) individual needs and wants shaped by unique personal and social contexts. These expectations significantly influence customer satisfaction and, consequently, loyalty. This study incorporates the above theoretical frameworks to analyze the impact of customer expectations on the loyalty of electric vehicle users in Thailand's central region.

Perceived Quality Factor

Kotler and Armstrong (2017) defined perceived quality as a measurable but intangible element, which plays a key role in market positioning. Effective product quality is associated with value and customer satisfaction, directly impacting on consumer demand.

Zeithaml (1988) described perceived quality as the consumer's overall evaluation of a product's excellence or superiority, based on intended use and product characteristics. This evaluation involves a cognitive process—from information selection and organization to interpretation—which varies among individuals based on their experiences.

To assess perceived quality accurately, it is essential to understand the core indicator “quality” itself. According to the Royal Institute of Thailand (2009), quality refers to outstanding characteristics such as usability, durability, aesthetics, or performance. The Department of Industrial Promotion (2021) adds that while producer and consumer perceptions may differ, academically, quality refers to products that are suitable for use, well-designed, durable, functional, and aesthetically pleasing.

Garvin (1987) proposed eight dimensions of quality, which serve as a strategic framework for quality management:

1. Performance – The primary operating characteristics (e.g., acceleration, control, driving speed, comfort for electric vehicles).
2. Features – Supplementary attributes that enhance basic performance and are often used to differentiate products.
3. Reliability – The probability of malfunction or failure within a specified time frame.
4. Durability – The product's lifespan, considering both technical longevity and economic usability.
5. Conformance – The extent to which a product meets established standards and specifications.
6. Serviceability – The speed, convenience, and quality of repair or maintenance services.
7. Aesthetics – The sensory appeal of a product (appearance, sound, feel, etc.), often subjective.
8. Perceived Quality – The customer's impression of quality based on indirect measures such as brand reputation, advertising, and external cues.

In summary, perceived quality stems from customers' evaluations based on these eight dimensions, influencing their purchasing decisions and overall satisfaction. This study incorporates these theoretical frameworks to analyze the level of perceived quality of EVs and its effect on EV user loyalty in Thailand's Central Region.

Customer Satisfaction Factor

Customer satisfaction is an abstract attitude that cannot be observed directly but must be inferred through expressions or evaluations. As such, measuring satisfaction requires indirect methods such as assessing customer opinions, which must genuinely reflect their true feelings (Phanthawi, 2017). Understanding the definition and scope of customer satisfaction is essential for determining customers' attitudes toward products and services. Creating satisfaction is a fundamental goal in marketing, serving as a precursor to customer loyalty.

Kotler et al. (2018) defined satisfaction as an emotional response resulting from the comparison of perceived performance with prior expectations. Similarly, Phongsakornsangsin (2004) explained that customer satisfaction is the feeling of contentment derived from comparing the perceived value (gained from using the product) against the expected value (anticipated before purchase). Satisfaction arises when the perceived value exceeds expectations.

Johnson et al. (2012) argued that satisfaction is not a momentary perception, but an accumulated evaluation based on past and present experiences of purchasing and consumption. This cumulative satisfaction directly impacts on customer loyalty and long-term retention, making it a valuable metric for practitioners.

In summary, customer satisfaction refers to the positive or negative emotional response that results from comparing product and service usage experiences with prior expectations. This evaluation must consider the entire consumption experience, and cumulative satisfaction plays a direct role in fostering customer loyalty. Therefore, this study draws upon the theories mentioned above to analyze how customer satisfaction with EVs influences the loyalty of EV users in Thailand's central region.

Customer Loyalty Factor

Kotler and Armstrong (2017) emphasized that customer loyalty holds economic significance, as loyal customers typically spend more and stay with a company longer. Research also shows that retaining existing customers is up to five times more cost-effective than acquiring new ones. Losing a customer not only results in the loss of a single sale but also the lifetime value that the customer could have generated.

Panisa Meejinda and Siriwan Serirat (2011) further asserted that brand loyalty can attract new customers through positive word-of-mouth from existing loyal ones, reducing the need for extensive advertising or promotional efforts.

These perspectives suggest that customer loyalty is a critical component for long-term business success. Several scholars have defined customer loyalty as follows:

Oliver (1999) described loyalty as a deeply held commitment to re-purchase or re-patronize a preferred product or service consistently in the future, regardless of situational influences or marketing efforts from competitors.

Bose and Rao (2011) defined loyalty in a business context as a customer's commitment to doing business with a specific organization, leading to repeat purchases and positive referrals to others.

Li and Green (2011) stated that loyalty is a deeply rooted intent to continue purchasing a favored product or service in the future, even when faced with external influences that may encourage brand switching. Key drivers of this loyalty include positive attitudes, emotional attachment, and commitment to the brand.

In summary, customer loyalty refers to a customer's ongoing support for a company's product or service despite competitive alternatives. It manifests in three main behavioral forms: repeat purchases, positive word-of-mouth, and resistance to switching. Accordingly, this study adopts theories and concepts to analyze the factors influencing the loyalty of EV users in the central region of Thailand.

Research Methodology

This study employed a quantitative research approach. The sample was drawn from the population of individual EV users who had legally registered their vehicles with the Department of Land Transport by the year 2024. The sample size was determined using Taro Yamane's formula (1973) for a known population, applying a 95% confidence level and a 5% margin of error, which resulted in a total sample size of 400 participants.

The researcher utilized purposive sampling to identify the target group, focusing on provinces in Thailand's Central Region that recorded the highest number of registered private EV users under the Automobile Act, based on year 2024 data from the Department of Land Transport. The top three provinces selected for this study were Bangkok, Phra Nakhon Si Ayutthaya, and Saraburi. The questionnaire was distributed through both online and offline channels. Participants were further screened to include only individuals who had owned and used an EV for at least one year since early adopters of EVs may exhibit characteristics that differ from those of mainstream consumers.

The research instrument used in this study was a questionnaire, which was divided into seven sections as follows:

Section 1: Screening questions to ensure eligibility of respondents.

Section 2: Questions related to EV user loyalty.

Section 3: Questions regarding Customer Expectations.

Section 4: Questions regarding Perceived Quality.

Section 5: Questions regarding Perceived Value.

Section 6: Questions regarding Customer Satisfaction.

Sections 2 to 6 of the questionnaire consisted of five-point Likert scale items, designed to capture the level of agreement of the respondents. These are considered interval scale data, and the scoring interpretation was based on interval range classification using the following criteria:

4.21 – 5.00 = Strongly Agree 3.41 – 4.20 = Agree 2.61 – 3.40 = Neutral

1.81 – 2.60 = Disagree 1.00 – 1.80 = Strongly Disagree

Section 7: Open-ended questions collecting opinions and suggestions from EVs users in the Central Region. Responses from this section were analyzed using content analysis and presented in the form of frequency counts.

The statistical methods used for data analysis included mean, percentage, standard deviation, multiple linear regression analysis, simple linear regression analysis, and correlation coefficient analysis. These techniques were applied to examine the relationships between variables and to identify the factors influencing customer loyalty among EV users.

Research Findings

1. Results of Respondents' Data Analysis

The analysis of data from 400 questionnaire respondents who have owned and used EVs for at least one year revealed that the majority reside in Bangkok, followed by those residing in Phra Nakhon Si Ayutthaya and Saraburi provinces, respectively.

2. Results of Electric Vehicle Users' Loyalty Analysis

The analysis of user loyalty toward EVs in the central region, which comprises three dimensions, revealed the following findings:

Repeat Purchase: Overall, this dimension received a high level of agreement, with a mean score of 3.42. The item with the highest mean score was the respondents' likelihood of choosing an EV again when purchasing a new car in the future, which had a mean score of 4.13, indicating the highest level of agreement.

Word-of-Mouth: This dimension also received a high level of agreement, with an overall mean score of 3.78. The item with the highest score was the respondents' intention to recommend the benefits of EVs to others, which received a mean score of 4.28.

Resistance to switching: This dimension received the highest overall level of agreement, with a mean score of 4.27. The highest-rated item was the regular use of EVs for daily commuting, with a mean score of 4.56.

Furthermore, the level of loyalty among EV users in the central region did not differ significantly, as indicated by standard deviation values of 0.98, 0.84, and 0.80 for the respective dimensions.

3. Results of Customer Expectation Factors Analysis

The analysis of customer expectation factors, which consists of two dimensions, revealed the following findings:

Outcome Compared to Overall Experience: This dimension received the highest level of agreement, with a mean score of 4.31. The item with the highest score was the respondents' perception of having a positive experience with driving an EV, which had a mean score of 4.40.

Level of Need: This dimension also received the highest level of agreement, with a mean score of 4.43. The item with the highest score indicated that respondents believed EVs could help solve problems associated with combustion engine vehicles, with a mean score of 4.52.

Moreover, the level of customer expectations among EV users in the central region did not differ significantly, as indicated by standard deviation values of 0.58 and 0.52 for the respective dimensions.

4. Results of Perceived Quality Factors Analysis

The analysis of perceived quality factors, which includes eight dimensions, revealed the following findings:

Performance: This dimension received the highest level of agreement, with a mean score of 4.65. The item with the highest score was the perception that EVs provide good overall performance, which had a mean score of 4.76.

Features: This dimension also received the highest level of agreement, with a mean score of 4.73. The highest-rated item indicated that EVs help reduce noise pollution, with a mean score of 4.83.

Reliability: This dimension received the highest level of agreement, with a mean score of 4.55. The top-rated item was the belief that EVs can safely reach their destinations, with a mean score of 4.78.

Durability: This dimension also showed the highest level of agreement, with a mean score of 4.46. Respondents most strongly agreed that EVs should come with a warranty of at least five years, with a mean score of 4.66.

Conformance: This dimension received the highest level of agreement, with a mean score of 4.54. The highest-rated item was the belief that all EVs should be manufactured by certified, quality-assured producers, with a mean score of 4.59.

Serviceability: This dimension received a high level of agreement, with a mean score of 4.11. Respondents strongly agreed that service centers and dealerships offer convenient service, with a mean score of 4.39.

Aesthetics: This dimension received a high level of agreement, with a mean score of 4.12. The most highly rated item was the preference for EVs due to the modern design of their interior features, with a mean score of 4.40.

Perceived Quality: This dimension also received a high level of agreement, with a mean score of 4.17. The item with the highest score was the perception that brand image contributes to others' willingness to adopt EVs, with a mean score of 4.29.

Moreover, the level of perceived quality among EV users in the central region did not differ significantly, as indicated by standard deviation values of 0.46, 0.46, 0.58, 0.56, 0.50, 0.78, 0.77, and 0.75 across the eight dimensions.

5. Results of Perceived Value Factors Analysis

The analysis of perceived value factors, consisting of two dimensions, revealed the following findings:

Perceived Value Compared to Price: This dimension received the highest level of agreement, with a mean score of 4.30. The item with the highest score was the respondents' belief that the cost of installing EV accessories is worthwhile when compared to the cost of using combustion engine vehicles, which had a mean score of 4.43.

Willingness to Pay: This dimension also received the highest level of agreement, with a mean score of 4.29. The most highly rated item was the belief that if the price of EVs were reduced, the number of users would significantly increase, with a mean score of 4.45.

Additionally, the perceived value among EV users in the central region did not differ significantly, as indicated by standard deviation values of 0.66 and 0.63 for the respective dimensions.

6. Results of Customer Satisfaction Factors Analysis

The analysis of customer satisfaction factors revealed that overall satisfaction with the use of electric vehicles was at the highest level of agreement, with a mean score of 4.34. The highest-rated item was the respondents' expression of happiness when using EVs, which had a mean score of 4.63. Following this, respondents reported satisfaction with the overall infrastructure supporting EV use, with a mean score of 4.36, and satisfaction with the services provided by EV manufacturers and distributors, with a mean score of 4.03, respectively. Furthermore, customer satisfaction levels among EV users in the central region did not differ significantly, as indicated by the standard deviation value of 0.64.

7. Hypothesis Testing Results

The results of Hypothesis 1, which examined whether customer expectations influence the loyalty of electric vehicle users in the central region of Thailand, are summarized in Table 1.

Table 1: Summary of Hypothesis Testing: The Effect of Customer Expectations on the Loyalty of Electric Vehicle Users in the Central Region (Multiple Regression Analysis)

Customer Expectation Factors	Loyalty of Electric Vehicle Users		
	Repeat Purchase	Word-of-Mouth	Resistance to switching
Outcome Compared to Overall Experience	✓	✓	✓
Level of Need	✗	✓	✓

Note: ✓ indicates a statistically significant effect; ✗ indicates no statistically significant effect.

The results from Table 1 can be summarized as follows:

Hypothesis 1.1: Customer expectations influence the repeat purchase behavior of EV users in the central region. The analysis showed that the “Outcome Compared to Overall Experience” factor has a statistically significant effect on repeat purchase behavior at the 0.01 level.

Hypothesis 1.2: Customer expectations influence word-of-mouth behavior among EV users in the central region. The results indicated that both “Outcome Compared to Overall Experience” and “Level of Need” have a statistically significant effect on word-of-mouth behavior at the 0.01 level.

Hypothesis 1.3: Customer expectations influence the resistance to switching among EV users in the central region. The analysis found that both “Outcome Compared to Overall Experience” and “Level of Need” significantly influence the resistance to switching at the 0.01 significance level.

The results of Hypothesis 2, which examined whether perceived quality affects the loyalty of electric vehicle users in the central region, are summarized in Table 2.

Table 2: Summary of Hypothesis Testing: The Effect of Perceived Quality on the Loyalty of Electric Vehicle Users in the Central Region (Multiple Regression Analysis)

Perceived Quality Factors	Loyalty of Electric Vehicle Users		
	Repeat Purchase	Word-of-Mouth	Resistance to switching
Performance	X	X	X
Features	✓	X	X
Reliability	X	✓	X
Durability	✓	X	✓
Conformance	X	X	✓
Serviceability	✓	X	X
Aesthetics	X	X	X
Perceived Quality	X	X	X

Note: ✓ indicates a statistically significant effect; X indicates no statistically significant effect.

The results from Table 2 can be summarized as follows:

Hypothesis 2.1: Perceived quality influences the repeat purchase behavior of EV users in the central region. The analysis found that the “Features” factor had a statistically significant effect on repeat purchase behavior at the 0.05 level. Furthermore, the “Durability” and “Serviceability” factors significantly influenced repeat purchases at the 0.01 level.

Hypothesis 2.2: Perceived quality influences word-of-mouth behavior among EV users in the central region. The “Reliability” factor was found to significantly influence word-of-mouth behavior at the 0.01 level.

Hypothesis 2.3: Perceived quality influences the resistance to switching among EV users in the central region. The analysis indicated that “Durability” had a statistically significant effect on usage insensitivity at the 0.05 level, while “Conformance” had a significant effect at the 0.01 level.

The results of Hypothesis 3 testing, which examined whether perceived value influences the loyalty of electric vehicle users in the central region, are summarized in Table 3.

Table 3: Summary of Hypothesis Testing: The Effect of Perceived Value on the Loyalty of Electric Vehicle Users in the Central Region (Multiple Regression Analysis)

Perceived Value Factors	Loyalty of Electric Vehicle Users		
	Repeat Purchase	Word-of-Mouth	Resistance to switching
Value Perception Compared to Price	X	X	✓
Willingness to Pay	✓	✓	✓

Note: ✓ indicates a statistically significant effect; X indicates no statistically significant effect.

The results from Table 3 can be summarized as follows:

Hypothesis 3.1: Perceived value influences repeat purchase behavior among EV users in the central region. The results revealed that the “Willingness to Pay” factor had a statistically significant effect on repeat purchase behavior at the 0.01 level.

Hypothesis 3.2: Perceived value influences word-of-mouth behavior among EV users in the central region. The “Willingness to Pay” factor was also found to have a statistically significant effect on word-of-mouth at the 0.01 level.

Hypothesis 3.3: Perceived value influences the resistance to switching among EV users in the central region. Both “Value Perception Compared to Price” and “Willingness to Pay” significantly influenced usage insensitivity at the 0.01 level.

The results of Hypothesis 4 testing, which examined whether customer satisfaction influences the loyalty of electric vehicle users in the central region, are summarized in Table 4.

Table 4: Summary of Hypothesis Testing: The Effect of Customer Satisfaction on the Loyalty of Electric Vehicle Users in the Central Region (Simple Regression Analysis)

Customer Satisfaction Factor	Loyalty of Electric Vehicle Users		
	Repeat Purchase	Word-of-Mouth	Resistance to switching
Overall Satisfaction with EV Usage	X	✓	✓

Note: ✓ indicates a statistically significant effect; X indicates no statistically significant effect.

The results from Table 4 can be summarized as follows:

Hypothesis 4.1: Customer satisfaction influences repeat purchase behavior among EV users in the central region. The results showed that overall satisfaction with EV usage does not significantly affect repeat purchase behavior.

Hypothesis 4.2: Customer satisfaction influences word-of-mouth behavior among EV users in the central region. The results revealed that overall satisfaction with EV usage significantly affects word-of-mouth behavior at the 0.01 significance level.

Hypothesis 4.3: Customer satisfaction influences the resistance to switching among EV users in the central region. The results indicate that overall satisfaction with EV usage significantly affects the resistance to switching at the 0.01 significance level.

Table 5: Summary of Hypothesis Testing Results

No.	Hypothesis	ANOVA (P-Value)	R Square	Adjusted R Square	Factors	Sig	Correlations
1	The Effect of Customer Expectations on the Loyalty of Electric Vehicle Users in the Central Region.						
1.1	Repeat Purchase	0.001**	0.053	0.048	Outcome Compared to Overall Experience	<0.001**	0.214
1.2	Word-of-Mouth	0.001**	0.125	0.121	Outcome Compared to Overall Experience	<0.001**	0.278
					Level of Need	<0.001**	0.292
1.3	Resistance to switching	0.001**	0.105	0.101	Outcome Compared to Overall Experience	0.001**	0.232
					Level of Need	<0.001**	0.286

No.	Hypothesis	ANOVA (P-Value)	R Square	Adjusted R Square	Factors	Sig	Correlations
2	The Effect of Perceived Quality on the Loyalty of Electric Vehicle Users in the Central Region.						
2.1	Repeat Purchase	0.001**	0.081	0.063	Features	0.024*	-0.030
					Durability	0.002**	0.207
					Serviceability	0.007**	0.191
2.2	Word-of-Mouth	0.001**	0.099	0.081	Reliability	0.001**	0.257
2.3	Resistance to switching	0.001**	0.155	0.138	Durability	0.014*	0.335
					Conformance	0.009**	0.335
3	The Effect of Perceived Value on the Loyalty of Electric Vehicle Users in the Central Region.						
3.1	Repeat Purchase	0.019*	0.020	0.015	Willingness to Pay	0.006**	0.133
3.2	Word-of-Mouth	0.001**	0.057	0.052	Willingness to Pay	0.002**	0.226
3.3	Resistance to switching	0.001**	0.104	0.100	Value Perception Compared to Price	0.002**	0.276
					Willingness to Pay	<0.001**	0.287
4	The Effect of Customer Satisfaction on the Loyalty of Electric Vehicle Users in the Central Region.						
4.1	Repeat Purchase	0.146			-		
4.2	Word-of-Mouth	0.005**	0.019	0.017	Overall Satisfaction with EV Usage	0.005**	0.139
4.3	Resistance to switching	0.001**	0.048	0.046	Overall Satisfaction with EV Usage	<0.001**	0.220

Note: **Significant at the 0.01 level *Significant at the 0.05 level

Conclusion and Discussion

Based on the findings from the study on the factors influencing the loyalty of EV users in the central region, the researcher discusses the results to draw conclusions and present factual insights. Relevant literature and previous studies are cited to support or contradict the four hypotheses as follows:

Hypothesis 1: Customer Expectations influence the loyalty of EV users in the central region. This includes overall outcomes compared to experiences and levels of demand. The hypothesis was tested using multiple regression analysis, and the results showed that overall outcomes when compared with user experiences and levels of demand have a statistically significant positive relationship with EV user loyalty at the 0.01 level. This finding aligns with the proposed hypothesis, indicating that these variables are influential in shaping the loyalty of EV users. This may be because individuals' experiences with EVs and their personal level of demand can impact repeat purchases, word-of-mouth behavior, and resistance to switching. The findings of this study are consistent with those of Xu et al. (2024) found that improved customer experience management may encourage sustainable consumer behaviors by making eco-friendly EVs more appealing, thereby supporting

environmental sustainability. Similarly, Former plug-in electric vehicle (PEV) owners, when purchasing a new vehicle, are unwilling to compromise on key issues such as electric driving range (minimum 330 miles for BEVs), charging station locations, recharge times, home charging unavailability, higher purchase prices, battery replacement costs, and lower resale values, which are also concerns shared by households that continue to own PEVs (Dua et al., 2024). Therefore, it can be concluded that customer expectations significantly influence the loyalty of EV users.

Hypothesis 2: Perceived Quality influences the loyalty of EV users in the central region. This includes performance, features, reliability, durability, conformance, serviceability, aesthetics, and perceived quality. Based on the hypothesis testing using multiple regression analysis, it was found that durability, serviceability, reliability, and conformance have a statistically significant positive relationship with EV user loyalty at the 0.01 level. However, features were found to have a statistically significant negative relationship with EV user loyalty at the 0.05 level. These findings are consistent with the proposed hypothesis, suggesting that product durability and the service provided by distributors may influence repeat purchases, while product reliability can impact word-of-mouth referrals. Additionally, the durability and legality of the product may contribute to consumer trust and confidence in using it. On the other hand, special features—such as the electric vehicle's ability to reduce noise pollution—might negatively influence repeat purchases, possibly due to users' concerns about road safety and the risk of accidents. In addition, some special features may be overly complex features to use for EV users. These research findings are consistent with the study by Cheng and Lee (2023), which found that core performance, reliability and perceived quality have a significantly positive effect on customer loyalty.

Hypothesis 3: Perceived Value influences the loyalty of EV users in the central region. This includes perceived value in comparison to price and willingness to pay. Based on hypothesis testing using multiple regression analysis, it was found that perceived value—when compared to price and willingness to pay—has a statistically significant positive relationship with EV user loyalty at the 0.05 and 0.01 levels, respectively. These findings are consistent with the proposed hypothesis. This is because EV users believe that the overall cost, including the installation of accessories and other related expenses, is more worthwhile compared to internal combustion engine vehicles. Most respondents also agree that if electric vehicle prices were reduced, there would be a higher number of EV users. These research findings are consistent with the study by Purwanto and Irawan (2024), which found that the high initial cost of electric vehicles remains a major obstacle. However, EVs offer an economic advantage due to their lower operating costs, making them more attractive from a financial perspective. Government incentives, although differing by region, can help reduce financial barriers and promote the adoption of electric vehicles.

Hypothesis 4: Customer Satisfaction influences the loyalty of EV users in the central region. This refers to overall satisfaction with electric vehicle usage. Based on hypothesis testing using simple regression analysis, it was found that overall satisfaction with electric vehicle usage has a statistically significant positive relationship with EV user loyalty at the 0.01 level. This finding is partially consistent with the proposed hypothesis. Overall satisfaction with EV use may influence word-of-mouth recommendations and user sensitivity but does not affect repurchase behavior. This is in line with the findings of Hasan (2021), who noted that there was no significant direct effect of overall satisfaction on repurchase intention. However, it is not possible to dismiss its impact on user attitudes and perceived usage barriers. It is possible that overall satisfaction is inversely related to consumers' negative attitudes and positively related to their favorable attitudes toward EV usage. This indicates that after using EVs, consumers' level of satisfaction tends to positively influence their emotions or perceptions regarding EV use. Accordingly, the study found that repurchase decisions were influenced primarily by physical value factors such as user experience, perceived quality, and price, whereas customer satisfaction tends to be driven by emotion. Therefore, it can be concluded that customer satisfaction does not significantly influence the loyalty of EV users in terms of repeat purchase behavior, but customer satisfaction does significantly influence the loyalty of EV users in terms of Word-of-Mouth and Resistance to switching behavior.

Suggestions

From the research findings, it was found that the opinions on the factors of perceived quality such as Serviceability, Aesthetics, and Perceived Quality, had an overall average rating of "agree." Therefore, to improve the level of customer satisfaction, businesses or interested parties should improve and develop products and services in the following areas:

1.1 Serviceability: After-sales service staff and operators should pay more attention to providing information and advice to EV users. They must also build confidence in the users that after-sales services will follow the terms and guarantees specified by the manufacturers and sellers. Operators or interested parties could implement a subsidized maintenance program to enhance consumer confidence and encourage long-term loyalty among EV users.

1.2 Aesthetics: The attractiveness of the EV, in terms of color and external design, may not be sufficient to fully attract users. Operators or interested parties should have a customizable design option for EV buyers to support individual customer design.

1.3 Perceived Quality: Some EV users still do not associate the brand with reflecting their own image. Therefore, operators or interested parties should focus more on advertising the brand's image or organizing activities to promote and create a positive image for the brand.

For future research, the study method may shift to qualitative research by conducting in-depth interviews with the same group of respondents on the special features of EVs that negatively correlate with the loyalty of EV users, particularly regarding repeat purchases. This means that certain special features of EVs may have an inverse relationship with repeat purchases. Therefore, reducing some special features could potentially increase repeat purchases. The use of in-depth interviews could benefit operators or interested parties by providing insights that help improve and develop EV products to prevent a decrease in the loyalty of EV users and understand EV user perceptions better.

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Marketing Factors Influencing the Decision to Use Fitness Services in Mueang, Nakhon Ratchasima

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Abstract

This research aims to study the marketing factors: product, price, place (distribution channels), promotion, process, people, and physical evidence that influence the decision to use fitness services in Mueang, Nakhon Ratchasima. The sample group consisted of 400 respondents, selected through purposive sampling. The research instrument used for data collection was a questionnaire. The statistical methods employed included descriptive statistics (percentage, mean, and standard deviation) and multiple regression analysis for hypothesis testing. The results revealed that most respondents were female, aged between 31–40 years, working as employees in private companies or state enterprises, holding a bachelor's degree or equivalent, and earning an average monthly income between 15,001–20,000 baht. Regarding behavior, most participants used fitness services with friends, at fitness studios, with a frequency of 3–4 times per week. The level of decision to use fitness services regarding the use of fitness services was found to be high ($\bar{X} = 4.50$, S.D. = 0.43). Furthermore, the study found that product, promotion, and physical evidence were statistically significant factors influencing the decision to use fitness services at the 0.05 level. The model demonstrated moderate explanatory power with an R^2 value of 0.276, indicating that these variables collectively explain 27.6% of the variance in decision-making behavior. These findings offer practical implications for fitness business operators aiming to enhance customer engagement through strategic marketing efforts.

Keywords: marketing, decision, use, fitness services

Introduction

In Thailand, the cumulative number of newly registered businesses in the sports and exercise industry between January and November 2023 reached 732 enterprises, marking an increase of 195 businesses compared to the same period in the previous year. Moreover, growing sub-sectors are fitness centers and personal training services, which have seen a growth rate of over 27% in new business registrations. In recent years, the demand for health and fitness services in Thailand has been steadily increasing, driven by urbanization, rising health awareness, and changing lifestyles. Mueang District in Nakhon Ratchasima has emerged as a strategic location for fitness businesses due to its high population density, rapid urban development, and growing middle-class population. According to the Office of the National Economic and Social Development Council (NESDC, 2023), Nakhon Ratchasima ranks among the top five provinces in Northeastern Thailand in terms of household spending on health and wellness. Moreover, data from the Department of Business Development (2023) indicate a 23% growth in newly registered fitness centers in the province over the past three years, particularly concentrated in the Mueang area. This reflects a strong and growing consumer demand for fitness-related services. Nowadays, people's lifestyles have become a highly competitive society. The new modern lifestyle. Urban environments are marked by time-pressured activities such as commuting, public service usage, and work obligations. People spend more time working and working hard to change their status. The work condition of full-

time pressures affects working behaviors. So, people spend more time in front of computer screens (Wanthida Chotimanotam, 2003). People work under time conditions, and they demand good health and physical well-being. In addition to healthy diets and adequate rest, physical exercise is increasingly recognized as a vital component of a balanced lifestyle (Wanthida Chotimanotam, 2003: Pattamanun Poldej, 2004). Beyond healthy diets and adequate rest, physical exercise is increasingly recognized as a vital component of a balanced lifestyle (Wanthida Chotimanotam, 2003: Pattamanun Poldej, 2004). Driven by the growing trend of fitness awareness, people focus on more exercises. So, there are sports business sectors that are interested, and registered for the establishment of a sports business entity. In addition to conventional forms of exercise, consumers are increasingly fitness trends such as yoga, Pilates, and scuba diving (Kaohoon, 2024). The increasing popularity of fitness as a lifestyle trend has created new opportunities for the expansion of fitness businesses, particularly small fitness centers, which require less capital investment compared to large gyms. These smaller fitness centers offer exercise machines and serve more than one fitness usage that depends on the size of the fitness center that offers costs per hour for each individual. These offers affect exercisers and can control the exercise cost per one time. Additionally, Smaller fitness centers typically offer shared access to exercise machines and standard service options, with pricing that varies based on the size of the facility and hourly usage rates. Every fitness center faces high competition that depends on the marketing dimensions, especially the service marketing mix, which includes seven key elements: product, price, place, promotion, people, physical evidence, and process. Understanding which of these marketing mix factors influence consumer decision-making.

Based on the previously discussed points, the researcher studied the factors influencing decision to use fitness services in Mueang, Nakhon Ratchasima. This study stems from the recognition that such research could offer practical value to fitness business operators, enabling them to apply the findings to marketing strategies, and they adjust the demand of fitness usage in Meung, Nakhon Ratchasima.

Objective of the study

The aims of this research were to study factors influencing the decision to use fitness services in Mueang, Nakhon Ratchasima: product, price, place, promotion, process, people, and physical evidence.

Hypothesis of the study

H1: Product factors significantly influence the decision to use fitness services in Mueang, Nakhon Ratchasima.

H2: Price factors significantly influence the decision to use fitness services in Mueang, Nakhon Ratchasima.

H3: Place (distribution channel) factors significantly influence the decision to use fitness services in Mueang, Nakhon Ratchasima.

H4: Promotion factors significantly influence the decision to use fitness services in Mueang, Nakhon Ratchasima.

H5: Process factors significantly influence the decision to use fitness services in Mueang, Nakhon Ratchasima.

H6: People factors significantly influence the decision to use fitness services in Mueang, Nakhon Ratchasima.

H7: Physical evidence factors significantly influence the decision to use fitness services in Mueang, Nakhon Ratchasima.

Literature Review

Marketing Mix

Referring to Chalongsri Pimolsompong (2005), study the service marketing mix that services are the activities to meet customers' demand and create the highest service satisfaction. At first, customers will determine the quality and benefits criteria of service. On the other hand, sellers must

build consumer confidence by offering guarantees for customers to make fast purchasing decisions. The seven service marketing mixes consist of the following: 1) A product is defined as things to purchase for the target market that serve the need and demand of humans. Products can be tangible (physical goods) or intangible (services). The seller must provide value and benefits through either form. In the context of services, customers receive benefits and perceived value from the offering even though the service itself is intangible. 2) Price is meant for customers' decision on initial pricing, markups, and customer discounts. Price represents the monetary value of the product or service. In the case, customers often compare the perceived value of a service to its price; if the value exceeds the cost, a purchase is more likely to occur. Therefore, service pricing must be appropriate, clearly structured, and easily distinguishable between service levels. 3) Place is distribution channels and methods for delivering goods and services to customers in a timely manner. These activities involve the service atmosphere and environment, which influence customer perceptions of value and benefits. The important considerations include location and distribution channels. Siriwan Serirat, Parin Laksitanont, and Suporn Serirat (1998) emphasized that location is particularly important in service businesses, as it directly influences the customer. The location is selected as accessible as possible to the target group. Therefore, the level of important location may depend on the type of business. 4) Promotion is defined as marketing communication tools that create motivation, thinking, feeling, need, and satisfaction regarding a product and/or service. Promotion persuades customers to simulate customers' reminders with goods. The communication is applied for exchanging information between sellers and buyers. Additionally, the marketing communication tools are mixed together, known as Integrated Marketing Communication (IMC). IMC. The selection of tools depends on the characteristics and appropriateness for the target customer group (Siriwan Serirat et al., 2003). The important promotional tools include personal selling, advertising, sales promotion, publicity, and public relations. These tools introduce customers to attention goods and services and encourage continued product or service usage. 5) People are known as people involved in the process of goods and services. Both of them interact between seller and buyer. These interactions significantly influence customer perceptions of service quality. Therefore, organizations must engage in effective recruitment, training, and motivation of their personnel to ensure that they can deliver superior customer satisfaction and differentiate themselves from competitors. Employees must have their competency and service-minded attitude exhibit initiative, demonstrate problem-solving abilities, and contribute to building the organization's core values. 6) Physical evidence and presentation is defined as tangible cues that reflect the quality and nature of a service offered by an organization. These physical elements can be perceived by customers during the service encounter and serve to reinforce the organization's value proposition. Physical evidence includes the overall physical evidence, staff appearance, cleanliness, polite communication, speed of service delivery, and other tangible benefits that customers expect. The purpose is to create a consistent and high-quality service experience that enhances customer value and satisfaction. 7) Process means the procedures and workflows involved in delivering a service to customers. It includes the methods, operations, and systems that guide how the service is provided. An effective process guarantees that services are delivered correctly, promptly, and consistently. Well-designed service processes lead to greater service quality and efficiency, ultimately leaving a positive impression on customers.

Decision to Use

Kotler & Keller (2006), The decision to use a service refers to the consumer's decision-making process regarding the purchase of products or services. This process generally comprises five stages:

1) Need Recognition: This stage begins when an individual becomes aware of a need or problem, which may arise from various factors such as product depletion, changes in personal circumstances, environmental changes, or marketing stimulation. These factors trigger the desire to fulfill a perceived need.

2) Information Search: The information resource is searched through individual resources, online media, offline media, and organizational resources.

3) Evaluation of Alternatives: Consumers compare various options based on product or service features, brand reputation, and the perceived benefits of each alternative. This stage is crucial for determining the most suitable choice.

4) Purchase Decision: In this case, the consumer selects a product or service and proceeds with the purchase. This decision is influenced by the degree of satisfaction or utility the consumer expects to receive from the chosen option.

5) Post-Purchase Behavior: After the consumer purchase, the consumer evaluates their level of satisfaction. If the experience meets or exceeds expectations, repeat purchases are likely. Conversely, dissatisfaction may result in discontinued usage or switching to alternative providers.

Related research:

Thanyanan Jirathamavit (2021) found that marketing promotion factors significantly influenced the decision to use fitness services among women in Mueang Samut Prakan District, Samut Prakan Province. The study revealed that marketing promotion had a positive effect on women's decisions to select fitness services, as demonstrated by a T-test significance value of 0.000. The research result investigated that appropriate advertising and public relations across various media platforms, offering service fee discounts on special occasions, and consistently implementing promotional campaigns are key factors influencing the decision to use fitness services. Moreover, the study found that physical evidence and its presentation were factors that also positively influenced the decision to use fitness services of women in Mueang Samut Prakan District, Samut Prakan Province, with a T-test significance value of 0.000. These results showed factors that influence decision to use fitness services that included the availability of relaxation areas after workouts, sufficient parking space, and the cleanliness of restrooms and shower facilities. These factors were shown to play an important role in women's decision-making regarding fitness service usage in Mueang Samut Prakan District, Samut Prakan Province.

Thanyathorn Wongkun (2018) conducted a study on the marketing mix factors influencing decision to use fitness services among Generation Y individuals in Bangkok. The study found that exercise machines, safety, modern exercise machines, and regularly updated workout programs were critical factors. Moreover, boutique fitness centers, which are designed to stand out from general fitness facilities, product safety, and innovative class design are essential in meeting current consumer demands. These fitness centers allow customers to select specialized activities based on their preferences or strengths such as yoga, boxing, weight training, or cycling; thereby offering a more different, personalized, and engaging experience than conventional fitness centers.

This research provided guidance to conceptual Framework as following:

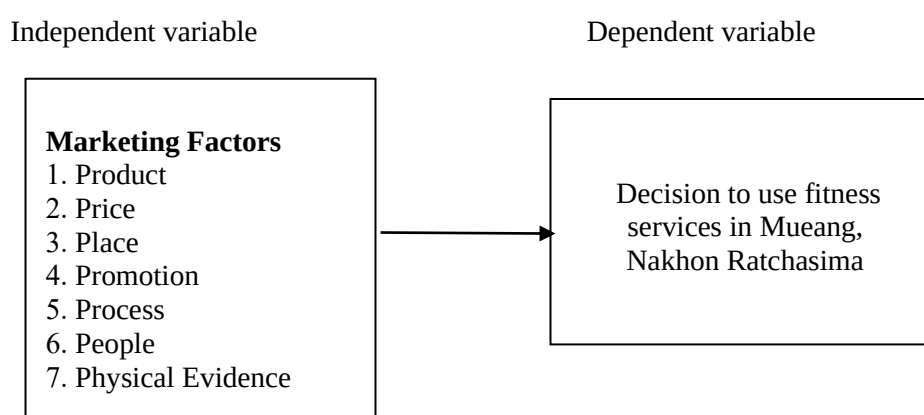


Figure 1: Conceptual Framework

Research Methodology

This research was quantitative research in which data were collected by questionnaires and respondents who were fitness service users in Mueang, Nakhon Ratchasima. The population of this research was people who stayed in Mueang, Nakhon Ratchasima and who have used fitness services in Mueang, Nakhon Ratchasima. The sample group was calculated by Krejcie & Morgan's formula with a confidence level set at 95% and a margin of error not exceeding 5%, resulting in a required sample of 400 participants (Krejcie & Morgan, 1970). These 400 participants were selected through the purposive sampling. The researcher used self-administered questionnaires. The questionnaire has content validity between 0.67-1.00, which is not less than 0.50 (Nielsen and Landauer, 1993) and the questionnaire is reliability with an alpha coefficient between 0.813 - 0.986, which is more than 0.70 (Nunnally, 1978). Data collected by online surveys via Google Forms.

Research Instrument

The instrument of this research was a questionnaire for collecting data. This questionnaire was created through the literature reviews that were divided into 3 sections as follows:

Section 1: The questionnaires collected the fitness service users' 5 general information; gender, age, educational level, and monthly income. Especially, the respondents can select only one answer from the checklist.

Section 2: The questionnaire was designed to assess opinions of respondents on 7 factors influencing the decision to use fitness services in Mueang, Nakhon Ratchasima; Product, Price, Place, Promotion, Process, People, and Physical Evidence. This section was a rating scale format for all items with 5 levels.

Section 3: Questionnaire on the decision to use fitness services in Mueang, Nakhon Ratchasima (5-point rating scale).

Data Analysis

1. The general information of the sample group was analyzed by frequency and percentage.
2. The level of opinions regarding each factor was analyzed using descriptive statistics based on a five-point Likert scale: strongly agree, agree, neutral, disagree, and strongly disagree. The statistical method of this research included mean and standard deviation.
3. Multiple linear regression analysis was applied to test factors influencing the decision to use fitness services in Mueang, Nakhon Ratchasima.

Research Results

The research results investigated most of the respondents were 223 female (55.90%), while 176 respondents were male (44.10%). The majority were 131 respondents who were aged between 31 and 40 years (32.80%). 165 respondents worked in the private sector or state enterprises (41.40%). Regarding educational background, 140 respondents (35.10%) held a bachelor's degree or equivalent. In terms of monthly, 138 respondents earned between 15,001 and 20,000 baht (34.60%).

The research results show the most respondents used fitness services with friends (53.10%). Most respondents exercised at fitness studios (56.40%). In terms of time for service usage was between 8:01 p.m. and 10:00 p.m. (79.70%). Regarding fitness usage, respondents exercised 3-4 times per week (55.10%).

The respondents' opinions on factors influencing the decision to use fitness services in Mueang, Nakhon Ratchasima, were analyzed based on mean scores and standard deviations that revealed the following:

The results indicated that the factors of physical evidence and place (distribution channels) were rated at a high level, with the highest mean score of 4.60. This was followed closely by the process factor, with a mean score of 4.59, also interpreted as a very high level of influence. Furthermore, promotion and people factors were both rated at a very high level, with a mean score of 4.57. The price factor was also rated at a very high level, with a mean score of 4.56. Lastly, the product factor was evaluated at a high level, with a mean score of 4.44, as shown in Table 1.

Table 1: Results of the Analysis of Mean and Standard Deviation of factors influencing the decision to use fitness services in Mueang, Nakhon Ratchasima.

Marketing Factors	Mean	SD	Level of Agreement
Product (X1)	4.44	0.45	High
price (X2)	4.56	0.68	Highest
Place (X3)	4.60	0.56	Highest
promotion (X4)	4.57	0.52	Highest
Process (X5)	4.59	0.45	Highest
People (X6)	4.57	0.50	Highest
Physical Evidence (X7)	4.60	0.51	Highest
Decision to Use Fitness Services (Y)	4.50	0.43	High

Results of Hypothesis Testing

The relationship between factors influencing the decision to use fitness services in Mueang, Nakhon Ratchasima, was analyzed and revealed correlation coefficients ranging from 0.138 to 0.720, indicating positive correlations at the 0.01 level of statistical significance. In addition, the multicollinearity showed that the Variance Inflation Factor (VIF) values ranged from 1.552 to 2.456, which is well below the starting point of 10. The tolerance values ranged from 0.407 to 0.644, which are greater than the minimum criterion of 0.10. These results indicate that the Independent variables were correlated without causing multicollinearity problems (Black, K., 2006).

Table 2: The Relationship between factors influencing the decision to use fitness services in Mueang, Nakhon Ratchasima.

Variables	X1	X2	X3	X4	X5	X6	X7	Y
Product (X1)	1							
price (X2)	0.710**	1						
Place (X3)	0.201**	0.370**	1					
promotion (X4)	0.242**	0.324**	0.528**	1				
Process (X5)	0.251**	0.373**	0.382**	0.442**	1			
People (X6)	0.247**	0.279**	0.409**	0.435**	0.720**	1		
Physical Evidence (X7)	0.138**	0.267**	0.343**	0.372**	0.550**	0.514**	1	
Decision to Use Fitness Services (Y)	0.346**	0.349**	0.214**	0.334**	0.345**	0.295**	0.407**	1

**Statistically significant at the 0.01 level

Table 3: Multiple Regression Coefficients of factors influencing the decision to use fitness services in Mueang, Nakhon Ratchasima.

Marketing Factors	B	std.	Beta	t	p-value
constant	1.491	.264		5.649	.000
Product (X1)	.147	.041	.222	3.564	.000*
price (X2)	.049	.054	.061	.918	.359
Place (X3)	-.048	.047	-.055	-1.021	.308
promotion (X4)	.160	.054	.159	2.936	.004*
Process (X5)	.070	.061	.078	1.159	.247
People (X6)	-.026	.058	-.029	-.447	.655
Physical Evidence (X7)	.309	.057	.292	5.448	.000*
R= 0.526 R ² = 0.276 R ² Adj=0.263, SEE. = 0.391, F=21.372 Sig 0.000 Durbin = 1.138					

* Statistically significant at the 0.05 level

Results from the multiple regression analysis are presented in Table 3, examining factors influencing the decision to use fitness services in Mueang, Nakhon Ratchasima. These results revealed that three factors: product (X1), promotion (X4), and physical evidence (X7) have a statistically significant influence on the decision to use fitness services in Mueang, Nakhon Ratchasima. The model showed a coefficient of determination (R²) of 0.276, suggesting that these variables collectively explain 27.60% of the variance in service usage decisions. These factors were statistically significant at the 0.05 level, which led to the acceptance of the related hypotheses. In contrast, price (X2), place (X3), process (X5), and people (X6) did not significantly influence the decision to use fitness services in Mueang, Nakhon Ratchasima; thus, the corresponding hypotheses were rejected.

Table 4: Summary of Hypothesis Testing Results of factors influencing the decision to use fitness services in Mueang, Nakhon Ratchasima.

Hypothesis	Hypothesis Testing
H1: Product factors significantly influence the decision to use fitness services in Mueang, Nakhon Ratchasima.	Accept
H2: Price factors significantly influence the decision to use fitness services in Mueang, Nakhon Ratchasima.	Reject
H3: Place (distribution channel) factors significantly influence the decision to use fitness services in Mueang, Nakhon Ratchasima.	Reject
H4: Promotion factors significantly influence the decision to use fitness services in Mueang, Nakhon Ratchasima.	Accept
H5: Process factors significantly influence the decision to use fitness services in Mueang, Nakhon Ratchasima.	Reject
H6: People factors significantly influence the decision to use fitness services in Mueang, Nakhon Ratchasima.	Reject
H7: Physical evidence factors significantly influence the decision to use fitness services in Mueang, Nakhon Ratchasima.	Accept

Conclusion and Discussion

The research results on the factors influencing the decision to use fitness services in Mueang, Nakhon Ratchasima, showed that most respondents exhibited fitness service usage behavior by attending sessions with friends and preferring to exercise at fitness studios. The peak service hours were between 8:01 PM and 10:00 PM, with a frequency of 3-4 times per week. Additionally, it was found that factors influencing the decision to use fitness services in Mueang, Nakhon Ratchasima, the physical evidence, and place (distribution channels) are the most influential, followed by process, promotion, and people, respectively. Price and product were also found to be of a high level of influence. Hypothesis testing confirmed that these marketing factors significantly influenced customers' decisions to use fitness in Mueang, Nakhon Ratchasima. The hypothesis testing showed that the product factor significantly influenced the decision to use fitness services in Mueang, Nakhon Ratchasima. This finding is consistent with the study of Thanyathorn Wongkul (2018), who examined the marketing mix factors influencing the decision to use boutique fitness services Generation Y in Bangkok. The study revealed that consumers prioritized the product element the most in their decision-making, particularly focusing on exercise programs and fitness equipment. Safety of the equipment received the highest score, followed by modernity and regularly updated, engaging programs. As boutique fitness centers are expected to have distinctive product features, consumers favored well-designed, modern classes that aligned with their preferences, such as yoga, boxing, weight training, or cycling offering greater variety and differentiation from conventional fitness centers. In addition, the finding of marketing promotion factors significantly influenced the decision to use fitness services among women in Mueang Samut Prakan District, Samut Prakane. It was found that the promotion factor also influenced the decision to use fitness in Mueang, Nakhon Ratchasima, which aligns with the study by Thanyanan Jirathamavit (2021), study investigated factors influencing women's decisions to use fitness services in Mueang Samut Prakan District, Samut Prakan Province. The findings showed that appropriate advertising through various media, discounts on special occasions, and regular promotional campaigns were significant promotional elements that influenced women's decisions to use fitness services in Mueang Samut Prakan District, Samut Prakan Province. The study's result of factors influencing the decision to use fitness services in Mueang, Nakhon Ratchasima., revealed that the physical evidence factor was found to significantly influence the decision to use fitness services in Mueang, Nakhon Ratchasima. This finding is consistent with the study conducted by Thanyanan Jirathamavit (2021), which examined factors affecting women's decisions to use fitness services in Mueang Samut Prakan District, Samut Prakan Province. The study revealed that elements such as relaxation places after the exercise, sufficient parking spaces, and the cleanliness of restrooms and shower facilities were components that influenced women's decisions to use fitness services in Mueang Samut Prakan District, Samut Prakan Province. Although the study found that price, location, process, and people were not statistically significant, these factors should not be

overlooked. Competing on price may still attract new users. Staff training in social skills, ease of travel, and streamlined service processes can support fitness operators overall.

Suggestion

1. Fitness entrepreneurs should emphasize the image of fitness services. Nowadays consumers concentrate on physical appearance, which significantly influences their decision to use fitness services. Including a modern facility, adequate parking, and safety while using the service are key aspects that consumers consider. In addition, offering promotional campaigns can help attract potential customers and influence their decision to choose a particular fitness service.

2. Fitness entrepreneurs should maintain a clean, modern, and safe environment. Provide sufficient parking, accessible facilities, and welcoming reception areas. Clearly display service packages, equipment zones, and hygiene standards to create trust and satisfaction.

3. Fitness entrepreneurs should develop a variety of fitness programs that cater to diverse customer needs such as weight training, yoga, and group classes. Regularly update equipment and introduce specialized sessions (e.g., beginner, senior, or athlete-focused) to attract niche markets.

4. Fitness entrepreneurs should utilize a multi-channel marketing approach by integrating online platforms with offline methods. Implement time-limited promotions and loyalty programs to encourage trial and repeat visits.

Suggestions for Future Research

1. Future studies should consider additional data collection tools, such as focus group discussions and in-depth interviews, alongside online questionnaires to obtain more detailed and specific insights.

2. Future research should build the relationship with consumers to explore the method to determine strategies for maintaining a loyal customer base of fitness businesses. Moreover, investigations into the challenges and obstacles consumers face when choosing fitness services should be conducted to provide practical guidelines for improvement and better responsiveness to customer needs in the future.

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Precautionary Behaviors Against PM2.5 Exposure: Evidence from Business and Tourism Travelers in Thailand

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Abstract

PM2.5, or fine particulate matter with a diameter of 2.5 micrometers or less, presents a serious and persistent public health threat in Thailand, where concentrations frequently exceed the WHO Air Quality Guidelines and contribute to adverse respiratory and cardiovascular outcomes. Although the health risks are well established, individual responses to reduce exposure vary substantially, and the underlying decision-making processes have not been adequately investigated in literature. This study develops an integrated conceptual and empirical framework combining Protection Motivation Theory, the Precautionary Principle, and the Precaution Adoption Process Model to investigate determinants of precautionary behavior. The analysis focuses on assessing the influence of sociodemographic characteristics, information sources, and household context on behavioral responses, and on identifying the specific contributions of awareness, risk perception, and environmental factors to the adoption of precautionary behaviors. The framework incorporates cognitive processes, information sources, and a public attention index derived from internet search activity to capture both individual-level decision-making and population-level patterns of risk awareness. Primary data were collected from 400 individuals, equally divided between Bangkok and Chiang Mai visitors. Multinomial logit models, estimated separately for business and tourism travel purposes, assess the probability of adopting proactive defensive behavior, passive avoidance, or no precautionary action. Results show that public attention, PM2.5 concentration, information source, health status, and household composition shape individual behavior. Among business travelers, the strongest predictors of passive avoidance are self-employment (0.568), student status (0.245), and media-based information seeking (0.080), while private-sector employment (−3.853) and farming (−2.964) reduce the likelihood. For proactive defensive behavior, the highest positive associations are observed among farmers (6.079), private-sector employees (3.820), and those accessing both formal and informal information sources (0.924), whereas higher PM2.5 levels (−0.048) and health vulnerability (−0.147) reduce adoption. Among tourism travelers, proactive behavior is most strongly associated with formal information channels (0.256), followed by combined sources (0.182). Passive avoidance is most likely among individuals living with elderly (0.102), and least likely among those with PM2.5-related illnesses (−0.113) or relying on informal sources (−0.224). The findings support the need for tailored communication and institutional support that reflect individuals' behavioral stages, occupational context, and household vulnerabilities to promote effective responses to PM2.5 exposure.

Keywords: Precautionary Behavior, Protection Motivation Theory (PMT), Precautionary Principle (PP), Precaution Adoption Process Model (PAPM), PM2.5 Exposure

Introduction

In recent years, PM2.5 (fine particulate matter with a diameter of 2.5 micrometers or less) has emerged as a serious environmental and public health concern, particularly in developing countries experiencing rapid population growth. PM2.5 can remain suspended in the airborne for long periods and penetrate deep into the respiratory system (Thangavel & Lee, 2022). Long-term exposure to PM2.5, even at low levels leads to premature mortality and other adverse health effects (Pope et. al., 2002; Pope III & Dockery, 2006). PM2.5 originates from diverse sources, both outdoor and indoor

environments, meaning that even areas with seemingly clean air can have high PM2.5 levels due to indoor activities such as burning wood or coal for heating and cooking (Liu & Salvo, 2018; Kummetha, 2022). In 2019, Thailand ranked as the 28th most polluted country among 98 countries, with an annual average PM2.5 concentration of 24.3 micrograms per cubic meter. By 2020, an annual average PM2.5 concentration was recorded at 18.1 micrograms per cubic meter, moving Thailand to 57th place in the rankings. Thailand's PM2.5 level, while improved, remained four times above the WHO's recommended annual air quality guideline value (IQ Air, 2022). To reduce the negative effects of PM2.5 exposure, individuals take preventive actions to manage their exposure levels. These range from short-term proactive defensive behaviors (such as using indoor air purifiers or wearing protective masks outdoors) to longer-term passive avoidance strategies (such as avoiding outdoor activities during high PM2.5 periods or relocating to areas with better air quality) (Ward & Beatty, 2016).

This article presents pertinent literature on the integration of Protection Motivation Theory (PMT), Precautionary Principles (PP), and the Precaution Adoption Process Model (PAPM) to develop a conceptual framework for analyzing precautionary behavior in response to PM2.5 exposure across different travel purposes in Thailand. Business and tourism travelers were selected to capture variation in behavioral responses stemming from differences in travel purpose, time flexibility, and risk perception. Business travelers often face occupational obligations and limited discretion in travel timing, which may constrain their ability to avoid exposure to environmental hazards. In contrast, tourism travelers typically have more flexibility and may adjust their plans in response to perceived environmental risks. Prior research indicates that perceived risk and the salience of environmental information significantly influence behavioral adjustments, including avoidance and delay decisions (Slovic, 1987; Zivin and Neidell, 2009). Moreover, consumption behavior under pollution conditions varies depending on the urgency and purpose of activity, suggesting that travelers with discretionary objectives, such as tourists, are more likely to engage in precautionary behavior (Kang et al., 2019). Disaggregating by travel purpose therefore enhances the model's ability to explain heterogeneous responses to PM2.5 exposure.

The framework examines how various information channels influence decision-making processes, from awareness to action through cognitive assessments, stages of precaution adoption behaviors. In addition to incorporating a public attention index based on internet searches, the framework links individual-level processes and population-level indicators of concern on PM2.5 issue. This integrated framework offers insights into environmental health research, risk communication, and informed targeted strategies to promote protective behaviors against air pollution and other environmental threats. Suggesting that effective interventions should be tailored to different stages of awareness and decision-making, considering various information sources and their impacts. Policies could focus on enhancing risk communication strategies, targeting specific demographic groups, and addressing barriers to adoption of protective behaviors.

Research Objectives

The objective of this research is to construct an integrated conceptual and empirical framework grounded in Protection Motivation Theory (PMT), the Precautionary Principle (PP), and the Precaution Adoption Process Model (PAPM) to examine the determinants of precautionary behaviors against PM2.5 across different travel purposes in Thailand.

Literature Review

Theories and principles provide a comprehensive framework for understanding how individuals perceive and respond to environmental and health risks. Protection Motivation Theory (PMT) explains the cognitive processes behind threat assessment and coping strategies. Precautionary Principles advocates for preventive action despite to the threat, which can be observed in both proactive defensive and passive avoidance behaviors. Precaution Adoption Process Model (PAPM) outlines the stages individuals go through when deciding to take protective action. Public Attention Index to PM2.5 Exposure offers a practical measure of public engagement with PM2.5 issues through internet search behavior.

Protection Motivation Theory (PMT)

PMT is a psychological framework developed by R. W. Rogers (1975) explores the cognitive processes involved in threat appraisal and coping appraisal, providing insights into how people perceive threats and how threats motivate individuals to adopt protective behaviors. The theory is widely used in health psychology, risk communication, and behavior change interventions.

Threat Appraisal: The cognitive process by which individuals evaluate the level of danger posed by a particular threat, involves with: Perceived severity, refers to individuals' assessment of how serious or severe the consequences of the threat would be if it occurred. Perceived vulnerability refers to an individual's belief about their personal likelihood of experiencing the threat. **Coping Appraisal:** The cognitive process by which individuals assess their ability to cope with a threat and the effectiveness of the recommended protective action, involves with: Response efficacy, refers to belief that the recommended protective action will be effective in reducing or eliminating the threat. Self-efficacy refers to individuals' confidence in their ability to perform the recommended protective action. Response costs refer to perceived costs associated with taking protective action such as money and time, which are crucial factors to consider.

The theory determines the level of protection motivation. A high perceived severity and vulnerability of threat appraisal tends to increase protection motivation and lead to a higher likelihood to adopting protective behaviors of coping appraisal. Understanding threat appraisal is key for promoting protective behaviors through effective interventions and messaging. Whereas, coping appraisal complements threat appraisal by ensuring individuals feel capable of addressing perceived threats.

Precautionary Principles (PP)

PP defines a new standard of risk management when the existence of risk is subject to some scientific uncertainty. It was introduced at the 1992 Rio Conference in Article 15, stated that "where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing effective measures to prevent environmental degradation" (Treich, 2001). The concept of precautionary is strongly linked to the effect of arrival of information over time in sequential models as well as to the situations in which there is ambiguity over probability distributions [10]. Therefore, the principle as applied to individuals' behavior can be understood through proactive defensive and passive avoidance behavior, which provides a framework for analyzing how individuals respond to potential risks when faced with the threats.

Proactive Defensive Behavior: This refers to actions that individuals take to actively protect themselves from perceived threats. The purpose is to seek control or mitigate the risks while still actively engaging with the risk. This involves investing in protective equipment or technology, making backup plans, actively seeking information and expertise, or engaging in developing skills for effective risk management. **Passive Avoidance Behavior:** This refers to avoiding situations or activities perceived as potentially risky. The purpose is to reduce the risk by limiting exposure to potential threats. This involves avoiding certain activities or environments, opting out of decisions with uncertain outcomes, or maintaining the plan even if the change presents potential risks.

PP has become a key approach in risk management that has been widely adopted and applied across various fields (Treich, 2001; Courbage & Treich, 2013). The principle is frequently examined in the context of policy and environmental regulation and is also applicable to the study of individual behavior. The principle emphasizes the dynamic nature of sequential decision-making with evolving information. Importantly, it's worth noting that individuals employed proactive defensive and passive avoidance behavior at the same time.

Precaution Adoption Process Model (PAPM)

PAPM is a stage-based model that describes the process individuals go through when deciding whether to take protective action against a health threat. The model illustrates a series of stages aiming to explain how an individual comes to decisions to act and how individuals translate the decision into action. Unlike other health behavior models, such as the Health Belief Model, the model explicitly includes unawareness, and inaction stages and also provides a more detailed description of the process leading up to action (Weinstein, et. al., 2020).

PAPM conceptualizes decision-making as a progression through discrete stages, each defined by distinct belief structures, behavioral tendencies, and informational requirements. In Stage 1 (Unaware), individuals lack any awareness of the health issue or associated preventive measures and

thus do not perceive any risk or necessity for action. In Stage 2 (Unengaged), individuals recognize the existence of the issue but do not consider taking action and remain personally indifferent despite being aware of the potential risk. Stage 3 (Undecided) involves active deliberation, during which individuals assess the benefits and drawbacks of precautionary behavior while experiencing uncertainty and seeking additional information. In Stage 4 (Decided not to act), individuals consciously choose not to engage in precautionary measures, typically due to low perceived risk, anticipated barriers, or other evaluative judgments. Stage 5 (Decided to act) reflects a firm intention to adopt precautionary behavior, though implementation has not yet occurred. Finally, Stage 6 (Action) marks the transition from intention to execution, as individuals begin enacting the chosen precautionary behavior.

The transition through stages is not always linear, individuals can move backward as well as forward or skip stages. Importantly, awareness of the treats doesn't always lead to engagement or action. PAPM addresses the overlooked early stages and the gap between decision-making and action, enabling more targeted interventions and communication strategies in public health efforts.

Public Attention Index to PM2.5 Exposure (PAI_PM2.5)

PAI_PM2.5 is a proxy measure designed to quantifying public attention to PM2.5 issues through online search behavior in Thailand, which reflects public's threat appraisal and information-seeking in response to perceived PM2.5 risks. Individuals' expressions of concern toward the risk from PM2.5 exposure could be detected by online search to locate the resolutions to the problem (internet search behavior) such as reading media news online or searching for relevant information about PM2.5 exposure. The index estimates public attention to PM2.5 issues in Thailand by analyzing internet search data across 77 provinces. The methodology involves collecting monthly search data, selecting terms most correlated with actual PM2.5 levels, and calculating the index using a formula that normalizes search volumes. The resulting index is then validated against actual PM2.5 levels, economic and social costs, and willingness to pay for pollution reduction. This method provides a comprehensive understanding of public reactions to air quality changes, enabling policymakers to assess perceptions and develop effective interventions for environmental health.

The Public Attention Index for PM2.5 (PAI_PM2.5) serves as a proxy for population-level concern about air pollution by capturing real-time information-seeking behavior using Google Trends data. This index reflects the intensity of online search activity related to PM2.5 across provinces and is increasingly employed to approximate public awareness and perceived environmental risk (Shi et al., 2016; Wang and Zhang, 2022). Empirical studies suggest that heightened attention to air pollution is positively associated with perceived severity and influences precautionary behavior, avoidance of polluted areas, and increased demand for protective goods and services (Zivin and Neidell, 2009; Yan et al., 2019). From an economic standpoint, integrating public attention into behavioral models provides insight into heterogeneity in individual responses to environmental risk and facilitates more responsive and spatially targeted policy interventions. The PAI_PM2.5 therefore functions as both an indicator of behavioral adaptation and a policy-relevant measure of environmental risk perception.

Determinants of Precautionary Behavior Against PM2.5 Exposure

A growing body of literature has identified multiple factors influencing the adoption of precautionary behaviors against PM2.5 exposure. One significant factor is the co-resident status with elderly individuals. Households that include members aged 60 years and over tend to demonstrate heightened precautionary responses due to the increased health vulnerability of the elderly and the associated sense of caregiving responsibility. The presence of older adults elevates environmental risk salience and encourages behavioral adjustments aimed at reducing exposure (Pope & Dockery, 2006; Slovic, 1987).

Educational attainment also plays a critical role in shaping precautionary behavior. Individuals with higher education levels are generally more aware of environmental risks, more likely to perceive air pollution as a health threat, and more inclined to adopt proactive behaviors. In contrast, lower educational attainment is often associated with limited concern, reduced risk perception, and lower engagement with air quality information (Kim et al., 2012; Egondi et al., 2013). Health vulnerability, particularly among individuals with PM2.5-sensitive conditions such as asthma, chronic respiratory diseases, or cardiovascular disorders, further contributes to precautionary behavior. These individuals typically perceive themselves as highly susceptible to adverse health effects, leading to increased motivation to engage in protective actions (Semenza et al., 2008; Shi et al., 2016).

Information-seeking motivation is another relevant determinant. Individuals residing in high-risk areas or those exposed to frequent media coverage tend to perceive greater informational gaps and experience anxiety over health risks, prompting them to actively seek PM2.5-related information. However, evidence suggests that formal government alerts are generally more effective in eliciting proactive responses than information disseminated through informal or media-driven channels (Viscusi, 1990; Hovick et al., 2021). Occupational status significantly influences both exposure and behavioral flexibility. Outdoor workers and those in informal sectors often face structural constraints that limit their ability to reduce exposure. Conversely, individuals in professional or remote occupations exhibit greater behavioral adaptability due to more flexible schedules and greater access to environmental health information (Chuang et al., 2020; Wang & Zhang, 2022).

The severity of PM2.5 exposure itself is directly associated with behavioral adjustments. As ambient concentrations of PM2.5 rise, individuals are more likely to engage in avoidance behavior, such as reducing outdoor activities, using protective gear, and modifying routines in response to perceived risk (Yan et al., 2019; Kang et al., 2019). The source of information also determines behavioral outcomes. Formal information sources, particularly government-issued alerts, are generally perceived as more credible and are more successful in prompting precautionary measures compared to informal or media-based sources, which may be inconsistent or less trustworthy (Lee, 2018; Hovick et al. Higher values of this index are associated with greater societal awareness and progression through the stages of precautionary behavior adoption, underscoring the influence of collective cognition on individual action (So, 2021). Finally, the Public Attention Index (PAI_PM2.5), constructed from internet search activity, offers a proxy measure of collective concern regarding PM2.5. et al., 2019).

Health and Economic Implications of PM2.5 Exposure

Empirical studies consistently show that PM2.5 exposure imposes substantial negative externalities on population health and economic well-being. Short-term exposure has been associated with increased rates of respiratory illness, cardiovascular stress, and school absenteeism, particularly among children and vulnerable populations (Pope and Dockery, 2006; Liu and Salvo, 2018). Long-term exposure is linked to elevated mortality risk and persistent health deterioration, undermining human capital accumulation and labor market participation (Pope et al., 2002; Wang and Zhang, 2022). PM2.5 also imposes indirect welfare costs by altering behavior, reducing social and economic activity, and increasing precautionary expenditures (Shi et al., 2016; Yan et al., 2019). In Thailand, these health burdens are reflected in millions of reported pollution-related illnesses and escalating economic costs due to medical treatment, lost productivity, and decreased quality of life (Kummetha, 2022; IQAir, 2022). From an economic perspective, these outcomes represent substantial welfare losses and justify intervention through both regulatory and behavioral channels to mitigate the long-term impacts of air pollution on public health and economic development.

Research Methodology

Data

Empirical analysis draws on primary data collected through structured questionnaires developed to examine individual responses to PM2.5 exposure, informed by theoretical constructs from Protection Motivation Theory, the Precautionary Principle, and the Precaution Adoption Process Model. These frameworks guide the assessment of perceived risk, adaptive behavior, and progression through behavioral adoption stages. The dataset includes 400 individuals aged 18 and over, equally divided between two groups consisting of Bangkok and Chiang Mai visitor. The sample size is determined using the Yamane formula (Yamane, 1967) with a 95 percent confidence level and a 5 percent margin of error to ensure representativeness and statistical reliability. Due to the large population, Yamane's method was appropriate. Population estimates were based on data from the Ministry of Tourism and Sports (2023). Simple random sampling is employed for both subsamples. The subsamples consist of individuals visiting Bangkok and Chiang Mai who are at least 18 years old, able to communicate in Thai, and do not hold permanent residence in the destination province. All participants provided informed consent voluntarily, following ethical research procedures and with full access to study documentation outlining their rights and data confidentiality protections. Bangkok and Chiang Mai were purposefully selected to represent distinct travel purposes and environmental contexts under

PM2.5 exposure. Bangkok, a major urban and business center, experiences chronic air pollution from traffic congestion and industrial activities (Pollution Control Department, 2023), providing a setting to examine precautionary behavior among business travelers. Chiang Mai, a leading domestic tourism destination, faces severe seasonal pollution due to agricultural burning during the dry season (Attavanich, 2022), offering a contrasting context for studying tourists' responses. This contrast enables comparison of precautionary behavior across mobility types and pollution profiles, consistent with the study's objective to assess heterogeneous responses to environmental risk. The questionnaire is organized into three sections. The first section collects demographic and socioeconomic information. The second section investigates information sources, perceived health risks, and precautionary measures adopted in response to PM2.5 exposure. The third section examines individual perceptions of air pollution risks associated with travel destinations. Data collection is conducted through both online (80.0%) and offline (20.0%) channels to facilitate participant accessibility. Privacy and confidentiality are strictly maintained, and participants retain the right to withdraw at any stage.

Conceptual Framework

Figure 1 is the study's conceptual framework presents an integrated conceptual framework of the Precaution Adoption Process Model (PAPM), Protection Motivation Theory (PMT), Precautionary Principles (PP), and Public Attention Index to PM2.5 Exposure (PAI_PM2.5). This integration demonstrates how external factors (exposure levels and information availability) and internal processes (threat perception and coping strategies) work together to move individuals through stages of awareness and action regarding to PM2.5 exposure. It shows both the cognitive progression through the PAPM stages, and the factors influencing this progression in the determinants section.

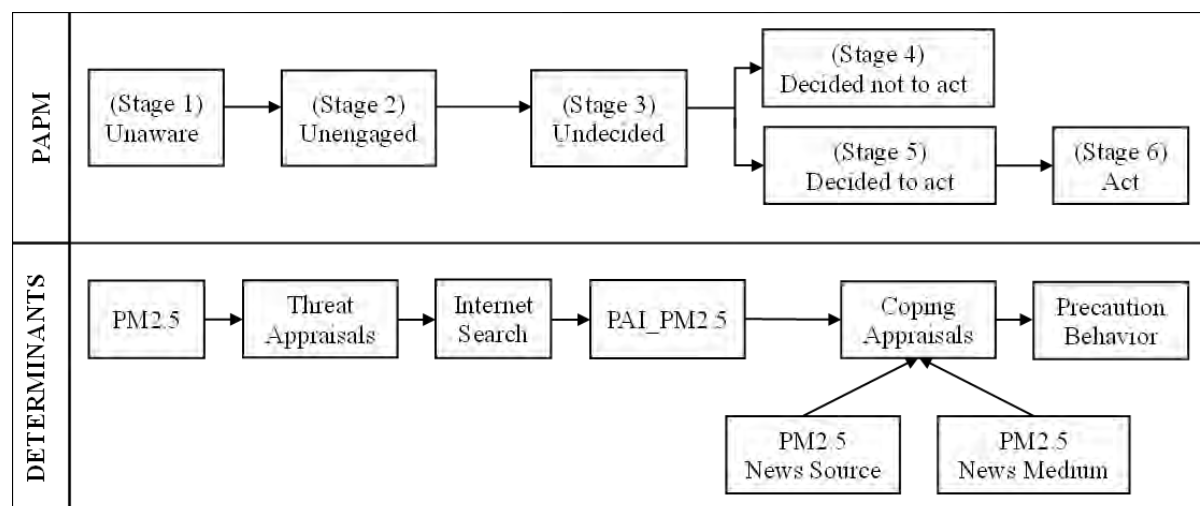


Figure 1: Conceptual Framework.

The PAPM section outlines stages from "Unaware" to "Act" which illustrate the progression of awareness toward decision-making. The determinant section outlines the specific determinants related to PM2.5 exposure that influence progression through the PAPM stages, starting with the severity of PM2.5, leading through threat appraisal, internet search, and public attention index for PM2.5 exposure, to coping appraisal, precautionary behavior, and future intention. The framework highlights the crucial roles of internet searches, news and information on the issue of PM2.5 exposure in shaping public attention, and subsequent decision-making stages. It demonstrates the effects of information sources on precautionary behaviors. Table 1 and Table 2 provide detailed information on how each component in the framework is defined and measured.

Table 1: The Notation and Definition of Variables in Conceptual Framework.

Notation	Definition
PM2.5	The 24-hour average of PM2.5 concentration levels in micrograms per cubic meter. This reflects the actual severity of PM2.5.
Threat Appraisals	A combination of perceptions of the severity of potential harm (perceived severity) and the likelihood of experiencing that harm (perceived vulnerability), towards a perceived severity of the risk from PM2.5 exposure. This is derived from PMT.
Internet Search	Internet search term on the issue of PM2.5, the secondary data collected across 77 provinces of Thailand, provided by Google Trends. This reflects the information-seeking behavior related to PM2.5.
PAI_PM2.5	Public attention index for PM2.5 exposure. This reflects attention on the issue of PM2.5.
Coping Appraisal	An assessment of precautionary action according to the concept of PMT involves assessing the effectiveness of potential protective actions (response efficacy) and ability to successfully implement these actions (self-efficacy).
PM2.5 News Source	Sources of PM2.5 news and information perceived by individuals are classified into formal and informal types.
PM2.5 News Medium	Medium of PM2.5 news and information perceived by individuals which classified into off-line and on-line platforms.
Precautionary Behavior	An action on how people respond to the threat of PM2.5 exposure. This encompasses proactive defensive behavior such as wearing masks and passive avoidance behavior such as avoiding polluted areas.

Table 2 illustrates the stages of the PAPM in relation to public awareness and response to PM2.5 pollution threats. The table integrates key concepts from PMT, including threat appraisals and coping appraisals, while also considering internet search behavior and precautionary actions. Each of the six stages is clearly defined and associated with specific determinants, providing a comprehensive view of how people progress in their understanding and response to PM2.5 exposure risks.

Table 2: Description of Conceptual Framework.

PAPM Stages	Determinant	Definition
Stage 1: Unaware	- PM2.5	In the initial stage, individuals are unaware of the health risks associated with PM2.5 exposure and available protective measures. Although exposed, they have not formed any perceptions due to a lack of awareness. The only relevant factor is the 24-hour average PM2.5 concentration in micrograms per cubic meter.
Stage 2: Unengaged	- Threat Appraisals - Internet Search	As individuals enter this stage, an initial understanding of the health risks posed by PM2.5 exposure and potential protective measures begins to form but remains unengaged due to a perceived lack of personal relevance. As they begin to recognize the risk, referred to as threat appraisal in Protection Motivation Theory (PMT), they may express concern through online search behavior, such as reading news or seeking information related to PM2.5 exposure. The Public Attention Index for PM2.5 (PAI_PM2.5), derived from internet search activity, captures the level of public attention during this stage.
Stage 3: Undecided	- PAI_PM2.5	Individuals are aware of PM2.5 risks and protective measures but remain uncertain about acting due to limited knowledge. Consequently, individuals in this stage actively seek information, influenced by the level of public attention to PM2.5 (PAI_PM2.5).

PAPM Stages	Determinant	Definition
Decision making (Stage 4 and 5)	- Coping Appraisal	At this point, individuals have recognized the risks and become engaged with the issue of PM2.5 exposure. The decision to act or not is determined by coping appraisal in PMT, which involves evaluating the perceived effectiveness of protective measures (response efficacy) and one's ability to carry them out (self-efficacy). Based on this assessment, individuals either choose not to act (Stage 4) or decide to adopt protective behavior (Stage 5). Both decisions are influenced by the sources and media through which PM2.5-related news and information are perceived.
Stage 4: Decided not to act	- PM2.5 News Source - PM2.5 News Medium	Individuals who are aware of and engaged with the issue of PM2.5 exposure may decide not to take protective action. The decision may result from low perceived threat, limited response efficacy, or low self-efficacy. This decision is influenced by their evaluation of effective coping strategies and by the sources and media through which they perceive PM2.5-related news and information.
Stage 5: Decided to act	- PM2.5 News Source - PM2.5 News Medium	Individuals who are aware and engaged may choose to take preventive action against PM2.5 exposure, based on an adopted precautionary preference. This decision is influenced by their evaluation of effective coping strategies and by the sources and media through which they perceive PM2.5-related news and information.
Stage 6: Acting	- Precautionary Behavior	In this final stage, individuals implement the protective measures they have decided to adopt in response to PM2.5 exposure. This stage involves the actual adoption of either proactive defensive or passive avoidance behavior, marking the transition from decision-making to action.

Empirical Model

This study employs a Multinomial Logit model to estimate the probability that individuals adopt distinct precautionary behaviors in response to PM2.5 exposure. The Multinomial Logit model is appropriate because the dependent variable consists of three unordered categories: proactive defensive, passive avoidance, and no precautionary behavior. Linear regression is unsuitable due to the categorical nature of the outcome and its violation of key assumptions, such as homoscedasticity and the possibility of predicted probabilities falling outside the [0,1] range. A binary logit model cannot capture multiple behavioral choices. In contrast, Multinomial Logit model accommodates multiple, non-ordinal outcomes and allows for estimation of the relative probability of each behavior, providing a more accurate and flexible framework for analyzing discrete choice behavior. The standard assumptions of the multinomial logit model were applied, including the independence of irrelevant alternatives (IIA), which was acknowledged as a potential limitation in cases of close substitutes. Post-estimation, marginal effects were computed to interpret the partial impact of each explanatory variable on the probability of selecting each behavioral outcome. The theoretical validity of the model was supported by referencing McFadden (1974), Train (2009), and Greene (2012), and the econometric specification aligns with standard practice for discrete choice analysis.

The dependent variable $Action_i$ is a categorical outcome indicating the precautionary action chosen by individual i , defined as:

$$Action_i = \begin{cases} 1 & \text{Proactive defensive behavior} \\ 2 & \text{Passive avoidance behavior} \\ 3 & \text{No precautionary behavior} \end{cases}$$

Each individual i faces a latent utility $U_{i,j}$ associated with behavioral alternative $j \in \{1,2,3\}$, specified as:

$$U_{i,j} = \alpha_j + X_i \beta_j + \varepsilon_{i,j} \quad (1)$$

where α_j is an alternative-specific intercept, X_i is a vector of covariates, β_j is a vector of coefficients, and $\varepsilon_{i,j}$ is an i.i.d. error term following a Type I Extreme Value distribution. The individual is assumed to choose the alternative that maximizes utility.

The covariate vector X_i includes the following explanatory variables:

$$X_i = [PAI\_PM25_i, PM2.5_i, NewSource_i^D, NewMedium_i^D, SeekMotive_i^D, TargetArea_i^D, Female_i, Age_i, Married_i^D, Education_i^D, Occupation_i^D, R\_Income_i^D, HH\_Income_i^D, Sickness_i^D, Cores\_Elderly_i^D, Cores\_Children_i^D, Cores\_Patient_i^D] \quad (2)$$

The probability of selecting alternative j is:

$$\Pr(Action_i = j) = \frac{\exp(\alpha_j + X_i \beta_j)}{\sum_{k=1}^3 \exp(\alpha_k + X_i \beta_k)} \quad (3)$$

$$\Pr(Action_i = j) = \frac{\exp(\alpha_j + X_i \beta_j)}{\exp(\alpha_1 + X_i \beta_1) + \exp(\alpha_2 + X_i \beta_2) + \exp(\alpha_3 + X_i \beta_3)} \quad (4)$$

Model identification is achieved by normalizing the base category (no precautionary behavior) such that $\alpha_3 = 0, \beta_3 = 0$. The conditional probabilities for each alternative are expressed as:

$$\text{Proactive defensive behavior} : \Pr(Action_i = 1) = \frac{\exp(\alpha_1 + X_i \beta_1)}{1 + \exp(\alpha_1 + X_i \beta_1) + \exp(\alpha_2 + X_i \beta_2)} \quad (5)$$

$$\text{Passive avoidance behavior} : \Pr(Action_i = 2) = \frac{\exp(\alpha_2 + X_i \beta_2)}{1 + \exp(\alpha_1 + X_i \beta_1) + \exp(\alpha_2 + X_i \beta_2)} \quad (6)$$

$$\text{No precautionary behavior} : \Pr(Action_i = 3) = \frac{1}{1 + \exp(\alpha_1 + X_i \beta_1) + \exp(\alpha_2 + X_i \beta_2)} \quad (7)$$

The latent utility functions for each alternative can be expressed in full as follows:

Proactive Defensive Behavior ($j = 1$):

$$U_{i,1} = \alpha_1 + PAI\_PM25_i \beta_{1,1} + PM2.5_i \beta_{1,2} + NewSource_i^D \beta_{1,3} + NewMedium_i^D \beta_{1,4} + SeekMotive_i^D \beta_{1,5} + TargetArea_i^D \beta_{1,6} + Female_i \beta_{1,7} + Age_i \beta_{1,8} + Married_i^D \beta_{1,9} + Education_i^D \beta_{1,10} + Occupation_i^D \beta_{1,11} + R\_Income_i^D \beta_{1,12} + HH\_Income_i^D \beta_{1,13} + Sickness_i^D \beta_{1,14} + Cores\_Elderly_i^D \beta_{1,15} + Cores\_Children_i^D \beta_{1,16} + Cores\_Patient_i^D \beta_{1,17} + \varepsilon_{i,1} \quad (8)$$

Passive Avoidance Behavior ($j = 2$):

$$\begin{aligned}
 U_{i,2} = & \alpha_2 + PAI\_PM25_i \beta_{2,1} + PM2.5_i \beta_{2,2} + NewSource_i^D \beta_{2,3} + NewMedium_i^D \beta_{2,4} \\
 & + SeekMotive_i^D \beta_{2,5} + TargetArea_i^D \beta_{2,6} + Female_i \beta_{2,7} + Age_i \beta_{2,8} \\
 & + Married_i^D \beta_{2,9} + Education_i^D \beta_{2,10} + Occupation_i^D \beta_{2,11} + R\_Income_i^D \beta_{2,12} \\
 & + HH\_Income_i^D \beta_{2,13} + Sickness_i^D \beta_{2,14} + Cores\_Elderly_i^D \beta_{2,15} \\
 & + Cores\_Children_i^D \beta_{2,16} + Cores\_Patient_i^D \beta_{2,17} + \varepsilon_{i,2}
 \end{aligned} \tag{9}$$

No Precautionary Behavior ($j = 3$)

$$U_{i3} = 0 \text{ (normalized base category)} \tag{10}$$

The estimations are disaggregated by trip purpose, with separate models specified for individuals traveling for business and those traveling for tourism. For each group, the probabilities of selecting proactive defensive behavior and passive avoidance are modeled relative to the base outcome of no precautionary behavior.

where $Action_i$ denotes types of precautionary action against PM2.5 chosen by individual i include of proactive defensive (engage to the risk with the use of protective equipment), passive avoidance (not engage with the risk), and do not adopt any proactive defensive or passive avoidance actions. PAI_PM25_i denotes public attention index for PM2.5 of the province where individual i currently resides. $PM2.5_i$ denotes average PM2.5 concentration level in micrograms per cubic meter for province i which individual i habitat. $NewSource_i^D$ denotes sources of PM2.5 news and information perceived by individual i include formal and informal sources. $NewMedium_i^D$ denotes medium of PM2.5 news and information perceived by individual i include off-line and on-line platforms. $SeekMotive_i^D$ denotes motivations for seeking PM2.5 information by individual i include media coverage, government-issued alerts, and residence in high-pollution areas ($PM2.5 > 37.50 \mu g/m^3$). $TargetArea_i^D$ denotes target areas in seeking PM2.5 information by individual i , including general areas in Thailand, residential areas, travel destinations. $Female_i^D$ denotes gender of individuals i is female. Age_i denotes age (in year) of individuals i . $Married_i^D$ denotes marital status of individuals i is married. $Education_i^D$ denotes the highest education attainment level of individuals i . $Occupation_i^D$ denotes current occupation of individuals i , including student, public servant, full-time employee, part-time employee, self-employed, farmer, and unemployed. R_Income_i denotes total income per month of individual i . HH_Income_i denotes total household income per month of individual i . $Sickness_i^D$ denotes sickness caused by PM2.5 of individuals i , including chronic obstructive pulmonary disease, ischemic heart diseases, inflammatory eye disease, eczema and atopic dermatitis, other-related disease groups, and lung cancer which is considered as a long-term effect. $Cores\_Elderly_i^D$ denotes co-resident status of individual i with elderly aged 60 and over. $Cores\_Children_i^D$ denotes co-resident status of individual i with children aged below 12 years. $Cores\_Patient_i^D$ denotes co-resident status of individual i with a patient suffering from an illness caused by PM2.5 exposure, including chronic obstructive pulmonary disease, ischemic heart diseases, inflammatory eye disease, eczema and atopic dermatitis, other-related disease groups, and lung cancer which is considered as a long-term effect.

Research Findings

Business trip: Passive avoidance

Null Hypothesis 1: Occupation, PM2.5 information source, PM2.5 concentration, and public attention have no effect on the probability of adopting passive avoidance behavior among business travelers. Result 1: Among business travelers, the highest increase in the probability of adopting

passive avoidance behavior is found among self-employed individuals, with a marginal effect of 0.568, followed by students at 0.245, and individuals who seek information about PM2.5 due to media coverage at 0.080. Residing in provinces with elevated PM2.5 concentrations is associated with an increased probability of 0.043 and living in areas with higher public attention to PM2.5 issues increases the likelihood by 0.008. Conversely, the largest reductions are observed among private sector employees, who are 3.853 less likely to adopt passive avoidance behavior, and among farmers, with a reduced probability of 2.964, both compared to their respective reference categories.

Business trip: Proactive defensive

Null Hypothesis 2: There is no statistically significant relationship between occupation, information source, health status, PM2.5 concentration, or public attention and the probability of adopting proactive defensive behavior among business travelers. Result 2: The strongest positive effect on proactive defensive behavior among business travelers is observed for farmers, who are 6.079 more likely to adopt this behavior, followed by private sector employees at 3.820, and those accessing both formal and informal PM2.5 information sources at 0.924. In contrast, the largest reduction is found among students, who are 0.238 less likely to adopt proactive defensive behavior, followed by individuals who seek information due to media exposure (−0.151), those with PM2.5-sensitive health conditions (−0.147), residents of high PM2.5 concentration areas (−0.048), and those residing in provinces with high public attention (−0.008), all relative to their respective comparison groups.

Tourism trip: Passive avoidance

Null Hypothesis 3: There is no statistically significant relationship between co-residence with elderly individuals, health status, information source, motivation, or PM2.5 concentration and the probability of adopting passive avoidance behavior among tourism travelers. Result 3: Among tourism travelers, the highest increase in the probability of adopting passive avoidance behavior is found among individuals who live with elderly household members, showing a marginal effect of 0.102. In contrast, the probability of passive avoidance decreases by 0.098 among those who seek information due to residing in highly polluted areas, by 0.113 among those with PM2.5-sensitive health conditions, by 0.150 among individuals influenced by media reports, by 0.224 among those relying on formal information sources, and by 0.021 among individuals living in provinces with elevated PM2.5 concentrations.

Tourism trip: Proactive defensive

Null Hypothesis 4: Information source, PM2.5 concentration, and educational attainment have no statistically significant effect on the probability of adopting proactive defensive behavior among tourism travelers. Result 4: For tourism travelers, the largest increase in the likelihood of adopting proactive defensive behavior is observed among individuals who rely on formal information sources (0.256), followed by those who use both formal and informal sources (0.182), and residents in areas with high PM2.5 concentration levels (0.020). Conversely, individuals whose highest educational attainment is high school are 0.256 less likely to adopt proactive defensive behavior compared to those with lower or higher levels of education.

Conclusion and Discussion

Precautionary behaviors against PM2.5 exposure are essential for both immediate protection and long-term health, particularly among vulnerable groups such as the elderly, children, and individuals with chronic conditions. In the absence of timely public intervention or sufficient infrastructure, individual actions including mask use, air filtration, and avoidance of outdoor exposure offer accessible protection and promote broader public health preparedness. This study applies an integrated conceptual and empirical framework based on Protection Motivation Theory, the Precautionary Principle, and the Precaution Adoption Process Model to analyze determinants of precautionary behavior. A multinomial logit model, disaggregated by travel purpose, reveals significant behavioral variation influenced by sociodemographic attributes, health status, information access, and household context.

Among business travelers, passive avoidance behavior is positively associated with public attention, PM2.5 levels, and media exposure, while proactive behavior decreases under similar conditions,

possibly reflecting limited perceived efficacy or constraints to protective action. Among tourism travelers, proactive behavior is more likely when formal information is received, while passive avoidance declines in high pollution areas, suggesting differences in risk perception and situational flexibility. Co-residence with elderly individuals increases passive behavior, particularly among tourists, indicating concern for household vulnerability. Students and self-employed individuals show greater likelihood of avoidance, likely due to higher flexibility and awareness. In contrast, private sector employees and farmers are less likely to respond, reflecting occupational constraints. Health-related vulnerability is associated with lower proactive behavior, possibly due to physical limitations or adaptation to chronic exposure. Information sources are critical. Formal government alerts are more effective than media reports in encouraging protective action, consistent with literature on credibility and behavioral response. The Public Attention Index, based on online search activity, reflects varying levels of public awareness and helps identify behavioral progression in line with the Precaution Adoption Process Model. The results emphasize the need for policies that correspond to behavioral readiness, enhance credible communication, and reduce structural barriers related to occupation, education, and health. Supporting precautionary behavior through accessible information and targeted interventions is essential for effective and equitable response to PM2.5 exposure.

Suggestions

Empirical evidence supports the need for targeted and evidence-based responses to PM2.5 exposure. Timely and geographically specific government communication, matched to individuals' behavioral stages, can strengthen precautionary actions. Structural barriers among vulnerable groups, including those with health conditions, elderly co-residents, and low income or informal workers, require tailored support and clear risk communication. Expanding digital health literacy can improve access to air quality information. Occupational exposure should be reduced through employer adaptations such as flexible schedules, indoor reassignment, and provision of protective equipment.

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Optimizing Logistics Service Quality for Competitive Advantage in Thailand's Freight Forwarding Market: An Integrated Conceptual Model

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Abstract

This paper examines how freight forwarders in Thailand can develop sustainable competitive advantage by optimizing logistics service quality through strategic orientation, service innovation practices, and logistics resources. The study employs a systematic literature review methodology to synthesize existing research and develop an integrated conceptual framework. The proposed model illustrates how different types of strategic orientation (customer, competitor, technology, network, and innovation), service innovation practices (process and product innovation), and logistics resources (technology, physical, management expertise, relational, and organizational) influence logistics service quality and, ultimately, competitive advantage. The framework provides freight forwarders with a comprehensive roadmap for enhancing their market position in Thailand's dynamic logistics environment. This research contributes to logistics management literature by clarifying the interrelationships between key constructs and offers practical guidance for logistics practitioners seeking to improve service quality and competitive positioning. Future research directions are identified to extend and validate the conceptual model empirically.

Keywords: logistics service quality, competitive advantage, freight forwarding, strategic orientation, service innovation, logistics resources

Introduction

Logistics plays a crucial role in modern economies, significantly contributing to the efficiency of supply chains and the seamless movement of goods across borders (Christopher, 2016). As a key driver for economic growth, logistics ensures effective distribution of products while minimizing costs and maximizing service efficiency. Third-Party Logistics (3PL) providers have emerged as essential players in global supply chains (Langley, 2019), offering outsourced logistics services including transportation, warehousing, distribution, and supply chain management (Rushton et al., 2017). The competitive advantage of 3PLs lies in their ability to provide specialized expertise, economies of scale, and technological advancements that enhance supply chain efficiency (Bolumole, 2003). By outsourcing logistics functions to 3PL providers, companies benefit from cost savings, improved service levels, and greater flexibility in adapting to market fluctuations (Hertz & Alfredsson, 2003). The logistics industry has witnessed rapid transformation with the adoption of digital technologies, automation, and data-driven decision-making, further enhancing the role of 3PLs in optimizing supply chain operations (Mangan & Lalwani, 2016).

One of the key differentiators of 3PL providers is their investment in advanced technology, such as artificial intelligence (AI), the Internet of Things (IoT), and blockchain (McKinsey & Company, 2021). Additionally, the logistics sector has been significantly impacted by sustainability concerns, prompting 3PL providers to adopt green logistics practices (Rushton et al., 2017). These initiatives reduce the environmental impact of logistics operations and enhance the reputation of businesses committed to sustainability (Bolumole, 2003). While existing literature extensively explores the role of 3PL providers in enhancing supply chain efficiency, limited studies specifically

focus on how freight forwarders develop a competitive advantage through strategic orientation, service innovation, and logistics resources. Most prior research has emphasized general logistics performance and operational efficiencies without adequately addressing how these factors interconnect to improve logistics service quality and ultimately influence competitive advantage.

Research Objectives

This study aims to develop a comprehensive framework for guiding the development of competitive advantage for freight forwarders in Thailand's logistics industry. The specific objective is to develop an integrated conceptual framework that enables Thai freight forwarders to enhance their competitive positioning through improved logistics service quality.

Literature Review

Thai Logistics Context: Unique Challenges and Opportunities

Thailand's logistics sector presents a distinct operating environment that necessitates adaptations to the conceptual framework. The freight forwarding industry in Thailand has experienced significant transformation due to the country's strategic positioning within ASEAN and its role as a regional logistics hub (Limnararat et al., 2022). Despite its growth potential, several contextual challenges exist that influence logistics service quality and competitive advantage in the Thai market. The country's logistics costs remain relatively high at approximately 13.4% of GDP compared to developed economies (7-9%), creating pressure for freight forwarders to deliver cost-effective yet high-quality services (Arvis et al., 2018). This economic reality underscores the importance of aligning strategic orientations with cost management strategies without compromising service quality. Furthermore, Thailand's infrastructure development through initiatives like the Eastern Economic Corridor (EEC) presents opportunities for freight forwarders to enhance their physical resources (Piantanakulchai & Jitpakdee, 2020).

Digital transformation has particularly impacted Thailand's logistics landscape, with increasing adoption of e-commerce platforms necessitating more agile and technology-oriented logistics solutions (Tippayawong et al., 2016). This trend aligns with our framework's emphasis on technology orientation and technology resources as crucial determinants of logistics service quality. Thai freight forwarders face unique challenges in technology integration, as the industry exhibits a digital divide between large multinational providers and smaller local operators (Suthiwartnarueput et al., 2021). Cultural factors also influence relationship-building in Thailand's business environment, where personal connections and trust significantly impact business partnerships (Keeratipranon et al., 2019). This cultural aspect enhances the relevance of network orientation and relational resources within our conceptual model for the Thai context. Small and medium-sized freight forwarders in Thailand often leverage these relational strengths to compete against larger international providers, despite having more limited technological and physical resources (Chetthamrongchai & Jermstittiparsert, 2020). Further, Thailand's regulatory environment presents another distinctive challenge, with complex customs procedures and documentation requirements that can impede efficient cross-border logistics (Banomyong & Supatn, 2018). Freight forwarders that develop organizational resources to effectively navigate these regulatory complexities can achieve superior logistics service quality, supporting our framework's proposition regarding organizational resources.

Theoretical Foundations of Competitive Advantage

Porter's theory focuses on how to build sustainable competitive advantages through positioning. It views the performance of a firm as a function of industry structure and market positioning. According to Porter (1985), there are three generic strategies for a firm to outperform competitors: cost leadership through operational effectiveness, differentiation through strategic positioning, and focus on particular customer groups with either cost focus or differentiation focus.

Cost leadership strategy applies when a firm produces at the lowest cost in the industry and targets customers in most or all segments by offering the lowest price. Differentiation strategy targets customers in most or all segments based on unique attributes like product quality or service, allowing firms to demand premium prices. Focus strategy concentrates on specific market segments rather than the total market, using either cost focus or differentiation focus to gain advantage.

Porter (1985) stressed that these strategies are incompatible with each other, arguing that a firm attempting both cost leadership and differentiation would be "stuck in the middle" with low profitability. Combination strategies may only succeed under specific conditions, such as when competitors are also stuck in the middle, when cost structure is strongly affected by share or interrelationships, or when a firm pioneers a major innovation.

Strategic Orientation and Competitive Advantage

Strategic orientation reflects the strategic directions implemented by a firm to create proper behaviors. Yang et al. (2022) identified several types of strategic orientations for business organizations:

Customer Orientation: Focuses on understanding current and future customers' preferences and expectations to gain competitive advantage (Zhang et al., 2018). This involves generating innovative ideas, quick response to customers' needs, and development of new beneficial products (Parente et al., 2018).

Competitor Orientation: Improves a company's market standing by learning from successful competitors (Mudanganyi et al., 2020). This involves analyzing competitors' strengths and weaknesses and sharing information within the organization (Mamman, 2020).

Technology Orientation: Drives product innovation more effectively (Yousaf et al., 2020) and enables businesses to offer more innovative products using the latest technology (Al-Idrus et al., 2020). Technology orientation enhances competitive advantage and sustainability during disruptions (Mandal, 2017).

Network Orientation: Enables businesses to identify new opportunities and demands in potential markets (Zhang et al., 2018). Networks provide valuable information, advice, and solutions to customer problems (Martins, 2016).

Innovation Orientation: A key strategy for businesses to attain competitive advantage by identifying market demands, product substitution, and economic stability (Anning-Dorson, 2018). Digital innovation particularly tends to positively influence competitive advantage and sustainability (Cosimato & Vona, 2021).

Yang et al. (2022) found that strategic orientation has a statistically significant and positive effect on economic sustainability, with competitive advantage expanding this effect. Their sensitivity analysis highlighted the importance of innovation, network and technological orientation for SMEs' economic sustainability.

Service Innovation Practices and Competitive Advantage

Service innovation practices are commonly divided into two categories: service process innovation and service product innovation (Avlonitis et al., 2001; Crawford & Benedetto, 2002; Gadrey et al., 1995; Gallouj & Weinstein, 1997).

Service Process Innovation refers to the introduction of new production methods or novel ways of handling commodities (Schumpeter, 1934). Information technology adoption positively impacts internal operational processes and external cross-enterprise processes (Joglekar & Yassine, 2002), enhancing a company's response to customer demands with shorter delivery times (Jackson, 1990).

Service Product Innovation involves introducing new goods or new qualities to existing goods (Schumpeter, 1934). Information technology applications enable employees to access past service innovation projects, learn from previous experiences, and update market strategies. This helps firms develop services better suited to market demand and offer improved post-selling services (Demirhan et al., 2006; Preissl, 1999).

Chen and Tsou (2007) found that adopting information technology has positive effects on service innovation practices, which in turn increase firms' competitive advantage. Competitive advantage can be viewed externally as outcome performance and internally as organizational capabilities. External competitive advantage comes from providing high-quality products and services that meet customer desires, while internal competitive advantage depends on resources and capabilities that create an environment where employees can develop and launch innovative services.

Logistics Resources and Competitive Advantage

Based on Resource-Based View (RBV) theory, logistics resources consist of five main components:

Technology Resources: The ability to acquire technologies for communicating, transmitting, and processing information. IT-enabled logistics services, tracking systems, and web-based linkages allow for quick response, easy access to information, time reduction, cost saving, and customer satisfaction (Sanders & Premus, 2005; Brah & Lim, 2006).

Physical Resources: The ability to acquire logistics equipment and facilities and continuously adapt and innovate in using these resources. Physical resources enhance control over logistics activities, save costs, improve delivery performance, and increase customer satisfaction (Olavarrieta & Ellinger, 1997).

Management Expertise Resources: The ability to acquire and develop skilled people and integrate teams with technical knowledge and experience. Management expertise allows LSPs to execute firm resources and capabilities, deliver innovative ideas for effective logistics operations, and inspire trust and confidence (Skjoett-Larsen, 2000; Karia & Razak, 2007).

Relational Resources: The ability to build close relationships with customers and suppliers, facilitating communication, coordination/collaboration, and information sharing. Strong supplier-customer relationships allow LSPs to better understand each other, increase commitment to information sharing, and jointly plan, execute, and coordinate logistics activities (Brewer & Speh, 2000; Mentzer et al., 2000).

Organizational Resources: Competences in developing systems, routines, policies, business processes, and operational procedures that positively impact firm strategy and objectives. Organizational resources allow firms to execute and implement strategies to meet customer requirements (Barney & Clark, 2007).

Karia and Wong (2012) found that each logistics resource is positively associated with both customer service innovation and cost leadership, and some resources are bundled together to enhance performance. Ahmad and Jais (2024) demonstrated that sustainable competitive advantage is influenced by both the direct and indirect effects of service quality, with service quality partially mediating the relationship between logistics resources and sustainable competitive advantage.

Logistics Service Quality (LSQ)

The quality of logistics service performance plays an important role in creating customer satisfaction (Bienstock et al., 1997; Mentzer et al., 2001). LSQ encompasses both technical quality (service outcome) and functional quality (process of service delivery). Mentzer et al. (2001) developed comprehensive components of LSQ, identifying nine dimensions: personnel contact quality, order release quantities, information quality, ordering procedures, order accuracy, order condition, order quality, order discrepancy handling, and timeliness. Rafiq and Jaafar (2007) reclassified these dimensions into technical quality (order quality, order condition, order accuracy, order release quantities, and timeliness) and functional quality (personnel contact quality, information quality, ordering procedure, and order discrepancy handling). Ahmad and Jais (2024) found that service quality has both direct and indirect effects on sustainable competitive advantage and partially mediates the relationship between logistics resources and sustainable competitive advantage.

Research Methodology

This study employs a systematic review methodology to synthesize existing literature on logistics service quality and competitive advantage in freight forwarding. The review follows these steps:

- 1) **Problem Identification:** Identifying the research gap related to the interconnection between strategic orientation, service innovation, logistics resources, logistics service quality, and competitive advantage in freight forwarding.

- 2) **Literature Search:** Comprehensive search of relevant literature using keywords such as "logistics service quality," "competitive advantage," "freight forwarding," "strategic orientation," "service innovation," and "logistics resources" in academic databases.

Selection of Studies: Screening and selecting studies based on predefined inclusion and exclusion criteria, focusing on empirical studies examining the relationships between the key constructs.

- 3) **Quality Assessment:** Evaluating the methodological quality of selected studies to ensure the reliability and validity of the findings.

- 4) **Data Extraction and Synthesis:** Extracting and synthesizing data from the selected studies to identify patterns, relationships, and gaps in the literature.

- 5) **Development of Conceptual Framework:** Based on the synthesis of existing literature, developing a comprehensive conceptual framework that integrates strategic orientation, service innovation, logistics resources, logistics service quality, and competitive advantage.

Research Findings and Discussion

The systematic review supports the development of an integrated framework that links strategic orientation, service innovation practices, and logistics resources to logistics service quality and competitive advantage.

Table 1: Systematic Review of Logistics Service Quality and Competitive Advantage

Relationship	Supporting Studies	Findings	Research gap
Strategic Orientation → Logistics Service Quality	Yang et al. (2022); Zhang et al. (2018); Parente et al. (2018); Mudanganyi et al. (2020); Mamman (2020); Yousaf et al. (2020); Al-Idrus et al. (2020); Mandal (2017); Martins (2016); Anning-Dorson (2018); Cosimato & Vona (2021)	- Customer orientation enables understanding of customer preferences - Competitor orientation improves market standing by learning from competitors - Technology orientation drives innovation and enhances sustainability - Network orientation identifies new market opportunities - Innovation orientation helps identify market demands and achieve competitive advantage	- Limited studies specifically linking these orientations to logistics service quality in freight forwarding - Most studies focus on general business performance rather than LSQ specifically - Lack of integration of multiple orientation types in single studies
Service Innovation Practices → Logistics Service Quality	Avlonitis et al. (2001); Crawford & Benedetto (2002); Gadrey et al. (1995); Gallouj & Weinstein (1997); Chen & Tsou (2007); Schumpeter (1934); Joglekar & Yassine (2002); Jackson (1990); Demirhan et al. (2006); Preissl (1999)	- Service process innovation introduces new production methods - IT adoption positively impacts internal and external processes. - Service product innovation introduces new services or quality improvements. - IT applications help develop services better suited to market demand	- Few empirical studies specifically examining freight forwarding. - Limited exploration of how digital innovations impact logistics service quality. - Lack of industry-specific innovation measures
Logistics Resources → Logistics Service Quality	Sanders & Premus (2005); Brah & Lim (2006); Olavarrieta & Ellinger (1997); Skjoett-Larsen (2000); Karia & Razak (2007); Brewer & Speh (2000); Mentzer et al. (2000); Barney & Clark (2007); Karia & Wong (2012); Ahmad & Jais (2024)	- Technology resources enable better communication and processing. - Physical resources enhance control over logistics activities - Management expertise resources deliver innovative ideas. - Relational resources build close customer-supplier relationships. - Organizational resources help execute and implement strategies	- Limited research on resource bundling effects. - Few freight-forwarding specific studies. - Limited exploration of resource deployment in different market conditions

Relationship	Supporting Studies	Findings	Research gap
Logistics Service Quality → Competitive Advantage	Bienstock et al. (1997); Mentzer et al. (2001); Rafiq & Jaafar (2007); Ahmad & Jais (2024)	- LSQ encompasses both technical and functional quality. - LSQ has nine dimensions including personnel contact quality, order accuracy, timeliness, etc. - Service quality has both direct and indirect effects on sustainable competitive advantage. - Service quality mediates the relationship between logistics resources and competitive advantage	- Limited research in freight forwarding context. - Few longitudinal studies showing long-term impact. - Limited research on relative importance of different LSQ dimensions

This framework provides a holistic view of how freight forwarders can enhance their competitive position in the market. The findings highlight the importance of aligning strategic orientation, service innovation practices, and logistics resources to enhance logistics service quality and achieve competitive advantage. Freight forwarders that adopt customer-focused strategies, invest in service innovation, and effectively manage their logistics resources are better positioned to deliver high-quality services and gain competitive advantage.

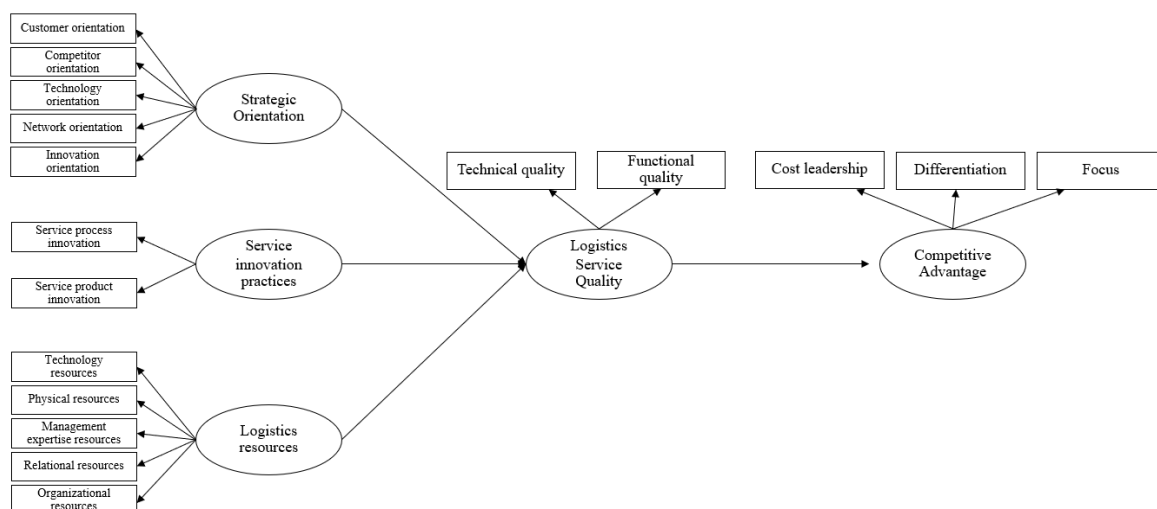


Figure 1: Proposed Conceptual Model

The proposed integrated conceptual framework distinguishes itself from existing models in logistics and supply chain management through several key innovations. While previous frameworks have typically examined the direct relationships between individual factors and competitive advantage in isolation, this model uniquely synthesizes multiple theoretical perspectives—including Porter's competitive advantage theory, the resource-based view, and service innovation literature—into a comprehensive explanatory framework. Unlike existing model that focuses predominantly on LSQ dimensions without addressing antecedents, or the solely use of resource-centric approach that neglects strategic orientation factors, this framework establishes a holistic perspective by connecting strategic, operational, and resource-based elements. In addition, traditional models emphasize operational efficiency but overlook the strategic orientation components crucial for market positioning. This framework's novelty lies in its comprehensive integration of five strategic orientations, two service innovation types, and five resource categories—offering a more nuanced understanding of how these elements interrelate through logistics service quality to create sustainable competitive advantage.

Based on the conceptual framework, here are research propositions for the study:

Proposition 1: Strategic orientation has a positive influence on logistics service quality of freight forwarders in Thailand.

Proposition 1a: Customer orientation positively influences logistics service quality of freight forwarders in Thailand.

Proposition 1b: Competitor orientation positively influences logistics service quality of freight forwarders in Thailand.

Proposition 1c: Technology orientation positively influences logistics service quality of freight forwarders in Thailand.

Proposition 1d: Network orientation positively influences logistics service quality of freight forwarders in Thailand.

Proposition 1e: Innovation orientation positively influences logistics service quality of freight forwarders in Thailand.

Proposition 2: Service innovation practices have a positive influence on logistics service quality of freight forwarders in Thailand.

Proposition 2a: Service process innovation positively influences logistics service quality of freight forwarders in Thailand.

Proposition 2b: Service product innovation positively influences logistics service quality of freight forwarders in Thailand.

Proposition 3: Logistics resources have a positive influence on logistics service quality of freight forwarders in Thailand.

Proposition 3a: Technology resources positively influence logistics service quality of freight forwarders in Thailand.

Proposition 3b: Physical resources positively influence logistics service quality of freight forwarders in Thailand.

Proposition 3c: Management expertise resources positively influence logistics service quality of freight forwarders in Thailand.

Proposition 3d: Relational resources positively influence logistics service quality of freight forwarders in Thailand.

Proposition 3e: Organizational resources positively influence logistics service quality of freight forwarders in Thailand.

Proposition 4: Logistics service quality has a positive influence on the competitive advantage of freight forwarders in Thailand.

Proposition 5: Logistics service quality mediates the relationship between strategic orientation and competitive advantage of freight forwarders in Thailand.

Proposition 6: Logistics service quality mediates the relationship between service innovation practices and competitive advantage of freight forwarders in Thailand.

Proposition 7: Logistics service quality mediates the relationship between logistics resources and competitive advantage of freight forwarders in Thailand.

The integrated conceptual framework for optimizing logistics service quality can be empirically tested using a sequential mixed-method approach. Initially, a qualitative phase involving semi-structured interviews with 15-20 senior executives from Thai freight forwarding companies would help validate and refine the theoretical constructs within the local context. This would be followed by a quantitative survey targeting a representative sample of 300-350 freight forwarding firms operating in Thailand, with stratification across firm size, geographic location (Bangkok, Eastern Seaboard, Northern region), and service scope (international, regional, domestic). Partial Least Squares Structural Equation Modeling (PLS-SEM) would be the preferred analytical approach due to its suitability for complex predictive models with multiple constructs and its ability to handle smaller sample sizes while making fewer assumptions about data distribution compared to covariance-based SEM (Hair et al., 2019).

For measurement development, strategic orientation would be assessed using established scales from Yang et al. (2022), with items measuring each orientation type (e.g., "Our company regularly collects information about competitors' strategies" for competitor orientation). Service innovation practices would be measured using indicators adapted from Chen and Tsou (2007), while logistics resources would employ measures from Karia and Wong (2012), including technology

adoption levels, physical asset adequacy, and management expertise indicators. For logistics service quality, the nine-dimensional scale developed by Mentzer et al. (2001) would be adapted to the freight forwarding context. Competitive advantage would be measured through both objective indicators (market share growth, profitability relative to competitors) and subjective perceptions of competitive positioning.

Control variables would include firm size, age, ownership structure (Thai-owned vs. multinational), and market turbulence. The research would employ a cross-sectional design initially, with potential for a follow-up longitudinal component measuring performance changes over 12-24 months to establish causality. Methodological robustness would be ensured through rigorous pre-testing, ensuring construct validity through expert reviews, and addressing common method bias through procedural remedies during questionnaire design and statistical controls during analysis. This comprehensive testing approach would provide empirical validation of the model while generating actionable insights for Thai freight forwarders seeking to enhance their competitive positioning.

Conclusion

This study has developed a comprehensive framework for understanding the factors that contribute to competitive advantage in the freight forwarding industry in Thailand. The findings indicate that strategic orientation, service innovation practices, and logistics resources are key determinants of logistics service quality, which in turn influences competitive advantage. Strategic orientation, particularly customer orientation, competitor orientation, technology orientation, network orientation, and innovation orientation, provides direction for freight forwarders to align their resources and capabilities with market demands. Service innovation practices, including both process and product innovation, enable freight forwarders to enhance service delivery and offer new and improved services. Logistics resources, encompassing technology, physical, management expertise, relational, and organizational resources, provide the foundation for delivering high-quality logistics services. The integrated framework developed in this study offers a holistic approach to enhancing competitive advantage in the freight forwarding industry. By focusing on these key success factors, freight forwarders can improve their logistics service quality and strengthen their competitive position in the market.

Suggestions

Based on the findings of this research, several directions for future research are suggested: First, future studies should empirically test the proposed framework using data from freight forwarding companies in Thailand to validate the relationships between the constructs. Second, comparative studies across different countries or regions would provide insights into how cultural, economic, and regulatory factors influence the relationships between strategic orientation, service innovation, logistics resources, logistics service quality, and competitive advantage. Third, longitudinal research would help understand how the relationships between these constructs evolve over time, particularly in response to technological advancements and changing market conditions. Fourth, in concerning about moderating factors, future research should explore potential moderating factors, such as firm size, market uncertainty, and competitive intensity, that may influence the relationships between the key constructs. Further, the issues about sustainability integration and digital transformation should be addressed given the growing importance of sustainability in logistics and digital disruption in many industries. Future studies should investigate how sustainable practices can be integrated into the framework and their impact on competitive advantage, while research on how digital transformation affects the relationships between strategic orientation, service innovation, logistics resources, logistics service quality, and competitive advantage would provide valuable insights for the rapidly evolving logistics industry. By addressing these research directions, future studies can further enhance our understanding of the factors that contribute to competitive advantage in the freight forwarding industry and provide more specific guidance for practitioners seeking to improve their competitive position.

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The Influence of Self-Regulation on Individual Productivity: Evidence from Thai Industrial Worker

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Abstract

This study investigates the influence of self-regulation on individual productivity among industrial workers in Thailand. Amid the growing labor shortage and increasing competition in production costs, enhancing employee productivity through internal capabilities has become a strategic priority. Self-regulation, as a psychological construct involving goal setting, planning, and emotional control, plays a critical role in self-directed work performance. This research, which is part of a larger study, focuses exclusively on the direct effects of self-regulation on individual productivity. Grounded in Self-Control Theory, Goal Setting Theory, and Regulatory Mode Theory, this study examines how personal discipline and behavioral regulation influence work performance. Data were collected via structured questionnaires from a national sample of 498 industrial workers in Thailand. Structural Equation Modeling (SEM) results reveal a statistically significant direct effect of self-regulation on individual productivity (path coefficient = 0.87, $p < 0.01$), underscoring the importance of internal regulatory processes in enhancing workplace outcomes. The findings suggest that cultivating self-regulation skills among workers such as goal-oriented planning and emotional regulation can substantially enhance personal work performance without requiring additional organizational costs. This paper discusses practical implications for human resource development and provides policy recommendations for fostering self-regulation in the workplace, particularly in industrial sectors facing workforce challenges.

Keywords: Self-Regulation, Individual Productivity, Industrial Workforce, Thailand, Goal setting and Behavioral Control

Introduction

As Thailand industries are challenged by the rising cost of production driven by external market forces. Understanding these mechanisms is particularly critical in the current era of dynamic global competition, where organizations must adapt to rapidly evolving economic pressures, this issue is further intensified by a persistent severe cost-based competition and, Thailand is the ones of country confronts labor shortages due to declining birth rates and a transition into a super-aged society, in the next 30 years, the proportion of Thailand-work force (Ages 15-59) is projected to decline to 62% in 2023 or be 50% in 2050 (UN, 2022). According to national labor statistics, the total number of employed persons in Thailand amounts to 39,579,000, reflecting the scale and significance of the country's active labor force. Enhancing working productivity is essential for maintaining competitiveness in this environment. While technological innovation and capital investment are traditional solutions, they are costly and time-intensive. In contrast, improving workers' intrinsic capacity through psychological development such as self-regulation is a low-cost and sustainable approach. This paper focuses on the direct influence of self-regulation on individual productivity, aiming to provide evidence-based recommendations for improving labor efficiency in industrial sectors.

Self-regulation plays a critical role in enhancing individual work productivity. It refers to the ability to manage one's thoughts, emotions, and behaviors in ways that lead to the achievement of personal and professional goals. In the context of the workplace, self-regulation enables individuals to

stay focused on tasks, maintain motivation over time, and adapt to challenges or setbacks without losing momentum. Employees with strong self-regulation skills are more likely to set realistic goals, plan effectively, monitor their progress, and adjust strategies as needed. This proactive approach leads to more consistent performance and higher quality outcomes. Moreover, self-regulation helps in minimizing procrastination, reducing work-related stress, and improving time management, all of which are key factors in boosting productivity. From an organizational perspective, fostering self-regulation among employees contributes to a more disciplined, goal-oriented, and resilient workforce. It not only improves individual efficiency but also enhances team performance and organizational success in the long run. In organizational behavior and performance management literature, self-regulation has emerged as a pivotal internal resource that significantly influences individual and collective productivity. Unlike external motivators such as monetary incentives, recognition programs, or reward-based systems which often require substantial ongoing investment and may yield only temporary engagement, self-regulation development represents a low-cost, high-impact intervention with long-term benefits. Self-regulation refers to the capacity of individuals to manage their cognitive processes, emotions, and actions in pursuit of goal attainment. Cultivating this competency among employees encourages autonomous goal setting, proactive task engagement, effective time management, and adaptive coping strategies in response to workplace challenges. As a result, employees become more intrinsically motivated, self-directed, and resilient qualities that are strongly associated with sustained high performance and organizational citizenship behaviors. Furthermore, organizational initiatives aimed at enhancing self-regulation such as mindfulness training, goal-setting workshops, and reflective learning practices are relatively inexpensive to implement and can be integrated into existing learning and development frameworks. These interventions not only foster individual psychological empowerment but also contribute to building a sustainable productivity culture that does not rely heavily on external reinforcements.

In summary, investing in the development of self-regulation capacities among employees offers a cost-effective and enduring strategy for improving work productivity, outperforming traditional extrinsic motivational mechanisms in both stability and long-term efficacy.

Research Objectives

This study aims to examine the influencing of self-regulation on individual productivity among industrial workers in Thailand.

Literature Review

Self-Regulation and Theoretical Foundations

Self-regulation has increasingly been recognized as a core psychological construct underpinning work performance and individual productivity. Defined broadly, self-regulation involves the ability to control and direct one's behavior, emotions, and cognitions in pursuit of long-term goals (Baumeister & Vohs, 2007). A growing body of literature suggests that individuals with stronger self-regulatory capacities are more effective in goal-directed behavior, time management, and resilience, leading to higher levels of work productivity.

Hirschi and Gottfredson's (1990) Self-Control Theory, which posits that low self-control is the primary determinant of deviant behavior and failure to achieve long-term objectives. Although originally developed within a criminological context, the theory's implications have extended to organizational settings. High self-control an essential component of self-regulation is associated with the ability to delay gratification, remain focused on long-term outcomes, and resist counterproductive impulses. In the workplace, these attributes contribute to higher task completion rates, reduced counterproductive work behavior, and consistent goal pursuit.

The Goal Setting Theory, proposed by Locke and Latham (2002), which highlights the central role of self-regulation in translating goals into performance outcomes. According to the theory, specific and challenging goals lead to higher performance when individuals are committed to those goals and possess the self-regulatory mechanisms to monitor and adjust their efforts accordingly. Goal setting acts as both a motivator and a behavioral guide, but without effective self-regulation, individuals may

struggle with implementation. The theory underscores that feedback, self-monitoring, and self-efficacy are essential self-regulatory processes that sustain productivity over time.

Kruglanski et al.'s (2000) Regulatory Mode Theory distinguishes between two regulatory orientations: locomotion (movement toward goals) and assessment (critical evaluation of goal approaches). Both modes are integral to effective work behavior. Locomotion facilitates action and persistence, while assessment ensures that actions are aligned with optimal strategies. The theory posits that individuals with a balanced regulatory mode exhibit superior task performance and decision-making, as they are able to flexibly shift between initiation and evaluation a self-regulatory dynamic critical for complex work environments.

Collectively, these theoretical frameworks emphasize that self-regulation is not a singular process but a constellation of interrelated mechanisms impulse control, goal commitment, self-monitoring, and strategic evaluation that support sustained productivity. Unlike extrinsic motivators, self-regulatory capacities are internal resources that, once developed, provide lasting benefits without continual external reinforcement. The literature strongly supports the view that self-regulation is a powerful predictor of work and individual productivity. Drawing from self-control theory, goal setting theory, and regulatory mode theory, it becomes evident that fostering self-regulation in organizational settings is not only beneficial for performance enhancement but also constitutes a sustainable and cost-effective strategy for long-term productivity growth.

Self-Regulation and Work Performance

These self-regulatory components are not only critical for individual task success but also serve as foundational mechanisms that align personal achievement with organizational outcomes. When organizations cultivate a culture that fosters understanding and application of these self-regulation principles, employees are more likely to perceive task attainability, thereby enhancing their intrinsic motivation and sense of efficacy. This, in turn, facilitates successful task completion at the individual level, which accumulates toward broader organizational success. In this study, the researcher aims to examine the influence of self-regulation on individual productivity. These components are hypothesized to function as essential self-regulatory mechanisms that support sustained productivity among employees in industrial organizations. Self-regulation, a multifaceted construct involving cognitive, emotional, and behavioral control processes, has been widely acknowledged as a key determinant of individual productivity across educational, occupational, and athletic domains. Recent empirical studies and theoretical discussions have provided robust evidence supporting the positive impact of self-regulation on performance, well-being, and goal attainment.

Duckworth et al. (2019) reviewed empirical findings and synthesized evidence regarding the relationship between self-regulation and academic performance. Their results demonstrated a consistent positive correlation, indicating that students with stronger self-regulation skills such as time management, attentional control, emotional regulation, and perseverance tend to achieve better academic outcomes. These findings suggest that enhancing students' self-regulatory capabilities can lead to improved academic productivity.

Balk and Englert (2020) emphasized the role of self-regulation in physical and psychological recovery following exercise and competition. The study discussed how athletes must actively engage in self-monitoring, emotional regulation, and cognitive disengagement (e.g., reducing mental rumination) to recover their depleted resources. The authors argued that self-regulation is essential not only during performance but also in the recovery phase, which directly contributes to sustained performance and long-term well-being.

Sajeevanie (2020) further broadened the scope of self-regulation by investigating its significance in the context of personal and professional success. The study emphasized that self-management, a form of applied self-regulation, enables individuals to efficiently manage their time, behaviors, and resources. Sajeevanie also proposed future research directions focusing on the cognitive, emotional, and social mechanisms underlying self-regulation, as well as strategies to promote it through training and interventions. This comprehensive perspective highlights the foundational role of self-regulation in enhancing both individual functioning and work-related productivity.

Rodríguez et al. (2022) conducted a systematic review of 14 empirical studies published between 2010 and 2020 to examine the relationship between self-regulation and student well-being. The results revealed that executive functions and self-regulation strategies were positively associated with various dimensions of student well-being, whereas self-regulatory deficits were linked to

negative outcomes. This study reinforces the idea that self-regulation not only supports productivity but also contributes to holistic development and long-term adaptive functioning.

Taken together, these studies confirm that self-regulation is a pivotal psychological competency influencing individual productivity in multiple domains. Whether through academic achievement, athletic performance, or workplace efficiency, individuals with strong self-regulation skills are better equipped to manage their resources, recover from setbacks, and maintain high levels of output over time. Although prior studies have established the importance of self-regulation in academic and sports contexts, limited empirical research addresses its direct impact on industrial workforce productivity, particularly within emerging economies like Thailand. This study fills this gap by validating self-regulation's role in enhancing workplace outcomes in an industrial setting.

Empirically, there is not much research on individual productivity in the industrial sector of Thailand. Based on the review of prior research and theories, it is evident that self-regulation exerts a positive influence on work success and individual productivity. In line with these findings, the following hypothesis is proposed for this study:

H1 : Self-regulation has a positive and significant effect on individual productivity among Thai industrial workers.

Research Methodology

Research Design and Sample

This study adopted a quantitative research approach to examine the relationship between self-regulation and individual productivity among industrial workers in Thailand. Data were drawn from a larger research project that surveyed a total of 498 participants. The sampling process involved a combination of purposive and stratified sampling techniques. Initially, purposive sampling was employed to identify individuals who met specific criteria relevant to the study's objectives namely, industrial workers with direct involvement in operational roles. To ensure comprehensive and diverse representation across the country, stratified sampling was then applied, dividing the population into six geographical regions: North, Northeast, Central, East, West and South. An appropriate number of participants was selected from each region proportionately. In this study, questionnaires were distributed to coordinators at selected industrial establishments. These coordinators were responsible for delivering the questionnaires to participants who met the inclusion criteria. Upon completion, the coordinators collected the responses and returned them to the researcher for verification and data completeness prior to analysis. A total of 575 questionnaires were distributed to coordinators at selected industrial establishments. After a 12-weeks data collection period, 515 completed questionnaires were returned, 498 questionnaires were fully completed and deemed to valid for analysis (30 from North, 30 from Northeast, 131 from Central, 247 form East, 30 from West and 30 form Southern). Data collection was conducted using structured questionnaires designed to measure self-regulation and individual productivity. The instruments consisted of closed-ended items rated on a 5-point Likert scale, ranging from "strongly disagree" to "strongly agree." This approach allowed for systematic and quantifiable data collection across a broad sample, providing a solid foundation for statistical analysis and inference.

Measurement of Variables

In this study, self-regulation was assessed using multiple behavioral and cognitive indicators that reflect the individual's ability to manage actions and emotions toward goal achievement. Specifically, the self-regulation construct comprised five key dimensions: goal setting, which involves the ability to define clear and achievable targets; planning, referring to organizing steps and allocating resources to achieve those goals; monitoring, which captures the capacity to track progress and make necessary adjustments; patience, reflecting one's ability to remain composed and avoid impulsive reactions; and emotional regulation and stress management, which involves effectively coping with pressure and maintaining mental resilience during challenging tasks.

Individual productivity was measured using four distinct indicators designed to capture both the quantity and quality of an individual's output. These included: the amount of work completed, representing task volume; the efficiency of work, reflecting time and resource optimization; the quality of

work, assessing accuracy and consistency; and the contribution to organizational goals, indicating alignment between individual efforts and broader company objectives.

All items for both constructs were rated on a 5-point Likert scale. To ensure measurement reliability, internal consistency of the scales was evaluated using Cronbach's alpha, with all subscales achieving coefficients above 0.80, which indicates high reliability and strong internal coherence among the items.

Data Analysis

The study employed Structural Equation Modeling (SEM) using the LISREL software to test the hypothesized relationship between self-regulation and individual productivity. SEM was chosen due to its capacity to simultaneously examine multiple relationships among latent constructs while accounting for measurement error, thus providing a more accurate and comprehensive understanding of the model.

For the purpose of this specific analysis, only the direct path from self-regulation to individual productivity was tested and reported. No additional statistical tests, modifications, or data manipulations were performed beyond the originally hypothesized model. This approach was taken deliberately to maintain transparency and uphold strict adherence to ethical research standards, ensuring that the findings accurately reflect the original data without introducing post hoc bias or distortion. The results thus offer a focused and ethically sound validation of the proposed theoretical relationship.

Research Findings

The Structural Equation Modeling (SEM) analysis was conducted to examine the influence of Self-Regulation on Individual Productivity as show in Figure 1. The model yielded a statistically significant path coefficient, indicating a positive and strong relationship between the two constructs. Specifically, the standardized regression weight from Self-Regulation to Individual Productivity was 0.78 which surpasses the critical threshold for statistical significance at the 0.01 level ($p < 0.01$). The model demonstrated an excellent fit to the data ($\chi^2/df = 1.794$, RMSEA = 0.04, CFI = 1.00, TLI = 0.99) indicating that the hypothesized structure adequately represented the empirical observations. This finding suggests that individuals who demonstrate higher levels of self-regulation manifested through goal setting, task monitoring, emotional control, and adaptive strategies tend to report greater levels of productivity in their work. The strength of the relationship ($\beta = 0.78$) underscores the critical role of internal self-regulatory mechanisms in enhancing individual performance outcomes. These results are consistent with existing theoretical frameworks such as Locke and Latham's Goal Setting Theory (2002), which emphasizes the importance of self-regulatory processes in goal attainment, and Kruglanski et al.'s Regulatory Mode Theory (2000), which outlines how self-directed regulation drives purposeful action. Moreover, the significant path coefficient corroborates Hirschi and Gottfredson's (1990) perspective on self-control as a determinant of productive behavior.

The empirical evidence from the SEM analysis affirms that self-regulation serves as a robust predictor of individual productivity. Interventions aimed at enhancing employees' self-regulatory skills may therefore offer a sustainable and cost-effective approach to improving workplace performance. The analysis revealed that among the indicators of self-regulation, monitoring emerged as the most significant component, followed by planning, goal setting, patience, and emotional regulation and stress management, respectively. The findings indicated that among the indicators of individual productivity, quality of work was identified as the most prominent indicator, followed by contribution to organizational goals, efficiency of work, and amount of work completed, respectively as shown in Figure 1.

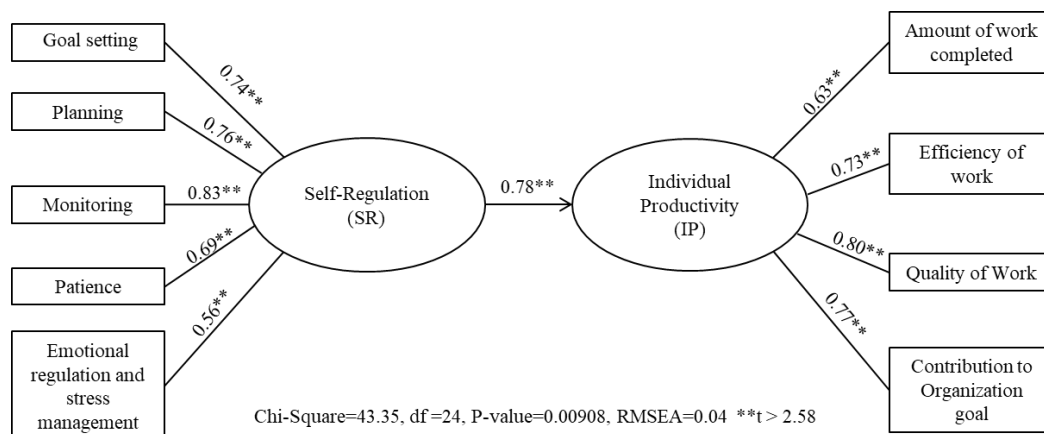


Figure 1: SEM of Self-Regulation --> Individual Productivity

The SEM analysis revealed a statistically significant direct effect of self-regulation on individual productivity. These findings confirm that individuals with better self-regulation tend to perform better, produce higher quality work, and contribute more effectively to organizational goals. The results support the hypothesis that self-regulation has a positive and significant effect on individual productivity among Thai industrial workers.

Conclusion and Discussion

This finding reinforces the notion that individuals with strong self-regulatory capacities such as effective management of time, emotions, attention, and behavior are more likely to perform with greater efficiency and effectiveness. The result is consistent with prior research across diverse domains, underscoring the pivotal role of self-regulation in enhancing work performance. Duckworth et al. (2019) found a strong relationship between self-regulation and academic achievement, underscoring the importance of skills such as perseverance and time management. Balk and Englert (2020) emphasized the role of self-regulation in sustaining athletic performance through recovery and emotional control. Sajeevanie (2020) extended this understanding into workplace settings, showing that self-management (as a form of self-regulation) directly enhances professional productivity. Rodríguez et al. (2022) further highlighted that self-regulation strategies are positively linked to overall well-being, a critical factor in long-term productivity. Collectively, these findings confirm that self-regulation is not only a personal competency but also a strategic driver of individual productivity.

In conclusion, self-regulation emerges as a significant determinant of individual productivity among industrial workers in Thailand. As a non-monetary mechanism, it offers a sustainable and scalable approach to enhancing organizational performance. These findings suggest that policy-makers and organizational leaders should prioritize the development of psychological self-regulatory competencies as a strategic component of comprehensive workforce improvement initiatives.

This study extends the theoretical utility of self-regulation frameworks in a non-Western, industrial context. It reinforces the argument that self-regulation is a transferable and scalable psychological construct that drives performance, even in task-oriented, hierarchical work environments.

This finding confirmed, self-regulation strategy is a low-cost and sustainable approach for increase productivity and advantage for organization's cost competitive, enhancing output through increased personal productivity while maintaining stable workforce offers, a sustainable approach to addressing the dual pressures of intensifying cost competition and looming labor shortages. The results from this study offers low-cost strategies for improving labor efficiency strategies, they are not only strengthens operational efficiency but also positions organizations to remain resilient and competitive in a global market increasingly shaped by cost-driven trade dynamics and resource constraints.

Suggestions

Organizations could implement a 'Monthly Goal-Setting Clinic' where workers learn to set, monitor, and adjust personal goals aligned with organizational objectives. Additionally, 'Mindfulness for Productivity' workshops can enhance emotional regulation and attention control among employees. Based on the findings, the following suggestions are proposed:

1. Integrate Self-Regulation Training Programs; organizations should implement workshops and training modules aimed at enhancing employees' self-regulatory skills, including time management, emotional regulation, and goal-setting. This can be achieved through coaching, workshops, and reflective practices.

2. Embed Self-Regulatory Support into Work Systems; design work environments that facilitate self-monitoring (e.g., feedback tools, progress trackers) and promote cognitive recovery (e.g., scheduled breaks, mindfulness sessions). Management should provide environments that support continuous self-monitoring and feedback, enabling employees to track their performance and adjust strategies as needed.

3. Promote Autonomy and Responsibility; Empower employees with autonomy in task execution, which can enhance intrinsic motivation and reinforce self-regulated behaviors.

4. Policy and Strategy Integration; human resource policies should integrate self-regulation competencies into performance appraisals and professional development plans to encourage long-term behavioral change and productivity growth.

5. Link Self-Regulation to Performance Appraisal and Rewards; acknowledge and reward not only outcomes but also the demonstration of effective self-regulation, such as resilience, initiative, and focus.

6. Supportive Leadership and Role Modeling; leaders should act as role models by demonstrating self-regulatory behaviors and creating a culture that values psychological discipline and personal accountability

7. Future Research Directions; Future studies may explore the mediating role of self-motivation or the moderating effects of organizational culture and leadership on the relationship between self-regulation and productivity. This finding aligns with Self-Determination Theory, suggesting that intrinsic capacities like self-regulation become critical when external motivators are insufficient. Particularly in collectivist cultures like Thailand, fostering self-regulation may be moderated by hierarchical work relationships, a topic warranting further exploration.

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The Role of Social Cohesion in Fostering Self-Motivation and Driving Personal Productivity in the Workplace

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Abstract

Amid labor shortages and rising global competition, enhancing employees' internal psychological and social resources is critical to sustaining organizational productivity. This study examines the influence of social cohesion on self-motivation, and its subsequent effect on individual productivity within Thailand's industrial workforce. Grounded in Self-Determination Theory, Flow Theory, and Social Capital Theory, social cohesion is conceptualized through four dimensions: belonging, trust, collaboration, and social recognition. Self-motivation is defined by interest, challenge, need for achievement, and autonomy. Data were collected from 498 industrial workers across six regions of Thailand using structured questionnaires. Structural Equation Modeling (SEM) was employed to evaluate the hypothesized relationships. The results indicate that social cohesion significantly and positively influences self-motivation (path coefficient = 0.89, $p < 0.01$), which, in turn, enhances individual productivity. These findings underscore the importance of a cohesive social work environment in fostering intrinsic motivation and improving performance outcomes. The study recommends practical, low-cost interventions such as strengthening peer support networks, implementing employee recognition programs, and promoting task autonomy. These strategies not only enhance individual and organizational efficiency but also foster a more resilient and motivated workforce, better equipped to navigate the demands of a globally competitive industrial landscape.

Keywords: Self-Motivation, Social Cohesion, Personal Productivity, Thai Industrial Workforce, Intrinsic Motivation

Introduction

The global labor landscape is undergoing a profound transformation, characterized by aging populations and declining birth rates across many countries. Thailand is similarly affected, particularly within its industrial sector, which now faces critical challenges arising from a shrinking labor force and intensified international competition. As of the most recent data, the overall capacity utilization rate in Thailand's industrial sector stands at 55.26%, indicating a relatively low level of production efficiency. This figure reflects a prolonged period of underutilization over the past three years and five months (2021–May 2024). According to the Department of Industrial Works, a total of 3,573 factories have ceased operations during this period. The current era of dynamic global competition, where organizations must adapt to rapidly evolving economic pressures, this issue is further intensified by a persistent severe cost-based competition and, Thailand is the ones of country confronts labor shortages due to a transition into a super-aged society. How to motivate the employees in the industrial sectors for increase their productivity by low cost strategies for keep the organizations' cost competitive and surviving? These demographic and economic pressures necessitate the development of sustainable, cost-effective strategies to maintain and enhance organizational productivity in the face of reduced human capital.

Traditionally, organizations have relied on extrinsic incentives such as higher wages, bonuses, and other financial rewards to drive employee performance. However, emerging research emphasizes the growing importance of intrinsic motivators and supportive social environments in sustaining high levels of individual productivity. In particular, self-motivation and social cohesion have been identified as

critical non-financial factors that empower employees to perform consistently, even under constrained conditions.

Self-motivation, encompassing internal drives such as interest, challenge, autonomy, and the need for achievement, enables individuals to engage deeply and persistently with their work. Meanwhile, social cohesion characterized by trust, collaboration, belonging, and social recognition creates a supportive workplace environment that reinforces positive behaviors and emotional resilience.

This study focuses on investigating the influence of social cohesion on self-motivation among Thai industrial workers. It presents a targeted analysis drawn from a broader research project, aiming to offer practical insights into how organizations can strategically cultivate internal psychological and social resources. By doing so, companies can enhance workforce performance and build greater organizational resilience in an increasingly competitive global environment.

Research Objectives

The primary objective of this study is to investigate the influence of social cohesion on self-motivation within Thailand's industrial workforce and to develop strategic recommendations for enhancing personal productivity. By examining the internal and social psychological mechanisms that drive individual performance, the study aims to provide practical insights into how organizations can strengthen non-financial factors to sustain and improve workforce efficiency in an increasingly competitive global environment.

Literature Review

Self-Motivation

Self-Motivation refers to the internal drive that propels individuals to act without reliance on external rewards (Deci & Ryan, 1985). According to Self-Determination Theory, individuals are more productive when their tasks align with intrinsic goals such as curiosity, mastery, and autonomy.

Key dimensions of self-motivation include:

- Interest: Enjoyment derived from performing the task itself.
- Challenge: Preference for activities that require skill and effort.
- Need for Achievement: The desire to accomplish meaningful goals.
- Autonomy: Feeling of ownership and control over one's work.

Flow Theory (Csikszentmihalyi, 1990) adds that self-motivated individuals are more likely to experience "flow states," where they are deeply engaged and fully absorbed in their tasks, leading to optimal performance.

Self-Determination Theory (SDT), proposed by Deci and Ryan (1985), provides a foundational framework for understanding how intrinsic motivation drives human behavior and performance. According to SDT, individuals are naturally inclined toward growth, mastery, and psychological fulfillment, and are most motivated when three basic psychological needs are satisfied: autonomy, competence, and relatedness. Autonomy refers to the feeling of being in control of one's own actions, while competence involves the sense of efficacy in achieving desired outcomes, and relatedness reflects the need to connect with others meaningfully. When these needs are fulfilled, individuals are more likely to experience intrinsic motivation engaging in activities for their inherent satisfaction rather than for external rewards. Deci's early experimental research demonstrated that extrinsic rewards, such as monetary incentives, can undermine intrinsic motivation, leading to reduced persistence and creativity. Conversely, fostering intrinsic motivation through autonomy, challenge, and meaningful engagement enhances self-motivation, resulting in higher levels of effort, persistence, and productivity. In workplace contexts, employees who are autonomously motivated demonstrate greater personal productivity, higher work quality, and stronger commitment to organizational goals. Thus, according to SDT, self-motivation driven by interest, challenge, need for achievement, and autonomy plays a pivotal role in enhancing personal productivity. In the long term, cultivating such intrinsic motivation within the workforce is likely to contribute significantly to overall organizational productivity and sustainability.

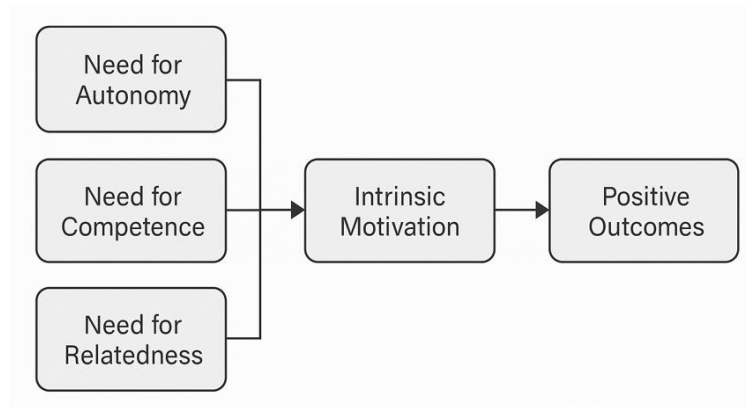


Figure 1: Self-Determination Theory (Deci and Ryan, 1985)

Flow Theory, introduced by Csikszentmihalyi (1990), offers further insights into how intrinsic motivation can elevate personal and organizational performance. Flow is described as a psychological state of deep absorption and optimal experience, where individuals feel fully immersed in activities that balance challenge and skill. When people engage in tasks that are sufficiently challenging relative to their abilities, they enter a flow state characterized by high concentration, enjoyment, and a sense of control. The flow experience fosters intrinsic motivation by making the activity itself rewarding and meaningful. Tasks that are too easy or too difficult disrupt the flow state, leading to boredom or anxiety, respectively. Therefore, ensuring a match between task difficulty and individual skill is critical to maintaining high engagement and motivation. In organizational settings, when employees experience flow during their work, they are more likely to produce high-quality outputs efficiently and sustainably. They are also more resilient to stress, more innovative, and more committed to their roles. By designing work environments that promote optimal challenges and support employee skills, organizations can leverage flow to enhance personal productivity and, ultimately, improve organizational performance.

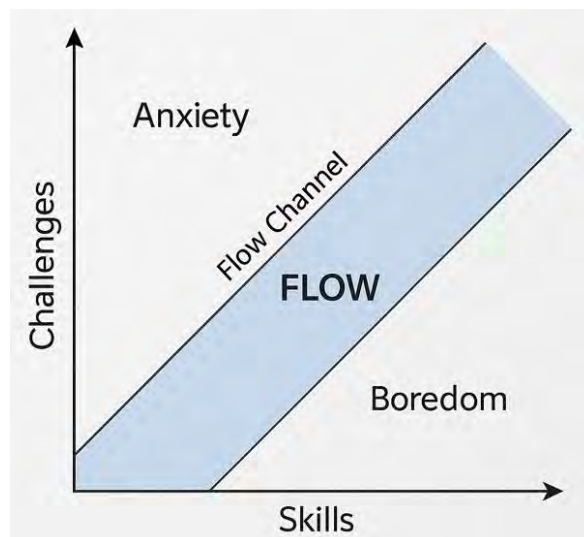


Figure 2: Flow Theory (Csikszentmihalyi, 1990)

Social Cohesion

Social Cohesion is the degree to which individuals feel connected and supported by their peers within the workplace. It includes elements such as:

- Belonging: A sense of acceptance and integration into the workgroup.
- Trust: Confidence in the intentions and actions of colleagues.
- Collaboration: Willingness to cooperate and work toward shared goals.
- Social Recognition: Feedback and acknowledgment from peers and leaders.

Social Capital Theory (Putnam, 2000) suggests that relationships characterized by trust and mutual respect create a network of support that enhances organizational effectiveness.

In industrial environments, where teamwork and coordination are essential, social cohesion can improve communication, reduce conflict, and foster shared responsibility, all of which contribute to productivity.

The Role of Social Capital in Enhancing Self-Motivation and Work Productivity. Social Capital Theory, initially proposed by Pierre Bourdieu and later expanded by Robert Putnam in the 1980s, offers a foundational perspective for understanding how social relationships contribute to individual and collective success. Social capital refers to the resources and benefits that individuals or groups derive from their social connections, encompassing elements such as trust, network ties, and shared norms (Bourdieu, 1986; Putnam, 1995). The theory categorizes social capital into three main forms: network social capital, referring to the access to information, support, and opportunities through interpersonal connections; trust social capital, highlighting the importance of mutual confidence and cooperative behavior; and norm social capital, which emphasizes shared values and expectations that facilitate respectful and responsible social interactions. These components collectively create a cohesive social environment that supports individual psychological and professional functioning. In the context of workplace dynamics, a high level of social cohesion fostered through trust, collaboration, and shared norms enhances employees' feelings of belonging, security, and mutual support. Such an environment is crucial for fostering self-motivation, particularly intrinsic motivation driven by internal interests, challenges, and the need for achievement and autonomy. When employees experience strong social bonds and trust within their teams, they are more likely to exhibit higher levels of self-motivation, engage more deeply with their tasks, and strive for excellence without relying solely on external rewards. Moreover, individuals with strong social capital tend to be more resilient, adaptable, and effective in achieving work-related goals. This ultimately translates into higher work productivity, greater efficiency, and better organizational outcomes. Thus, building a socially cohesive work environment is not only essential for employee well-being but also serves as a strategic lever for enhancing organizational performance.

Although the role of social cohesion in organizational settings has been extensively studied in Western contexts, there is a dearth of empirical research exploring its specific influence on self-motivation within Southeast Asian industrial workforces. This study addresses this gap by investigating the Thai context, where collectivist cultural values may amplify the role of workplace cohesion in fostering intrinsic motivation.

Based on the review of prior research and theories, it is evident that social cohesion exerts a positive influence on self-motivation and increasing self-motivation will also improve personal performance. In line with these findings, the following hypothesis is proposed for this study:

H1: Social Cohesion positively influences Self-Motivation among Thai industrial workers.

H2: Enhanced Self-Motivation subsequently improves Personal Productivity.

Research Methodology

Research Design

This study constitutes a focused component of a broader cross-sectional quantitative research project aimed at exploring the internal psychological and social factors influencing workforce productivity within Thailand's industrial sector.

Sample and Data Collection

Data were collected from a sample of 498 industrial workers employed in various industrial zones across six geographical regions of Thailand, namely the North, Northeast, Central, East, West, and South. A purposive sampling was utilized to approach enhanced the generalizability of the findings across Thailand's industrial sector. In this study, questionnaires were distributed to coordinators at selected industrial establishments. These coordinators were responsible for delivering the questionnaires to participants who met the inclusion criteria. Participants were invited to complete a structured, self-administered questionnaire. To ensure the integrity and confidentiality of the data, all responses were collected anonymously, minimizing social desirability bias and promoting honest reporting. In this study, a total of 575 questionnaires were distributed to coordinators at selected industrial establishments. After a 12-weeks data collection period among December to March 2025, 515 completed questionnaires were

returned, representing a response rate of 89.6%. Of these, 498 questionnaires (86.6%) were fully completed and deemed to valid for analysis, while 17 questionnaires (3.0%) were incomplete. A total of 60 questionnaires (10.4%) were not returned.

Measures

The study employed validated scales to measure the key constructs of interest. Self-Motivation was assessed using a 4 -item scale covering the dimensions of interest, challenge, autonomy, and need for achievement. Social Cohesion was measured through four indicators: belonging, trust, collaboration, and recognition.

All items were rated on a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree), enabling the capture of nuanced participant perceptions. The use of established measurement indicators ensured reliability and validity in assessing the constructs under investigation.

Data Analysis

The study applied Statistical Package for the Social Sciences (SPSS) for descriptive statistics analysis and Structural Equation Modeling (SEM) using LISREL to test the hypothesized relationship. Only the path between social cohesion and self-motivation is reported here, with no new statistical tests or data manipulation conducted to preserve research ethics.

Research Findings

Descriptive statistics of the respondents' demographic characteristics are presented in Table 1.

Table 1: The descriptive statistics of the respondents

N=498

Variable		Frequency	Percentage
Industry Group	Agro & Food Industry	64	12.9
	Consumer Products	11	2.2
	Financials	3	0.6
	Industrials	371	74.5
	Property & Construction	5	1.0
	Resources	9	1.8
	Services	28	5.6
	Technology	7	1.4
Gender	Male	302	60.6
	Female	196	39.4
Age	18 – 25 Y	46	9.2
	26 – 35 Y	176	35.3
	36 – 45 Y	169	33.9
	46 – 55 Y	94	18.9
	56 Y up	13	2.6
Education level	Under Bachelor	149	29.9
	Bachelor	298	59.8
	Master	45	9.0
	Higher than Master	6	1.2
Work experience	Less than 5 Y	97	19.5
	5 – 10 Y	149	29.9
	11 – 20 Y	147	29.5
	20 Y up	105	21.1

The data were originally analyzed using Structural Equation Modeling (SEM) via LISREL. For this paper, only path coefficients relevant to Social Cohesion and Self-Motivation were extracted and interpreted. The SEM analysis revealed a statistically significant direct effect of social cohesion on self-motivation. The path coefficient was 0.89 with a p-value less than 0.01, model fit indices: Chi-Square=24.65, df=15, $\chi^2/df = 1.64$, P-value=0.05484, RMSEA=0.036, CFI = 1.00 and TLI = 0.99 indicating

a robust model structure. The analysis revealed that among the indicators of social cohesion, trust emerged as the most significant component, followed by social recognition and feedback, belonging and collaboration, respectively. The findings indicated that among the indicators of self-motivation, challenge was identified as the most prominent indicator, followed by need for achievement, interest, and autonomy, respectively. The SEM analysis revealed a statistically effect of social cohesion on self-motivation as show in Figure 3.

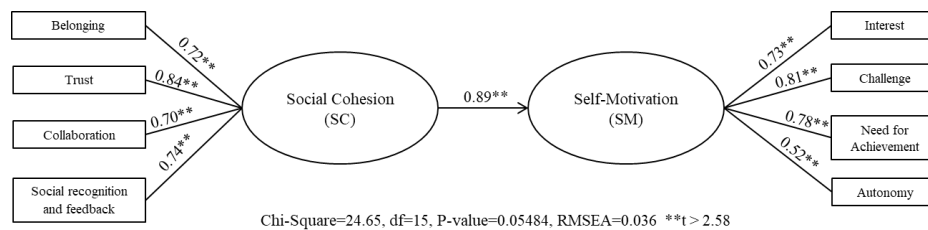


Figure 3: SEM of Social Cohesion --> Self-Motivation

Conclusion

The findings of this study align closely with its stated research objectives. The primary goal was to investigate the influence of social cohesion on self-motivation among Thailand's industrial workforce and to offer strategic insights for enhancing personal productivity. Based on the analysis conducted using Structural Equation Modeling (SEM), the study provides clear empirical evidence supporting the hypothesized relationship between social cohesion and self-motivation. These indices meet commonly accepted standards for model adequacy, thereby reinforcing the credibility of the findings. This strong and positive relationship confirms the theoretical assertion that a cohesive social environment, characterized by trust, collaboration, and a sense of belonging, can significantly foster intrinsic forms of motivation among employees. When workers feel socially connected and supported within their organizational environment, they are more likely to be self-driven, engaged, and committed to achieving work-related goals.

Thus, the study successfully validates its research hypothesis and contributes to the broader understanding of how social and psychological factors within the workplace can enhance workforce motivation and performance. These findings have important implications for organizational strategy, suggesting that investing in social cohesion initiatives may be a critical pathway toward building a more motivated, productive, and resilient workforce in an increasingly competitive industrial landscape.

The results of this study support the hypothesis that social cohesion can significantly foster intrinsic forms of motivation among employees and contributes to personal productivity in the industrial workforce as hown in Table 2.

Table 2: Summary of Hypothesis Testing Results

Hypothesis	Accepted	Rejected
H3: Social cohesion positively affects self-motivation.	✓	
H2: Enhanced Self-Motivation subsequently improves Personal Productivity or Self-motivation mediates the relationship between social cohesion and personal productivity.	✓	

Discussion

This study confirms the importance of social cohesion can significantly foster intrinsic forms of motivation among employees as a predictor of personal productivity. Consistent with previous theoretical expectations and the results align with the studies consistently highlight the critical role of motivation, particularly self-motivation and intrinsic motivation, in enhancing sustainable work performance.

The findings of this study confirm that social cohesion has a statistically significant influence on self-motivation. These results align with the conclusions of Sabir (2017), who found a significant

positive effect of motivation on work performance. According to Sabir's research, employees with high levels of motivation demonstrate greater commitment and effort in their work, which ultimately leads to enhanced performance. This suggests that social cohesion indirectly contributes to improved individual productivity through its effect on self-motivation. Moreover, the present findings are also consistent with those of Kuswati (2020), who studied 123 employees in a private company in Indonesia and confirmed a positive relationship between motivation and employee performance. In Kuswati's study, highly motivated employees exhibited stronger commitment and higher work efficiency, leading to improved individual performance outcomes. Collectively, these findings underscore the mediating role of self-motivation in the relationship between social cohesion and work productivity, reinforcing the view that fostering a cohesive social environment can yield significant gains in employee performance through enhanced intrinsic motivation. Similarly, Provitera (2023) highlighted that motivation is a pivotal factor influencing personal outcomes: highly motivated individuals tend to exhibit greater effort, dedication, and persistence in achieving their goals, the optimal balance of intrinsic and extrinsic motivation the "Sweet Spot" is essential for maintaining high personal productivity and long-term organizational success.

Building on this foundation, the present study proposes that social cohesion through fostering belonging, trust, collaboration, and recognition acts as a catalyst for self-motivation. When employees experience strong social cohesion, their intrinsic motivation is strengthened, leading to increased personal productivity, which cumulatively contributes to enhanced organizational productivity. Thus, the research hypothesis posits a sequential relationship: Social Cohesion positively influences self-motivation and enhanced self-motivation subsequently improves Personal Productivity. This study contributes to motivation literature by empirically confirming the mediating role of self-motivation between social cohesion and productivity, particularly within a collectivist and industrially structured Southeast Asian context a gap rarely explored in previous studies.

This study provides clear empirical evidence that social cohesion significantly influences self-motivation among industrial workers in Thailand. The findings support prior research demonstrating a positive relationship between motivation and work performance, confirming that social cohesion indirectly enhances individual productivity through increased self-motivation. This underscores the value of fostering supportive, trusting work environments to drive intrinsic motivation and improve employee performance. A key contribution of this study lies in its focus on Thailand's industrial workforce an often underrepresented population in global research on productivity. The results show that even in labor-intensive sectors, non-monetary psychological and social resources, such as trust, belonging, and recognition, are powerful motivators of productivity. However, cultural and contextual differences must be considered. Thailand's work culture emphasizes collectivism, hierarchy, and indirect communication, which shapes how social cohesion is experienced. This contrasts with Western cultures, where individualism, egalitarianism, and autonomy are more prevalent. Additionally, paternalistic or top-down leadership styles common in Thailand differ from participative models in Western or Nordic settings potentially moderating how social cohesion translates into motivation and performance across contexts. These insights suggest that efforts to strengthen social cohesion should be culturally tailored. In Thailand, this may involve leveraging informal peer networks, promoting group identity, and acknowledging collective contributions. Further cross-cultural studies are recommended to examine how cultural and institutional variables mediate the relationship between social cohesion, self-motivation, and productivity.

This study contributes to motivation literature by empirically confirming the mediating role of self-motivation between social cohesion and productivity, particularly within a collectivist and industrially structured Southeast Asian context a gap rarely explored in previous studies.

Suggestions

The findings of this study align closely with the stated research objectives, confirming that social cohesion has a significant and positive influence on self-motivation among industrial workers in Thailand. The statistically significant path coefficient (0.89, $p < 0.01$) and strong model fit indices validate the hypothesis that fostering a socially cohesive environment can enhance intrinsic motivation, which is a critical driver of personal productivity. In light of these findings, organizations seeking to improve workforce

efficiency should strategically invest in building and strengthening social cohesion within their teams. Based on the empirical evidence, the following management strategies are recommended:

1. Enhance Peer Support Systems; Develop formal and informal peer support initiatives, such as mentoring programs, team-based projects, and cross-functional collaborations. These initiatives encourage relationship-building, knowledge sharing, and mutual assistance, fostering a sense of belonging and trust among employees.

2. Recognize and Celebrate Contributions; Implement systems that acknowledge individual and group achievements not only through financial rewards but also through social recognition. Regularly celebrating contributions can reinforce employees' sense of value and enhance intrinsic motivation.

3. Promote Autonomy and Empowerment; Encourage employees to take ownership of their work by providing greater autonomy in decision-making and task management. Allowing employees to exercise control over their activities supports the psychological need for autonomy, further boosting self-motivation.

4. Strengthen Organizational Norms and Shared Values; Cultivate a culture grounded in shared norms of trust, mutual respect, and responsibility. Clear communication of organizational values, coupled with leadership modeling these behaviors, can reinforce a cohesive environment where self-motivation can flourish.

2. Facilitate Team-building Activities and Open Communication; Regular team-building programs and open communication forums should be conducted to enhance interpersonal relationships, resolve conflicts effectively, and maintain a high level of trust and collaboration within the organization.

Organizations may implement a 'Peer Mentorship Program' pairing new hires with experienced workers to foster trust and belonging. Additionally, 'Employee Recognition Days' can institutionalize social acknowledgment, enhancing intrinsic motivation across departments. By implementing these strategies, businesses can leverage the power of social cohesion to nurture a highly motivated workforce, leading to sustainable improvements in personal and organizational productivity in an increasingly competitive global environment.

Limitations and Future Research

This research employed a purely quantitative approach, which may not fully capture qualitative dimensions such as emotions, organizational culture, and context-specific perceptions. To gain deeper insight into these qualitative factors, future studies are encouraged to adopt mixed-methods designs, including in-depth interviews or focus groups or other qualitative techniques, to enrich the interpretation and validity of the findings. Additionally, the use of self-report questionnaires may have introduced bias; incorporating multiple sources of data could enhance accuracy. Future research should clearly define control variables such as job position, salary range, and education level to ensure that the data are derived from samples with comparable levels of knowledge and capability.

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Two-Stage Validation: A Stakeholder-Driven SDGs Interview Guide

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Abstract

This study presents a two-stage validation process for developing an interview guide to explore stakeholder-driven Sustainable Development Goals (SDGs) in farmers' cooperatives. The process combined expert consultation and pilot testing. The first stage involved expert consultation (n = 5) using the Content Validity Index (CVI), achieving strong content validity (S-CVI/Ave = 0.91) with 12 questions meeting the I-CVI threshold of ≥ 0.80 . The second stage involved key stakeholders (n = 6) from farmers' cooperatives in Guizhou Province, China, refining the guide from 15 to 10 questions. The validated tool balances theoretical rigor and local adaptation, contributing to a cross-cultural qualitative methodology in farmers' cooperatives.

Keywords: Interview guide validation; SDGs; Farmers' cooperatives; Qualitative methodology

Introduction

In qualitative research, the validity of research tools, processes, and data is pivotal for ensuring the credibility of research conclusions (Creswell & Creswell, 2022; Leung, 2015). For exploring complex topics such as the implementation of Sustainable Development Goals (SDGs) in farmers' cooperatives, a robust interview guide is essential (Flick, 2022). This paper presents a two-stage validation process for an interview guide designed to explore stakeholder-driven SDGs within the context of farmers' cooperatives.

By 2023, there were 64,100 specialized farmers' cooperatives in Guizhou Province, with 2.55 million members, driving 1.67 million households (Guizhou Provincial Department of Agriculture and Rural Affairs, 2024). Guizhou Province was chosen due to its underdeveloped infrastructure, large rural population, and government support for aligning cooperatives with the Sustainable Development Goals (SDGs). Existing studies often rely on quantitative methods or single-theory frameworks, lacking depth in stakeholder interactions and practical SDG implementation.

In this research series, the first paper laid a solid foundation by combining the SDG framework with Stakeholder Theory, the Sustainable Livelihoods Framework, Institutional Theory, and Vertical Coordination Theory through a comprehensive literature review. Subsequently, 15 stakeholder-centered interview questions were crafted to understand the complex stakeholder interactions during SDG implementation in farmers' cooperatives. Existing studies, however, mainly analyze the impact of cooperatives on individual SDGs from a single theoretical angle or focus on institutional factors. Most rely on quantitative surveys, falling short in their analysis of the complex interactions among multiple stakeholders and the practical aspects of SDG implementation.

The importance of instrument validation in qualitative research has been emphasized by scholars (Cypress, 2017; Morse et al., 2002). Methodologists have recommended a two-stage process combining expert consultation and pilot testing to enhance content validity and practical applicability in the context of interview guide validation (Kallio et al., 2016). This approach aligns with the concept of triangulation in qualitative research, which involves using multiple methods or data sources to develop a comprehensive understanding of phenomena (Patton, 2014).

Research Objectives

This study aims to address the following research questions:

1. Evaluate the content validity of the interview guide through expert consultation.
2. Assess the practical applicability of the guide via pilot testing with stakeholders.

By addressing these issues, the study enhances methodological transparency, contributing to sustainable development research in agricultural contexts. It aligns with stakeholder theory and institutional theory, thereby bridging global frameworks and local practices.

Literature Review

The validation of qualitative research instruments is grounded in trustworthiness and rigor, which are fundamental to ensuring the quality and credibility of qualitative research (Cypress, 2017; Lincoln & Guba, 1985).

Validation Framework

Content Validity

Content validity ensures questions cover research topics comprehensively, requiring both global and local relevance (Biermann et al., 2017). In qualitative interview guides, content validity ensures that the questions adequately cover all aspects of the research topic (Brod et al., 2009). The Content Validity Index (CVI), proposed by Lynn (1986), provides a systematic framework to evaluate content validity—i.e., the degree to which the items or questions in an instrument are relevant, representative, and comprehensive of the targeted content. The CVI is calculated based on expert panel ratings, where experts judge each item's relevance to the construct and the instrument's overall adequacy. It translates qualitative expert judgments into a numerical index, enabling researchers to quantify content validity and make data-driven decisions about instrument refinement.

Practical Applicability

Focuses on real-world usability, refined through pilot testing to address cultural and contextual nuances (Bowen, 2008; Dikko, 2016). Pilot testing is a crucial method for assessing and enhancing the practical applicability of interview guides (van Teijlingen & Hundley, 2002).

Combining expert consultation (theoretical rigor) and pilot testing (practical adaptation) aligns with methodological triangulation, enhancing the guide's validity and reliability (Carter et al., 2014). The theoretical framework acknowledges the need to bridge global Sustainable Development Goals (SDG) frameworks with local implementation contexts (Sachs et al., 2019). This integration is crucial in developing interview guides that capture universal sustainability principles and location-specific challenges. Recent studies (Hu & Zhang, 2024; Liu et al., 2018) highlight tensions between global standards and local farming traditions in Chinese farmers' cooperatives.

Methodology

Research Methodological Rigor

To ensure rigor and mitigate researcher bias, strategies included diverse expert panels, stakeholder pilot testing, and reflexive journals (Berger, 2015; Patton, 2014). A translation protocol, which involved back-translation and local review, ensured accuracy (van Nes et al., 2010). This approach aligns with Chatpibal et al. (2022), who emphasize that researchers are both instruments and subjects of study, highlighting the importance of their interview preparation.

Research Design

The validation process consists of two sequential stages: Expert consultation for content validation and Pilot testing for practical validation and refinement.

Stage 1 Expert Consultation

A purposive sampling strategy was employed to select experts for the consultation process (Palinkas et al., 2015). Experts were selected based on the following criteria: a) Minimum of 10 years of research experience in sustainable development or agricultural cooperatives, b) At least five peer-reviewed publications on SDGs or farmers' cooperatives, c) Familiarity with the agricultural context of Guizhou Province, d) Diversity in expertise across economics, sociology, and environmental

science to ensure comprehensive coverage of SDG dimensions. Expert Panel Composition (n=5): Two agricultural sustainability researchers, one cooperative development specialist, one rural policy expert, and one agricultural economist. This panel size aligns with Lynn's (1986) recommendation for content validation, which suggested that 3 to 10 experts are generally sufficient for ensuring adequate agreement; more recent qualitative research guidelines also support it (Guest et al., 2017; Hsu & Sandford, 2007). Given the targeted SDG focus and the specialized knowledge required in the agricultural context of Guizhou, the selected panel size is adequate to ensure informed, diverse, and contextually grounded input.

The Content Validity Index (CVI) form was adapted for this study based on the original work of Lynn (1986) and Polit & Beck (2006). The form included each interview guide question, rating scale (1-4), and qualitative feedback space. The rating scale was defined as follows:

- 1 = Not relevant/Not appropriate
- 2 = Somewhat relevant, needs significant revision
- 3 = Quite relevant, needs minor revision
- 4 = Highly relevant, very appropriate

Following Lynn (1986), the Item-level Content Validity Index (I-CVI) was calculated as the ratio of experts' ratings of items 3–4 (on a 1–4 scale), with an acceptable threshold of 1.0 for panels of 5 or fewer experts. The Scale-level Content Validity Index (S-CVI/Ave)—averaging I-CVI scores—was used to balance rigor and practicality for five experts, with values greater than 0.80 indicating good validity (Polit & Beck, 2006). Experts independently rated the relevance and clarity of questions and provided qualitative feedback.

Stage 2 Pilot Testing

A flexible approach was incorporated into our final interview guide to address concerns about data saturation with the reduced number of questions. While the guide contains 10 main questions, each includes several probes and follow-up questions, allowing the interviewer to delve deeper into topics as needed and ensuring comprehensive data collection. A final open-ended question was included: "Is there anything else you would like to share about SDGs and your cooperative that we have not covered?" This approach aligns with Fusch and Ness's (2015) recommendations for achieving data saturation in qualitative research.

A purposive sampling strategy was employed for the pilot testing phase (Etikan, 2016). As Hennink et al. (2017) demonstrate, code saturation can often be reached with 6-9 interviews, especially when the inquiry is focused on a specific topic, such as interview guide functionality. Six participants were selected to represent diverse stakeholders in farmers' cooperatives, including two cooperative managers, two cooperative members (farmers), and two local government officials involved in agricultural policies and rural development. This sample size aligns with data saturation principles, which suggest that smaller, carefully selected samples can provide sufficient information when participants possess high knowledge levels about the research topic (Fusch & Ness, 2015). In qualitative instrument validation studies, sample sizes of 5-8 participants are considered sufficient when the focus is on obtaining feedback about the instrument rather than generating generalizable findings (Thabane et al., 2010). Additionally, as noted by van Teijlingen and Hundley (2002), pilot testing emphasizes obtaining detailed feedback about research instruments rather than achieving statistical significance.

Pilot interviews were conducted using the revised interview guide resulting from the expert consultation phase. Each interview was followed by a debriefing session where participants were asked to provide feedback on a) the Clarity and comprehensibility of the question, b) the Relevance of the questions to their experience with farmers' cooperatives and SDGs, c) Any discomfort or difficulty in answering the questions, and d) Suggestions for additional topics or questions. Interviews were transcribed verbatim. The interviewer also kept field notes on the interview process and participant reactions. The pilot interviews were not analyzed for content, as this stage focused on the functionality of the interview guide rather than the data it produced (van Teijlingen & Hundley, 2002).

Ethical Consideration

This study adheres to the ethical guidelines for research involving human subjects. Approval was obtained from the Ethical Committee of Tongren Polytechnic College. All participants will be provided with informed consent. To ensure confidentiality, all data were anonymized, and participants were informed of their right to withdraw from the study at any time. Special consideration was given

to the cultural sensitivities and power dynamics inherent in researching rural communities in Guizhou Province.

Results

Phase 1 Expert Consultation Outcomes

Initial Interview Guide Development

The initial guide (V1) comprised 15 questions aligned with research questions and theoretical frameworks (Table 1). Key adjustments were made to address global vs. local relevance and stakeholder dynamics.

Table 1: V1 Interview Guide Development from Research Questions (RQ) and Literature Review

No.	Concise Interview Question V1	Purpose
1	Are you familiar with the SDGs?	RQ1: Assess SDG knowledge
2	Which SDGs are prioritized?	RQ1, RQ2: Identify SDG priorities
3	What cooperative initiatives have been implemented to support these SDGs?	RQ1, RQ4: Explore initiatives
4	How effective are these cooperative initiatives in achieving the targeted SDGs?	RQ2: Evaluate the impact
5	What factors influence the achievement of the SDGs by cooperatives?	RQ2, RQ3: Identify key factors
6	What internal factors impact the sustainability of cooperative efforts?	RQ2, RQ4: Examine internal influences
7	What external factors affect the sustainability of cooperative initiatives?	RQ2, RQ3: Assess external impacts
8	How do stakeholders influence the achievement of SDGs?	RQ2, RQ4: Analyze stakeholder roles
9	What is the sustainable development progress?	RQ1, RQ3: Evaluate current state
10	Main sustainability challenges?	RQ3: Identify obstacles
11	What strategies can be used to overcome sustainability challenges?	RQ1, RQ4: Explore adaptive strategies
12	What are the long-term impacts of these challenges on SDG achievement?	RQ3: Assess challenge longevity
13	How do stakeholders influence the overall pursuit of the Sustainable Development Goals?	RQ2: Examine stakeholder dynamics
14	To what extent are stakeholders involved in the formulation of SDGs?	RQ2, RQ4: Explore engagement levels
15	How do stakeholders influence decision-making processes within cooperatives?	RQ2, RQ4: Assess governance influence

Expert Evaluation Results

Five experts rated the questions using CVI (Table 2). Twelve questions met the I-CVI criterion of ≥ 0.80 , with an S-CVI/Ave of 0.91.

Table 2: V2 Interview Guide Development from Expert Consultation

Question (V1)	Expert 1 (Prof)	Expert 2 (Socio)	Expert 3 (Gov)	Expert 4 (Coop)	Expert 5 (Industry)	I-CVI	Action Taken in V2
Q1	4	4	3	4	4	1.00	Modified to warm-up question with an overview option

Question (V1)	Expert 1 (Prof)	Expert 2 (Socio)	Expert 3 (Gov)	Expert 4 (Coop)	Expert 5 (Industry)	I-CVI	Action Taken in V2
Q2	4	3	4	4	4	1.00	Became Q2 with a focus on 3-4 specific SDGs
Q3	3	4	3	4	3	1.00	Merged into Q1, focusing on specific actions
Q4	4	3	3	4	4	1.00	Became Q4 with a focus on effectiveness
Q5	4	4	4	3	4	1.00	Became Q5 with the request for 4+ factors
Q6	3	4	3	2	3	0.80	Modified to Q6 with specific examples
Q7	4	3	4	3	4	1.00	Became Q7 with specific examples
Q8	3	3	4	2	3	0.80	Modified to Q8 with a focus on mechanisms
Q9	2	3	3	2	3	0.60	Substantially revised to Q9
Q10	4	4	4	4	4	1.00	Retained as Q10
Q11	3	4	4	3	4	1.00	Modified to Q11, focusing on specific projects
Q12	3	3	4	3	3	1.00	Became Q12 with a focus on duration
Q13	3	4	3	2	3	0.80	Modified to Q13, requesting specific examples
Q14	3	3	4	2	3	0.80	Revised to Q14 with a clearer focus
Q15	4	4	3	3	4	1.00	Split into Q15 and Q16

Expert feedback theme, including simplify the language by replacing “global SDGs” with “local cooperative goals” for rural stakeholders. Consolidate questions by merging three stakeholder questions into one: “How do internal and external stakeholders influence SDG implementation?”

After expert consultation, the interview guide was revised into Version 2 (V2), as shown below.

Warm-up: What do you know about the UN Sustainable Development Goals (SDGs)? (Brief overview available if needed)

1. What specific actions/projects has your cooperative undertaken to achieve the SDGs?
2. Which 3-4 SDGs are your cooperative’s priorities, and why?
3. Have your priority SDGs changed in the past 5 years? If so, why?
4. How effectively are these actions/projects achieving their intended goals?
5. What are the main factors affecting SDG achievement in your cooperative? (List 4+)

6. Which internal factors (management, collaboration, governance, structure) significantly impact SDG achievement?
7. How do external factors (policies, markets) affect your cooperative's sustainable development?
8. How do stakeholders influence SDG achievement in Guizhou farmers' cooperatives?
9. What is your cooperative's current progress in sustainable development?
10. What significant challenges do cooperatives face in promoting sustainable development?
11. What specific strategies have been implemented to overcome sustainability challenges?
12. Are the SDG-related challenges temporary or long-term? Why?
13. Who are the 2-3 key internal stakeholders in SDG achievement?
14. Who are the 2-3 key external stakeholders in SDG achievement?
15. How do stakeholders collaborate to achieve the SDGs in Guizhou farmers' cooperatives?
16. How can stakeholder roles be optimized to maximize SDG achievement in Guizhou cooperatives?

Phase 2 Pilot Testing Outcomes

Six stakeholders (two managers, two farmers, one village official, and one township official) tested the revised 16-question guide (V2). Feedback focused on clarity, relevance, and cultural adaptation (Table 3).

Table 3: V3 Interview Guide Development from Pilot Testing

Original V2 Questions	Participant Group	Clarity Issue	Relevance Issue	Suggested Change	Final Version in V3	Research Questions
Q1-Q4 (SDG familiarity and initiatives)	Farmers (n=2)	Technical SDG terminology is unclear	Expected SDGs unfamiliarity	Simplify language, use local context	How familiar are you with sustainable farming and rural development? Can you give some examples? Follow-up: Which Sustainable Development Goals (SDGs) matter most to your work? (Please list 3-4) If needed, a brief overview can be provided.	RQ1
Q1-Q4 (Specific actions and projects)	Cooperative Managers (n=2)	None	Need broader scope	Include individual farmers	Q2: What specific farming practices or projects has your cooperative (or local farmers) implemented?	RQ1, RQ4
Q5-Q7 (Factors and challenges)	Village Official(n=1)	Complex terminology	Moderate	Focus on practical challenges	Q3: What are the primary challenges farmers encounter when adopting sustainable practices?	RQ2, RQ3
Q5-Q7 (Changes and impacts)	Township Official(n=1)	Need timeframe	High	Add a temporal element	Q4: How has your approach changed in 5 years? What drives these changes?	RQ1, RQ2, RQ3
Q8-Q10 (External influences)	All Groups(n=6)	Abstract concepts	Need specific examples	Focus on concrete policies	Q5: How do government policies affect your practices? Give examples.	RQ2, RQ4
Q11-Q14 (Stakeholder questions)	Cooperative Managers (n=2)	Too separated	Overlapping content	Combine stakeholder topics	Q6: Who are the key people/organizations influencing your practices? How?	RQ4
Q11-Q14 (Collaboration aspects)	Farmers (n=2)	Too formal	Need a practical focus	Make more action-oriented	Q7: How do you collaborate with others to address challenges?	RQ3, RQ4

Original V2 Questions	Participant Group	Clarity Issue	Relevance Issue	Suggested Change	Final Version in V3	Research Questions
Q15-Q16 (Optimization)	Village Official(n=1)	Too abstract	Need a practical focus	Focus on specific needs	Q8: What support would help you farm more sustainably?	RQ2, RQ4
N/A (New based on feedback)	All Groups(n=6)	N/A	Need future perspective	Add a forward-looking question	Q9: How do you see the future of farming and rural life?	RQ1, RQ3
N/A (New based on feedback)	Township Official(n=1)	N/A	Need comprehensive closure	Add an open-ended question	Q10: What else would you like to share about sustainable farming?	RQ1-RQ4

Table 3 outlines the development of the interview guide based on feedback from pilot testing. Respondents reported difficulties with technical jargon, convoluted phrasing, and abstract ideas, all of which hindered comprehension.

The updated interview guide (version 3) incorporates these suggestions and shows marked progress in various areas. For instance, overly specialized terms have been replaced with more accessible wording without sacrificing the study's academic rigor. Questions have been reframed to better resonate with participants' local knowledge and hands-on experiences; two new questions (Q9 and Q10) explore forward-looking views and uncover more profound insights. Each question now directly ties back to one of the four research questions (RQ1-RQ4), streamlining the interview process by eliminating redundancies while still covering all key areas of inquiry.

Discussion

The two-stage validation process employed in this study yielded valuable insights into the development and validation of qualitative research instruments for examining SDG implementation in agricultural settings. Through expert consultation and pilot testing, this study demonstrates how global sustainability frameworks can be effectively translated into locally applicable research tools.

Methodological Contributions

The validation process revealed several key insights about instrument development in sustainable development research. First, the expert consultation phase (achieving an S-CVI/Ave of 0.91) demonstrated the importance of theoretical rigor in interview guide development. This finding aligns with stakeholder theory (Freeman et al., 2010) and extends its application to instrument validation in sustainability research. Second, the pilot testing phase highlighted how global SDG frameworks must be adapted to local agricultural contexts, supporting recent work on SDG localization (Biermann et al., 2017). The reduction from 16 to 10 questions through pilot testing reflected the need for what Scott (2013) terms "institutional translation" in cross-cultural research settings.

Practical Implications

The systematic validation process yielded practical insights for both research and practice. The validated interview guide provides a template for examining stakeholder engagement in SDG implementation while maintaining cultural sensitivity. However, several limitations should be noted. The focus on Guizhou Province, while providing rich contextual insights, may limit broader applicability. Future research could extend this work by validating the findings in different cultural contexts and integrating them with quantitative measures.

Cross-Context Adaptability of the Validation Process

While this study focused on farmers' cooperatives in Guizhou Province, China, the two-stage validation methodology developed here offers significant potential for adaptation across different regions and sectors. Combining expert validation with contextual pilot testing provides a transferable framework that balances theoretical rigor with local relevance—a challenge faced in many SDG implementation studies globally (Stafford-Smith et al., 2017).

The validation approach could be particularly valuable for studies in other agricultural settings with different governance structures, such as smallholder farmer associations in Africa or agricultural cooperatives in Latin America. Beyond agriculture, this methodology could be adapted to validate research instruments examining SDG implementation in other sectors, including manufacturing,

education, and urban development. When adapting this process to different contexts, researchers should consider modifying three key elements: (1) the composition of the expert panel to reflect region-specific expertise, (2) the content validity metrics to accommodate different stakeholder literacy levels, and (3) the pilot testing procedures to align with local cultural communication norms (O’Cathain et al., 2015). For example, in contexts where power distances are significant, individual pilot interviews might be supplemented with focus groups to capture collective feedback that participants might be reluctant to provide individually (Patton, 2014).

Conclusion

Key Findings

This study developed a stakeholder-driven interview guide for exploring SDGs in farmers' cooperatives through a two-stage validation process, yielding three key findings:

Strong Content Validity via Expert Consultation

Expert consultation confirmed the interview guide’s theoretical rigor. Using the Content Validity Index (CVI), 12 out of 15 initial questions achieved an Item-level CVI (I-CVI) of 0.80 or higher, with an overall Scale-level CVI (S-CVI/Ave) of 0.91, surpassing the threshold for excellent validity (Polit & Beck, 2006). Experts emphasized simplifying language, reducing redundancy in stakeholder-related questions, and grounding questions in the local context of Guizhou Province. For example, Question 9 (“What is the current progress in global sustainable development?”) was revised from an abstract global focus to a localized inquiry about “your cooperative’s current progress in sustainable development” to enhance relevance.

Contextual Adaptation through Pilot Testing

Pilot testing, involving six stakeholders, refined the guide from 16 to 10 questions, prioritizing practical applicability. Key adjustments included: Replacing technical SDG terminology with locally relevant phrases (e.g., “sustainable farming and rural development” instead of “SDGs”). The overlapping stakeholder questions were combined into a single inquiry: “Who are the key individuals or organizations influencing your practices, and how?” Forward-looking questions (e.g., “How do you see the future of farming and rural life?”) were added to capture qualitative insights into long-term sustainability visions. Participants highlighted challenges with abstract concepts, leading to a focus on concrete examples (e.g., government policies affecting farming practices) and action-oriented phrasing.

Balancing Global Frameworks and Local Realities

The validation process revealed the critical need to translate global SDG frameworks into context-specific tools. For instance, while the initial guide emphasized universal SDG priorities, stakeholder feedback shifted the focus to 3–4 locally relevant SDGs (e.g., poverty reduction, rural infrastructure, and environmental sustainability) that align with Guizhou’s agricultural and cultural priorities. This “institutional translation” (Scott, 2013) ensured the guide captures both global sustainability principles and the region’s unique challenges, such as geographic limitations and ethnic diversity.

These findings demonstrate that the two-stage validation process effectively balances theoretical rigor and practical adaptation, resulting in an interview guide that is both culturally sensitive and methodologically robust. The final instrument serves as a template for cross-cultural SDG research in agricultural cooperatives, enabling stakeholders to bridge global goals with local realities.

Research Implications

The two-stage validation process establishes a transferable template for cross-cultural research, particularly in resource-constrained settings. By integrating expert-driven theoretical rigor (S-CVI/Ave = 0.91) with stakeholder-led contextual adaptation (reducing the number of questions to 10), this approach addresses the tension between global SDG standardization and local diversity. Future studies in agriculture or other sectors (e.g., education, urban development) can adapt this framework by tailoring expert panels to regional expertise and pilot testing to cultural communication norms (O’Cathain et al., 2015). The interview guide provides a systematic tool for gathering nuanced, context-specific information about SDG implementation, which can inform more targeted rural development policies.

The refined instrument offers a practical tool for cooperative managers and stakeholders to assess and enhance sustainable development practices. Specifically, the validated interview guide can be adapted by (a) Cooperative leadership for internal sustainability assessments and strategic planning, (b) NGOs working with agricultural communities to evaluate program effectiveness, (c) Government agencies developing targeted agricultural sustainability policies, and (d) International development organizations assessing SDG progress in rural contexts.

The guide's emphasis on combining global frameworks with local contexts makes it particularly valuable for bridging the implementation gap between international sustainability goals and ground-level practices (Biermann et al., 2017; Nilsson et al., 2016).

Future Directions

Future research could validate the framework in global contexts, conduct comparative analyses of SDG implementation across cooperatives, or integrate qualitative findings with quantitative measures for holistic sustainability assessments.

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Reliability and Validity of a Questionnaire on Acceptance and Use of Digital Education Platform in China

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Abstract

Digital education is emerging as a pivotal trend in national educational development in China, fostering equity through digital platforms. Enhancing rural teachers' proficiency in utilizing these platforms is imperative. Consequently, our research endeavor focused on developing, validating, and establishing the reliability of questionnaires designed to gauge rural teachers' willingness and actual usage of digital education platforms. We commenced by engaging three esteemed business administration experts to review and assign scores to each questionnaire item, followed by computing item-objective congruence (IOC) indices. Subsequently, a pilot study involving 30 rural teachers was conducted, with a two-week interval for a retest to assess test-retest reliability. Also, the ethics committee review was passed before issuing the questionnaire. The finalized questionnaire comprises 113 items, structured across eleven primary sections. Cronbach's alpha coefficient was utilized to evaluate internal consistency reliability, while Pearson's correlation coefficient assessed test-retest reliability. The overall IOC score was satisfactory (0.983), and Cronbach's alpha coefficients for the entire questionnaire indicated strong reliability (0.948). Additionally, the Pearson's correlation coefficient for the questionnaire was exceptionally high (0.984). Our results indicate that the questionnaires measuring willingness to use and actual behavior concerning digital education platforms are both valid and reliable for assessing rural teachers. In summary, this study successfully developed a standardized instrument to pinpoint factors influencing rural teachers' willingness to use and actual usage of digital education platform questionnaires.

Keywords: Digital Education Platform; Intention and Behavior to Use; Reliability; Validity; IOC

Introduction

As the foundational pillar of educational informatization, the development and utilization of digital educational resources significantly impact the advancement of educational modernization. These resources play a crucial role in addressing urban-rural education disparities and fostering the collaborative development and sharing of premium educational information resources. (Huai, 2024) During the World Digital Education Conference in 2023, Huai Jinpeng emphasized the Chinese government's commitment to digital education. Notably, China's national smart education public service platform stands as the largest digital education resource platform globally (The China Network Information Center, 2024, p. 53). However, a notable disparity exists between rural and urban teachers in their utilization of digital educational resources. Currently, the application status and future trajectory of digital educational resources in rural areas remain uncertain (Wang et al., 2018).

Our study, involving 2,942 primary and secondary school teachers across 31 provinces, identified several factors influencing the effective utilization of digital education resources by teachers. These include the quality of digital resources, teachers' self-efficacy, the school's application environment, and institutional support (CAI et al., n.d.). The results highlight that teacher-related and school-related factors are pivotal in determining the level of teachers' information technology application. Teacher-related factors encompass their information technology competencies and their

attitudes towards integrating technology in teaching. Notably, the content of school-provided information technology training for teachers emerges as a crucial determinant. (Zhang Yi et al., 2015)

To address the growing need for understanding the factors influencing rural teachers' engagement with digital education platforms in China, the authors designed a comprehensive series of questionnaires. These questionnaires aim to accurately gauge teachers' willingness and behavioral tendencies regarding the adoption of these digital tools. Recognizing that the findings must be applicable to a broader population, the authors emphasized the importance of establishing, verifying, and ensuring the reliability of these assessment tools.

As a result, the primary objective of this study was to create a detailed methodology for developing, validating, and confirming the reliability of the questionnaires specifically tailored to assess the willingness and behavior of rural Chinese teachers in utilizing digital education platforms. The development process involved several key steps, including extensive literature reviews to identify relevant factors, consultations with educational experts to refine the questionnaire items, and pilot testing with a sample of rural teachers to gather feedback and make necessary adjustments.

To ensure the validity of the questionnaires, rigorous statistical analyses were conducted, including factor analysis to identify underlying constructs and correlation studies to examine the relationships between various factors influencing teachers' decisions. In addition, the study employed Cronbach's alpha and other reliability tests to confirm that the questionnaires produced consistent and dependable results.

By detailing this development and validation process, the author aims to provide a framework for future researchers and educators to explore the adoption of digital education platforms in rural areas. By establishing these validated and reliable questionnaires, this study not only contributes to academic literature but also serves as a practical tool to help stakeholders enhance the digital literacy and teaching skills of rural teachers. Finally, the findings of this study are expected to inform policy initiatives and professional development programs that support rural educators in effectively integrating technology into their teaching practices, thereby improving educational outcomes for students in these communities.

Objectives

The objective of the study is to describe the development, validation and reliability of questionnaires assessing the willingness and behavior of teachers to use digital education platforms in rural China.

Materials and Methods

Settings

The study is a cross-sectional online questionnaire-based study conducted across China during August 2024. A questionnaire utilized the online data collection tool "Questionnaire star." A link and Quick Response code (QR code) were distributed in rural teachers groups in China using online platforms such as We chat and other social media applications.

Participants

The first 30 participants who responded to the questionnaire were chosen as the sample group. The participants were eligible for inclusion if they met the following criteria:

China males and females; Rural teachers; Can read and understand Chinese

Ethical consideration

Ethical considerations were paramount throughout this study. Initially, the researcher obtained all necessary permissions from relevant institutions prior to data collection. Furthermore, the researcher guaranteed that the collected data would solely be used for the purposes outlined in this study. The personal information gathered from participants was kept confidential and never disclosed to anyone else. The privacy of all collected data was rigorously maintained to safeguard participants' dignity and confidentiality.

Questionnaire development

On the basis of reviewing literature and practical Using a digital education platform based on the UTAUT2 model and questionnaire development. The questionnaire was then decided to include 113 questions divided into eleven major sections apart from demographic data.

Performance Expectation, which consists of Perceived usefulness, Relative Advantage, Extrinsic Motivation, Job-fit and Outcome Expectations. The total section consisted of 24 items. The responses were on a 5-point Likert scale (1-5). The Likert scale (1-5) was between never and always do. The maximum score was 120.

Efforts Expectation which consists of Perceived Ease of Use and Ease of Use. The total section consisted of 7 items. The responses were on a 5-point Likert scale (1-5). The Likert scale (1-5) was between never and always do. The maximum score was 35.

Social Influence which consists of General Social Influence and Peer Social Influence. The total section consisted of 6 items. The responses were on a 5-point Likert scale (1-5). The Likert scale (1-5) was between never and always do. The maximum score was 30.

Facilitating Conditions which consists of Perceived Behavioral Control, Facilitating Conditions and system compatibility with individuals. The total section consisted of 12 items. The responses were on a 5-point Likert scale (1-5). The Likert scale (1-5) was between never and always do. The maximum score was 60.

Hedonic Motivation which consists of User Attention, User curiosity and User Enjoyment. The total section consisted of 11 items. The responses were on a 5-point Likert scale (1-5). The Likert scale (1-5) was between never and always do. The maximum score was 55.

Intention To Use which consists of Intention To Use, Prediction to use and Planning to use. The total section consisted of 11 items. The responses were on a 5-point Likert scale (1-5). The Likert scale (1-5) was between never and always do. The maximum score was 55.

Behavior To Use which consists of Using experience and Using reaction. The total section consisted of 5 items. The responses were on a 5-point Likert scale (1-5). The Likert scale (1-5) was between never and always do. The maximum score was 30.

Teacher Innovativeness, which consists of Innate Innovativeness and Domain Specific Innovativeness. The total section consisted of 9 items. The responses were on a 5-point Likert scale (1-5). The Likert scale (1-5) was between never and always do. The maximum management score was 45.

Perceived Trust, which consists of System Quality, Relationship Quality and Service quality. The total section consisted of 11 items. The responses were on a 5-point Likert scale (1-5). The Likert scale (1-5) was between never and always do. The maximum management score was 55.

TPACK Ability, which consists of Technological Pedagogical knowledge, Technological Content knowledge and Technological Pedagogical Content knowledge. The total section consisted of 9 items. The responses were on a 5-point Likert scale (1-5). The Likert scale (1-5) was between never and always do. The maximum management score was 45.

Culture, which consists of Individualism/ Collectivism and Uncertainty Avoidance. The total section consisted of 7 items. The responses were on a 5-point Likert scale (1-5). The Likert scale (1-5) was between never and always do. The maximum management score was 35.

Content Validity

To develop the questionnaire, a panel of three experts in business administration conducted a thorough review of its content validity. Each question underwent scrutiny based on clarity, interpretation, and alignment with the study's objectives. The experts were briefed on the study's aims and instructed to assign a +1 for items meeting the criteria, 0 for uncertainty, and -1 for items failing to meet the criteria. Following the collection of results, the item-objective congruence (IOC) for each item was computed. Items required an IOC of at least 1; those scoring below 0.5 were revised based on expert suggestions. This iterative process continued until all items achieved an IOC greater than 1. Initially, the preliminary questionnaire featured 11 parts with 114 items. Based on expert input, two items were omitted, one was added, and nine were revised. The final questionnaire, refined with expert advice, consisted of 11 parts with 113 items.

The adjusted questionnaire was then piloted in 30 rural teachers over 18 years of age in Tongren city, Guizhou province, China. The response data were then collected and analyzed for validity and reliability of the questionnaire. All items were measured on a five-point Likert scale.

Table 2: Preliminary items in questionnaire with IOC index and test-retest reliability Final items included in the questionnaire

Item	Question	IOC Index	Cronbach's alpha	Test-retest reliability
Part 1	Performance expectation	+1	0.951	0.976
	Perceived usefulness	+1	0.914	0.988
1.1.1	Using platform resource enables me to accomplish my learning activities more quickly.	+1		0.967
1.1.2	Using platform resource improves my learning performance (i.e., develop new skills, techniques, and gain experience).	+1		0.958
1.1.3	Using platform increases productivity in my learning activities(i.e.,able to learn and understand a large amount of information)	+1		0.961
1.1.4	Using platform enhances my effectiveness in my learning activities(i.e.,gain comprehensive knowledge and greater understanding about course being studied for improving grades and academic performance)	+1		0.927
1.1.5	Using platform would make it easier to compete my courses and modules faster.	+1		0.967
1.1.6	I would find platform resource useful in my learning activities.	+1		0.933
	Relative Advantage	+0.934	0.904	0.938
1.2.1	Using platform resource enables me to learn more quickly as compared to traditional classroom.	+1		0.795
1.2.2	Using platform resource improves the quality of my learning activities(i.e., to achieve better grades and improve academic performance).	+0.67		0.797
1.2.3	Compared with the traditional learning, using the digital education platform resources can give me the freedom to learn.	+1		0.866
1.2.4	I am able to acquire information using platform for my learning activities.	+1		0.713
1.2.5	I am able to obtain the latest knowledge in education-related issues using platform.	+1		0.878
	Extrinsic Motivation	+1	0.907	0.955
1.3.1	Using platform resource can increase wages.	+1		0.878
1.3.2	Using the platform resources can help to work.	+1		0.909
1.3.3	Using platform resources can increase opportunities for promotion.	+1		0.858
1.3.4	I am able to learn through interactive discussions from using platform.	+1		0.864
1.3.5	I am able to generate an environment of trust using platform.	+1		0.913
	Job-fit	+1	0.772	0.888
1.4.1	The platform resources are close to my work field.	+1		0.833
1.4.2	Using platform resources can increase work output.	+1		0.744
1.4.3	Platform resources can be used in conjunction with textbooks and other resources.	+1		0.920

Item	Question	IOC Index	Cronbach's alpha	Test-retest reliability
1.5.1	Outcome Expectations If I use platform resource I will increase the chances of getting higher marks on test and exams for the same amount of effort.	+1 +1	0.894	0.965 0.890
1.5.2	If I use platform resource, my classmates will perceive me as competent.	+1		0.892
1.5.3	If I use platform resource, I will increase my chances of advancing to the next level.	+1		0.935
1.5.4	I am able to assimilate research and education related issues using platform.	+1		0.904
1.5.5	I am able to share important knowledge using platform.	+1		0.807
Part 2	Efforts Expectation	+1	0.891	0.976
2.1.1	Perceived Ease of Use Learning to operate platform resource would be easy for me.	+1 +1	0.908	0.952 0.863
2.1.2	I find platform resource to be flexible to interaction with.	+1		0.816
2.1.3	It is easy for me to become skillful at using platform resource.	+1		0.817
2.1.4	I feel confident in my ability to learn using platform.	+1		0.937
2.2.1	Ease of Use I believe I require little effort to understand how platform resource works.	+1 +1	0.864	0.958 0.856
2.2.2	I often use the platform resources.	+1		0.870
2.2.3	Overall, I believe that the platform resource is easy to use.	+1		0.935
Part 3	Social Influence	+0.945	0.826	0.956
3.1.1	General Social Influence People who influence my behavior think that I should use platform resource.	+1 +1	0.761	0.925 0.857
3.1.2	People who are important to me think I should platform resource.	+1		0.856
3.1.3	My school supports me to use the platform resources.	+1		0.895
3.2.1	Peer Social Influence Learner's who use platform resources enjoy more prestige than those who do not.	+0.89 +1	0.907	0.954 0.885
3.2.1	Learner's who use platform resources enjoy higher profile than those who do not.	+0.67		0.907
3.2.3	My peers , leaders and teachers think that I should use platform resources.	+1		0.895
Part 4	Facilitating Conditions	+1	0.915	0.963
4.1.1	Perceived Behavioral Control I have necessary to use the platform resources.	+1 +1	0.850	0.955 0.885
4.1.2	I have the necessary knowledge to use platform systems.	+1		0.893
4.1.3	I have mastered the knowledge and skills to using platform resources.	+1		0.884

Item	Question	IOC Index	Cronbach's alpha	Test-retest reliability
4.1.4	I have the knowledge necessary to use the platform resources.	+1		0.916
4.2.1	Facilitating Conditions Guidance is available to me in the selection of platform resources.	+1 +1	0.882	0.968 0.901
4.2.2	It is necessary to guide me specifically on the use of digital platform resources.	+1		0.904
4.2.3	Specialized instruction concerning the platform was available to me.	+1		0.741
4.2.4	I can get the support from a specific person/group when I face difficulties with platform resources.	+1		0.833
4.2.5	Using platform fits my learning.	+1		0.833
4.3.1	System compatibility with individuals The resource content of the education platform is compatible with my research field.	+1 +1	0.888	0.945 0.819
4.3.2	Even if I do not understand the teaching process of modern technology, but it does not affect my use.	+1		0.734
4.3.3	When I want to use technology to teach, I can immediately think of the content and technology of a certain platform resources.	+1		0.868
Part 5	Hedonic Motivation	+0.963	0.876	0.974
5.1.1	User Attention Using platform resources to conduct teaching makes students more focused on class.	+1 +1	0.861	0.962 0.862
5.1.2	Using platform resources to develop teaching enables students to better complete their learning tasks.	+1		0.843
5.1.3	Using platform to give students learning freedom.	+1		0.858
5.1.4	Using platform to make students communicate ideas regularly using platform.	+1		0.840
5.2.1	User curiosity Using platform to carry out teaching has made me more curious to explore the knowledge of various disciplines.	+1 +1	0.784	0.957 0.747
5.2.2	Using platform to conduct teaching enables students to answer questions more actively.	+1		0.725
5.2.3	Using platform to develop teaching can activate the classroom atmosphere.	+1		0.788
5.2.4	Using platform make students easier to share knowledge.	+1		0.793
5.3.1	User Enjoyment It is interesting to use platform for teaching.	+0.890 +1	0.835	0.947 0.872
5.3.2	Using platform is enjoyable.	+0.67		0.716
5.3.3	I am very satisfied with the use of platform for teaching.	+1		0.880
Part 6	Intention To Use	+0.927	0.876	0.971
6.1.1	Intention to use I intent to use platform immediately.	+1 +1	0.850	0.974 0.819
6.1.2	I look forward to popularizing the use of platform.	+1		0.867

Item	Question	IOC Index	Cronbach's alpha	Test-retest reliability
6.1.3	I intend to use platform in the future learning sessions.	+1		0.849
6.1.4	I would recommend others and my colleagues to use the platform in their teaching.	+1		0.712
6.1.5	If the resources of platforms become more diversified in the future, I plan to use it often in the future.	+1		0.848
6.2.1	Prediction to use I predict I will use platform in the future.	0.78 +0.67	0.835	0.903 0.754
6.2.2	I predict I would use platform.	+0.67		0.834
6.2.3	If the resources of platforms become more diversified in the future, I predict that I will use them more often in the future.	+1		0.883
6.3.1	Planning to use I plan to use platform in the future.	+1 +1	0.906	0.972 0.832
6.3.2	I plan to use platform in future learning sessions.	+1		0.822
6.3.3	I plan to continue to use the platform for various purposes in the future.	+1		0.733
Part 7	Behavior To Use	+0.89	0.776	0.952
7.1.1	Using experience I must use the platform for learning and teaching.	+1 +1	0.849	0.919 0.729
7.1.2	I have a lot of experience in using the platform.	+1		0.850
7.1.3	I use the platform, which has become a habit.	+1		0.835
7.2.1	Using reaction I am willing to recommend a platform that is worth to my friends on the on my favourite platform.	+0.78 +1	0.803	0.946 0.842
7.2.2	I plan to continue to use the platform frequently.	+0.67		0.805
7.2.3	I will continue to use the platform.	+0.67		0.708
Part 8	Teacher Innovativeness	+0.945	0.907	0.961
8.1.1	Innate Innovativeness I am more interested in using the new technologies and new products of platform.	+1 +1	0.925	0.951 0.763
8.1.2	I like to use platform for new technologies and new products.	+1		0.861
8.1.3	I'm excited to use new technologies and products from platforms.	+1		0.831
8.1.4	I have good study habits and time management using platform.	+1		0.885
8.1.5	I have a great sense of personal responsibility for using platform.	+1		0.806
8.1.6	I show initiative and judgment in carrying out my learning activities when using platform.	+1		0.760
8.2.1	Domain Specific Innovativeness Anyway, I really like to accept new things.	+0.89 +0.67	0.826	0.950 0.874
8.2.2	About platform, I know more about the latest education and teaching technology platform resources than others.	+1		0.733
8.2.3	When I listen to the latest technical resources in education, I will be the first to learn more information.	+1		0.727

Item	Question	IOC Index	Cronbach's alpha	Test-retest reliability
Part 9	Perceive Trust	+0.96	0.864	0.957
	System Quality	+1	0.861	0.982
9.1.1	Now the platform start speed, running speed is very fast.	+1		0.703
9.1.2	The operation of the current platform is very smooth.	+1		0.709
9.1.3	Now the platform registration and login is very convenient.	+1		0.821
9.1.4	Now the platform downloads smoothly, no flash back, no response error.	+1		0.826
9.1.5	In general, the system experience of platform is very good.	+1		0.835
	Relationship Quality	+1	0.738	0.955
9.2.1	I can ask teachers' questions and get answers in time on the platform currently used.	+1		0.877
9.2.2	I can exchange my learning experience with my classmates on the platform currently used.	+1		0.891
9.2.3	On the platform currently in use, I think I am very familiar with my classmates.	+1		0.875
	Service quality	+0.89	0.764	0.790
9.3.1	I think the platform content and information is reasonably priced.	+1		0.768
9.3.2	Compared with the time and energy I need to invest, I still think the use of platform is very valuable.	+1		0.769
9.3.3	Overall, I am very satisfied with and trust the platform.	+0.67		0.772
Part 10	TPACK Ability	+1	0.874	0.945
	Technological Pedagogical knowledge	+1	0.824	0.918
10.1.1	I was able to use platform student assessments to adjust the teaching.	+1		0.868
10.1.2	I was able to use platform resource to create valid content statements out of the textbook.	+1		0.697
10.1.3	My ability can meet the overall needs of contemporary platform resource teaching.	+1		0.864
	Technological Content knowledge	+1	0.875	0.900
10.2.1	I was able to use platform resource to predict the student's skills or understanding of a particular topic.	+1		0.800
10.2.2	I was able to build an platform resource learning environment that helped students build new knowledge and technology.	+1		0.850
10.2.3	I can use platform resource to improve the degree of students' knowledge (for example, preview the online courseware content in advance, etc.).	+1		0.844
	Technological Pedagogical Content knowledge	+1	0.845	0.947
10.3.1	I can select platform resource to use in my classroom that enhance what I teach, how I teach, and what students learn.	+1		0.856
10.3.2	I can teach lessons that appropriately combine my teaching subject, technologies, and teaching approaches.	+1		0.860

Item	Question	IOC Index	Cronbach's alpha	Test-retest reliability
10.3.3	I can provide leadership in helping others to coordinate the use of content, technologies, and teaching approaches at my school and/or district.	+1		0.715
Part 11	Culture	+1	0.917	0.940
	Individualism/ Collectivism	+1	0.796	0.903
11.1.1	I get better learning results when I study as a platform group member than when I study independently on my own.	+1		0.733
11.1.2	When group uses the platform, I am willing to abandon some personal interests to get benefits.	+1		0.879
11.1.3	When group uses the platform, I am willing to abandon some personal target to get the goal.	+1		0.823
	Uncertainty Avoidance	+1	0.895	0.933
11.2.1	Studying platform, rules, and regulations are important because they inform me what is expected of me	+1		0.707
11.2.2	Studying the order and structure of platform learning modules important.	+1		0.729
11.2.3	It is important to follow platform instructions and procedures closely.	+1		0.793
11.2.4	Standardized work procedures are helpful when studying with platform.	+1		0.729
	Total	0.983	0.948	0.984

Test-retest reliability

Test-retest reliability was employed to assess the consistency of results over time. The pilot questionnaire underwent testing and re-testing on the same subjects, with a two-week interval between sessions. Correlation analysis was utilized to analyze the data. Items with a correlation coefficient above 0.7 were deemed to have acceptable reliability. However, (Bland & Altman, 1996) suggested that a reliability coefficient of 0.5 might be sufficient in cases where the impact of measurement error is not significant, particularly in subjective assessments.

Statistical analysis

Collected data were entered and analyzed using the Statistical Package for the Social Sciences (SPSS, Inc., Chicago, IL, USA) version 26.

Internal consistency reliability

Internal consistency is a reliability metric that evaluates how well items on a test measure the same construct or concept by examining their correlations. Cronbach's alpha was used to test internal consistency, and a value of 0.70 or higher is considered reliable.

Results

The preliminary questionnaire is divided into 11 parts with a total of 114 items. It was reviewed, edited, and scored for content validity by Item-Objective Congruence (IOC) index by 3 experts. According to the opinion of the experts, Two items were removed, one item was added, and nine items were modified. The final questionnaire modified with expert opinion was composed of 11 parts and 113 items.

The content-validated questionnaire was then pilot tested in 30 rural teachers and retested two weeks apart for test-retest reliability. Table 1 shows characteristics of the participants.

The piloted results were analyzed. The reliability coefficient above the reliability criterion 0.7. The final 113 items, included with 11 parts, were then tested for internal consistency reliability. The Cronbach's alphas for each factor were 0.951, 0.891, 0.826, 0.915, 0.876, 0.876, 0.776, 0.907, 0.864, 0.874,

and 0.917 respectively, which are higher than the standard for internal consistency reliability of 0.70. The final items included in the questionnaire and their statistical value are presented in Table 2.

The questionnaire developed in this study, which has been rigorously tested and confirmed for both validity and reliability, serves as an effective instrument for measuring the various factors that influence the intention and behavior of rural teachers in China regarding the use of digital education platforms. By systematically assessing these factors, the questionnaire can provide comprehensive insights into the motivations, barriers, and facilitators that rural educators encounter in their adoption of digital tools.

Utilizing this tool has the potential to significantly enhance the capability of Chinese rural teachers to engage with digital education platforms. By identifying specific areas where support or training may be needed, educational stakeholders can tailor professional development programs to address the unique challenges faced by rural educators. This targeted approach can empower teachers with the knowledge and skills necessary to effectively integrate digital resources into their teaching practices.

Moreover, the insights gained from the questionnaire can inform policy decisions and the allocation of resources, ensuring that initiatives aimed at promoting digital education are grounded in the real experiences and needs of rural teachers. As a result, the implementation of this questionnaire not only contributes to a better understanding of the current landscape of digital education in rural China but also fosters an environment conducive to the effective use of technology in enhancing educational outcomes.

In summary, the application of this validated questionnaire can lead to a significant improvement in the proficiency and confidence of Chinese rural teachers in utilizing digital education platforms, ultimately supporting their efforts to provide high-quality education to their students and bridging the digital divide in rural education.

Discussion

This study aimed to develop and validate a standardized questionnaire for identifying factors influencing teachers' intentions and behaviors regarding the use of digital education platforms. A content validity assessment, conducted by three experts using the Item-Objective Congruence (IOC) index, verified that the questionnaire items align with the overall theoretical framework it intends to evaluate. To assess consistency over time, test-retest reliability was employed by administering the pilot questionnaire to the same group of subjects with a two-week interval. Additionally, internal consistency reliability was evaluated using Cronbach's alpha to measure how well the questionnaire items assess the same construct or concept. By rigorously validating the questionnaire through content validity, test-retest reliability, and internal consistency, as recommended by (Bryman, 2016), the study ensured a reduced risk of response bias. study consists of 113 items. It covers 11 different factors, based on the framework: Performance expectation, Efforts Expectation, Social Influence, Facilitating Conditions, Hedonic Motivation, Intention To Use, Behavior To Use, Teacher Innovativeness, Perceive Trust, TPACK Ability, and Culture. The internal consistency reliability test results were satisfactory, with Cronbach's alpha values of 0.951, 0.891, 0.826, 0.915, 0.876, 0.876, 0.776, 0.907, 0.864, 0.874, and 0.917 respectively. All items in the questionnaire have sufficient test-retest reliability and good internal consistency reliability, therefore suitable for implementation as a standardized instrument for measuring factors affecting intention and behavior to use digital education platform.

It is noteworthy that the validation of the questionnaire was conducted in a single rural school in Tongren, Guizhou Province, China. The instrument was developed as part of further research on the use of digital education platforms for rural teachers. If the instrument is to be used in other settings, further validation in different local village teachers may need to be performed to confirm its suitability. Furthermore, it should be acknowledged that the study had a limited sample size, which may introduce some degree of error in extrapolating the study findings to other local populations. Future studies with large sample sizes could build on the tools developed in this study to identify influencing factors influencing rural teachers' use of digital education platforms and assist digital platform companies in developing appropriate business strategies. And to assist education departments in developing strategies to improve teachers' use of digital education platforms.

The final questionnaire in this study comprises 113 items, spanning 11 distinct factors based on a comprehensive framework: Performance Expectation, Effort Expectation, Social Influence, Facilitating Conditions, Hedonic Motivation, Intention to Use, Behavior to Use, Teacher Innovativeness, Perceived Trust, TPACK Ability, and Culture. The internal consistency reliability test results were promising, with Cronbach's alpha values ranging from 0.776 to 0.951. All questionnaire items demonstrated adequate test-retest reliability and strong internal consistency, rendering the instrument suitable for standardized measurement of factors influencing teachers' intentions and behaviors related to digital education platform usage. And to assist education departments in developing strategies to improve teachers' use of digital education platforms.

Conclusion

A standardized questionnaire has been created to pinpoint factors that influence rural teachers' decisions to adopt digital education platforms. This questionnaire, which has demonstrated reliability and validity, is anticipated to serve as a benchmark for future research in identifying the specific practices that affect rural teachers' choices regarding digital education platforms.

A comprehensive standardized questionnaire has been developed with the aim of identifying the various factors that influence rural teachers' decisions to adopt digital education platforms. This carefully crafted instrument has undergone rigorous testing to ensure its reliability and validity, making it a robust tool for gathering data in this field. The questionnaire encompasses a wide range of variables, including technological access, teacher training, perceived effectiveness of digital tools, and contextual challenges unique to rural education environments.

By systematically evaluating these factors, the questionnaire is expected to provide valuable insights into the specific practices and conditions that shape rural teachers' choices regarding the integration of digital education platforms in their classrooms. Furthermore, the findings derived from this research will not only contribute to the existing body of knowledge but will also serve as a foundational benchmark for future studies aimed at understanding and enhancing the adoption of digital technologies in rural education settings.

Ultimately, this standardized questionnaire is poised to facilitate a deeper understanding of the dynamics at play in rural education, guiding policymakers, educators, and researchers in developing targeted strategies to support rural teachers in their efforts to leverage digital tools effectively. Through this initiative, we hope to bridge the gap between technology and education in rural areas, fostering an environment where teachers feel empowered to embrace innovative teaching methods that can enhance student learning outcomes.

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A Consumer Trust Model for AI-Generated Advertising: The Moderating Role of AI Literacy and Personalization Acceptance

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Abstract

Increasing necessity of AI in business operations also controversially raised concerns regarding misuse and unsafety from AI-generated outputs, especially in AI-generated Advertising which attempts to psychologically convince audiences to believe and finally to purchase. This conceptual study proposes a comprehensive theoretical framework that elucidates the mechanisms of consumer trust formation in AI-generated advertising, integrating ethical, technological, and psychological dimensions. The model synthesizes two major principles from Responsible AI, including perceived fairness, transparency, privacy concerns, and accountability, with core constructs from UTAUT2, namely social influence and performance expectancy. It also incorporates two individual difference moderators: AI literacy and AI-personalization acceptance, which represent technological and psychological readiness aspects in the trust formation process. Trust is positioned as the central mediating factor linking ethical perceptions to behavioral responses, particularly consumer engagement and purchase intention. Based upon scholarly insights spanning 2015-2025, this framework addresses three critical theoretical gaps, namely, insufficient integration of AI ethics with UTAUT2 and consumer behavior models to investigate the drivers to consumer trust and its subsequent linkage to purchase intention, limited exploration of individual-level readiness as moderating mechanisms, and inadequate conceptualization of ethic and adoption factors in AI-driven advertising contexts. This study offers practical guidance for marketers and policymakers seeking to ensure both safety and persuasiveness for all stakeholders in AI-driven and hyper-personalized advertising environments. Future empirical validation should test the proposed constructs and their relationships across heterogeneous consumer populations to establish cross-cultural generalizability

Keywords: Consumer Trust, AI-Generated Advertising, AI-Personalization Acceptance, Responsible AI, AI Literacy

Introduction

The fusion of AI and digital marketing is reshaping the future of advertising by enabling hyper-personalization at scale; however, this technological advancement simultaneously introduces complex ethical challenges. One of its key applications is AI-generated content (AIGC), which uses machine learning to autonomously produce text, images, and videos (Gu et al., 2024). These capabilities enable AI systems to simulate human-like reasoning, particularly in causal inference, which is a central component of rational decision-making (Mitchell, 2024). In the context of marketing, AI is used to deliver hyper-personalized advertisements based on real-time consumer preferences (Quantilus, 2024). These AI-driven efforts enhance the precision and relevance of brand communication (Dwivedi et al., 2021). Furthermore, generative AI tools significantly accelerate the production of advertising content while democratizing access to creative industries by reducing production costs and lowering traditional barriers associated with artistic skills (Tiwari & Pandey, 2025). However, these advancements raise ethical and societal concerns, particularly regarding transparency, data privacy, and the potential loss of human creativity in advertising (Jones, 2025). AI-

generated content may rely heavily on pre-existing patterns, which can limit originality (Amabile, 2020), while AI automation continues to displace human workers in repetitive, data-centric roles (Frey & Osborne, 2017).

Consumer responses to AI-generated advertisements are mixed, reflecting both positive and skeptical attitudes toward this technology (Graham & Stough, 2025). Some consumers appreciate the relevance and efficiency of such content, particularly in terms of algorithm-driven personalization (Manoj & Lee, 2025). In contrast, others express discomfort due to the absence of human touch and concerns about perceived algorithmic bias (Vukmirović et al., 2025). Trust in AI-driven personalized advertisements is shaped by consumers' perceptions of fairness, transparency, and data privacy, especially in environments where social and ethical concerns are amplified (Jones, 2025). To understand consumer responses to technology, researchers have traditionally employed models such as the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003). These models focus on perceived usefulness, ease of use, and social influence. However, they do not fully address the emotional, ethical, and trust-related complexities inherent in AI-generated content (Lee et al., 2025). To fill this gap, recent frameworks incorporating the Technology Readiness and Acceptance Model (TRAM) integrate psychological dimensions such as optimism, discomfort, innovativeness, and trust as critical antecedents to technology adoption (Sehgal et al., 2025), providing a broader framework to study how consumers engage with AI.

Despite the growing application of AI in advertising, there is a lack of empirical research exploring how consumer trust is formed and influenced by individual-level psychological and perceptual factors. In particular, the roles of AI literacy, which reflects consumers' ability to interpret algorithmic processes, and personalization acceptance, defined as the willingness to engage with AI-tailored content, have been underexplored in existing literature. These factors are likely to determine whether AI-generated ads are perceived as credible or intrusive and may ultimately shape consumer engagement and purchase intention. In addition, current research lacks a comprehensive framework that links trust to its behavioral outcomes in the context of AI-driven advertising. Although trust has been examined as an antecedent or mediating variable, few studies have modeled how it operates within a complete process that includes moderating effects of user readiness. Addressing these theoretical gaps is critical for the development of a robust, ethically informed, and psychologically grounded model of consumer trust formation in AI-generated advertising. This approach reflects not only the complexities of emerging AI technologies but also the diversity and depth of human responses to automated persuasion. The proposed model empowers consumers to interpret AI-generated content with greater confidence while assisting marketers in tailoring personalization strategies that align with audience trust expectations. This conceptual study adopts a theory-building approach through systematic synthesis of multidisciplinary literature in responsible AI, consumer behavior, and psychological readiness, thereby laying a foundation for future empirical validation and practical implementation.

Research Objectives

1. To develop a conceptual framework that explains how consumers form trust in AI-generated advertising, focusing on ethical considerations and their readiness to engage with emerging technologies.
2. To integrate interdisciplinary perspectives; technology adoption factors, ethical factors and trust-based factors, from Responsible AI, the Technology Acceptance Model (TAM), the Unified Theory of Acceptance and Use of Technology 2nd (UTAUT2), and trust-based marketing literature in constructing a multi-dimensional model of trust formation.
3. To conceptualize how AI Literacy and the acceptance of AI-driven personalization moderate the relationship between ethical perceptions and consumer trust.

Literature Review

The Evolution of AI in Marketing and Advertising

Marketing is a fundamental process by which businesses communicate the value of their products and services to targeted customers, aiming to foster satisfaction and long-term relationships (Kotler & Keller, 2016). As organizations continue to adapt to digital transformation, marketing practices have undergone substantial shifts via social media (Kurenkov, 2025), where advertisement has been increasingly interactive, data-driven, and personalized (Zukari & Aryanto, 2025; Mishra, 2025).

Artificial Intelligence (AI) has been evolving from an engineering approach to replicate human decision-making, to recently autonomous, rational, and adaptive reasoning systems in more complex and dynamic environments (Viswanathan, 2025; Kaplan & Haenlein, 2019). In the advertising landscape, AI facilitates automated configuration, enables hyper-personalized content, and analyzes consumer behavior to fine-tune marketing strategies (Mishra, 2025). In addition, AI-powered advertising systems, such as those social media ad managers, now support real-time A/B testing, enabling rapid adaptation of ad serving for the optimal personalization, budget and effectiveness. Nevertheless, the widespread adoption of AI in advertising raises critical ethical questions, particularly regarding fairness, transparency, privacy, and corporate accountability in data usage (Tiwari & Pandey, 2025).

Theoretical and Conceptual Framework: UTAUT2 and its limitations

The Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) proposed by Venkatesh et al. (2012) has been widely accepted as a robust model for explaining technology acceptance behavior, especially in consumer contexts. The model includes core constructs such as performance expectancy, effort expectancy, social influence, and facilitating conditions, as well as additional factors introduced in UTAUT2, namely, hedonic motivation, price value, and habit. However, while UTAUT2 comprehensively addresses user behavioral aspects, it does not fully account for ethical concerns and consumer trust, which are increasingly important in many technology contexts, particularly those involving automated systems that influence decision-making, such as AI-driven advertising (Lee et al., 2025). Thus, three main constructs from UTAUT2 integrated into the conceptual framework are; “Performance Expectancy (PE)” - an individual’s belief that a technology will help achieve one’s professional success or job performance (Venkatesh et al., 2003), “Social Influence (SI)” - the degree to which an individual is encouraged by the behaviors of the important others such as family, friends, and colleagues that he accepts to use the technology which positively impacts behavioral intent (Venkatesh et al., 2003; Venkatesh et al., 2012), and “Purchase Intent (PI)” - an outcome variable, involves the decision-making process and actions leading to acquiring goods or services (Venkatesh et al., 2012), equivalently buying intent after exposure of the ads (Ratta et al., 2024).

Theoretical Integration of conceptual frameworks

To address this gap, the present study adopts UTAUT2 as the primary analytical framework for explaining technology acceptance in consumer contexts (Venkatesh et al., 2012), while integrating the concept of Responsible AI to supplement the ethical dimensions of AI design and application. Responsible AI emphasizes ethics, transparency, and social accountability in system development (Floridi et al., 2020). Specifically, this study excludes Effort Expectancy (EE) and Facilitating Conditions (FC) from the model, as these constructs are less relevant in the context of automated advertising systems for consumers. In digital media contexts such as smartphones and social media, users are typically familiar with easy-to-use technologies, rendering EE insignificant in predicting consumer behavior (Abubakar & Al-Mamary, 2025).

Rationale for excluding Effort Expectancy and Facilitating Conditions

Previous studies support the exclusion of Effort Expectancy (EE) and Facilitating Conditions (FC) from the model in particular modern digital context. Research by Fakhrin and Widyaningsih (2025) found that EE is not a significant predictor of behavioral intention to use e-commerce credit services, as users found the system easy to use and were already familiar with similar digital tools. Similarly, Putra and Mukhlason (2025) found that in mobile banking platforms, Effort Expectancy (EE) was not a dominant predictor of usage intention when users were already familiar with the

system's interface and functions. Lee et al. (2022) also noted that when systems feature clear and user-friendly interfaces, the effect of EE becomes negligible. Dwivedi et al. (2020) demonstrated that in familiar environments, EE does not influence technology acceptance. On the other hand, empirical data from Pizzi et al. (2021) showed that FC does not directly influence technology acceptance, particularly among users with sufficient digital skills. Carolus et al. (2023) similarly concluded that FC is insignificant when consumers can access digital services via modern compatible platforms without difficulty. Based on these findings, the exclusion of EE and FC is theoretically justified and aligns with consumer characteristics in the context of AI-generated advertising.

The Responsible AI framework

The Responsible AI framework includes four key components -- fairness, transparency, privacy concerns, and accountability (European Commission, 2021; Martin & Shilton, 2016; Barocas et al., 2019; Shin & Park, 2019; Floridi et al., 2018), all of which significantly affect consumer trust in AI systems (Mayer et al., 1995). The integrated constructs are "Perceived Fairness" - a consumer's perception of AI functions without bias and discrimination (Mehrabi et al., 2019; Barocas et al., 2019), "Perceived Transparency" - a consumer's perception that AI processes, data usage and decision making mechanisms are explainable and understandable (Jobin et al., 2019), thus building user trust (Shin & Park, 2019) and reducing anxiety to use (Hoffman et al., 2018), "Privacy Concerns" - the anxiety and skepticism users have regarding information theft, leak or abuse through AI systems (Martin & Shilton, 2021; OECD, 2019), and "Accountability" - the responsibility of stakeholders in AI systems for the outcomes produced, which must be auditable (Raji et al., 2020) across the entire process (Floridi et al., 2018).

Moderator Selection Rationale

Among potential moderating variables in technology acceptance contexts (e.g., technology anxiety, innovativeness, personal innovativeness in IT), this study specifically focuses on AI literacy and AI-personalization acceptance for three theoretical and empirical reasons: (1) their direct relevance to AI-specific contexts rather than general technology adoption, (2) their under-investigation in existing AI advertising literature despite growing importance, and (3) their theoretical grounding in both cognitive (understanding) and affective (acceptance) readiness dimensions that comprehensively capture individual differences in AI interaction.

AI Literacy

AI Literacy refers to the degree of knowledge, understanding, and skills consumers possess in interacting with AI. It plays a critical role in shaping how consumers perceive, interpret, and evaluate AI technologies (Miller, 2018). Higher AI literacy enhances the consumer's ability to assess algorithmic decisions, build informed trust, and engage meaningfully with AI-generated advertising. Level of AI Literacy can be assessed by several invented methods, with variety of metrics and purposes, such as AI Literacy Questionnaire (AILQ) by Ng et al. (2023), AI Competency Objective Scale (AICOS) by Markus et al. (2025), and Meta AI Literacy Scale (MAILS) by Carolus et al., (2023). In this study, this construct will be measured across multiple dimensions, based on MAILS (Carolus et al., 2023), including "Conceptual Understanding" - knowledge of how algorithms work in targeting content, "Awareness of Limitations" - understanding the potential error or bias caused by AI decisions and "Interpretation Skill" - ability to critically evaluate AI-delivered information.

AI-Personalization Acceptance

AI-Personalization Acceptance refers to the degree of comfort, trust, and willingness that consumers exhibit when interacting with AI systems designed to deliver personalized advertisements. This level of this construct plays a crucial role in fostering trust and acceptance of autonomous systems within the context of digital marketing. This concept is grounded in the Compensatory Level of Acceptance model, which posits that consumers are willing to "compensate" for the perceived complexity or uncertainty of AI systems when these systems provide substantial value—such as enhanced accuracy or efficiency (Chow et al., 2023). Key dimensions include AI Intelligence, Performance Expectancy, and Effort Expectancy, which shape consumers' openness to AI-driven personalization. Further, recent research highlights that consumer acceptance of AI also depends on ethical and trust-related factors, such as transparency, fairness, and data security, especially in contexts where AI influences personalized content delivery (Paritosh & Jana, 2024). In line with this, Gerlich (2023) underscores that consumers' perceptions of transparency and understanding of AI decision-making are critical in building trust, particularly among those concerned with loss of control.

Trust in Marketing

This study aligns with modern marketing paradigms, especially those centered on customer-centricity and digital personalization. The integration of Value Co-Creation and Digital Consumer Engagement theories emphasizes the role of AI-generated advertising in crafting tailored, relevant, and interactive consumer experiences. In addition, the study applies the Initial Trust Formation Model by McKnight et al. (2002) to explain how consumers form trust in unfamiliar AI systems. This model highlights the influence of system transparency, ease of use, and the credibility of information sources in shaping early trust. Furthermore, the Trust-Commitment Theory developed by Morgan and Hunt (1994) provides a foundation to explain how consumer trust directly influences engagement and behavioral loyalty in marketing contexts. Hence, Trust in AI-Generated Ad is the reliability of AI-Generated Ad, due to its believed benefits and integrity, which is similar to credibility in AI-Generated Ad in Jayasingh et al. (2025)'s study but the latter variable focuses on system's expertise rather than its benevolence.

Trust, Engagement and Purchase Intention as Marketing Sustainability

This study extends beyond identifying the antecedents of consumer trust in AI-generated advertising to examine its behavioral consequences, particularly consumer engagement and purchase intention, which are critical indicators of marketing effectiveness. A review of the literature shows that trust is a key determinant of consumer engagement in digital contexts (Morgan & Hunt, 1994; Sashi, 2012). Thus, consumer engagement is defined as psychological bindings and behavioral interactivity, including dimensions such as attention, participation, and content sharing (Hollebeek et al., 2019). Trust also correlates directly with purchase intention, according to the Theory of Planned Behavior (Ajzen, 1991), which posits that consumer trust in information or sources leads to more favorable attitudes and stronger purchase intentions (Kim et al., 2008). In the context of AI-generated advertising, recent findings show that when consumers perceive such advertisements as credible, informative, and human-like, they exhibit significantly greater engagement and stronger purchase intention for a long term (Jayasingh et al., 2025).

Review Summary of Related Empirical Findings (2015–2025)

Related empirical studies from relevant journals in business, marketing/advertising, and information systems, conducted between 2015 and 2025, reveal several consistent predictors of consumer trust in technology-mediated environments. Among these, perceived transparency and fairness emerge as statistically significant drivers of trust in AI systems and automated content delivery (Shin & Park, 2019; Martin & Shilton, 2021). Privacy concerns, on the other hand, consistently exhibit negative effects, often moderating or diminishing consumer trust (Lwin et al., 2016; OECD, 2019). Social influence and performance expectancy have shown significant associations with behavioral intention across UTAUT-based studies (Dwivedi et al., 2020). However, individual-level factors such as AI literacy and personalization acceptance remain under-investigated in terms of their empirical significance, particularly as moderating variables. In addition, the variables have been defined differently with contextual nuances across those studies. While a few recent studies have begun exploring AI literacy in educational or organizational contexts (Ng et al., 2023; Carolus et al., 2023), its role in shaping consumer responses to AI-generated advertising is notably absent in current literature. Similarly, AI-personalization acceptance has been conceptually proposed but rarely operationalized and tested in empirical marketing research. This study addresses these empirical gaps by systematically integrating both factors into a trust-behavior framework within the AI advertising context.

In addition, the relationship between AI ethic and AI-generated advertising has been understudied with a few searchable studies in international academic databases, incomparable to the greater number of extensive studies on AI ethic, AI adoption showcasing perception of its benefits and concern. There are also plenty of AI-generated advertising studies, investigating its functionality, effectiveness, automation, etc., but rarely the relationship with AI ethical concerns.

These empirical findings collectively demonstrate a high level of consistency in identifying transparency, fairness, and social influence as statistically significant antecedents of consumer trust and behavioral intention across digital contexts. However, variables such as AI literacy and personalization acceptance have been conceptually proposed but rarely subjected to empirical validation, especially in advertising domains. To the authors' knowledge, no study to date has simultaneously modeled these variables as moderators within a unified trust-behavioral framework

that incorporates both ethical and technological dimensions. This research seeks to address this critical empirical gap and extend theoretical generalizability across AI-mediated advertising environments.

Based on the aforementioned theoretical grounds, the proposed model conceptualizes the following relationships

1. The attributes of Responsible AI, including fairness, transparency, privacy concerns, and accountability, are hypothesized to have a positive influence on consumer trust in AI-generated advertising.
2. Consumer trust is expected to significantly affect behavioral outcomes, particularly consumer engagement (such as attention, interaction, and sharing) and purchase intention.
3. These relationships are proposed to be moderated by two key psychological and perceptual constructs, namely AI Literacy and Level of AI-Personalization Acceptance.

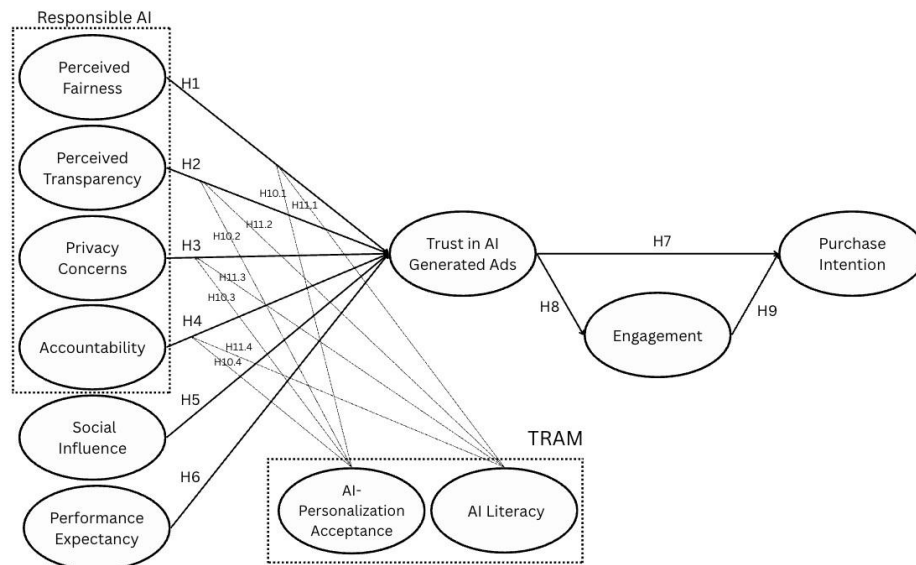


Figure 1: Proposed Conceptual Framework
Source: Developed by the Authors

To clarify the structural relationships among the variables examined in this study, a conceptual model entitled the **Consumer Trust Model for AI-Generated Advertising** was developed. This model integrates elements from UTAUT2 and the Responsible AI framework. In this model, the independent variables include fairness, transparency, privacy concerns, accountability, social influence and performance expectancy. The dependent variables are consumer trust and consumer behavior, specifically engagement and purchase intention. Additionally, the model incorporates two moderating variables: the level of AI-personalization acceptance and AI literacy. The proposed conceptual framework comprises three main components;

1. Ethical Factors (Responsible AI Constructs): This category includes Perceived Fairness, Perceived Transparency, Privacy Concerns, and Accountability, which serve as independent variables that influence the level of consumer trust in AI-generated advertising. These factors are grounded in the principles of Responsible AI system design, particularly those concerning fairness and the protection of individual rights, as emphasized by Floridi et al. (2018) and further elaborated by Barocas et al. (2019).

2. Trust and Consumer Behavior: Trust functions as a mediating variable that significantly influences two key behavioral outcomes: Engagement and Purchase Intention. The foundational role of trust in shaping user behavior toward automated systems has been extensively discussed in the literature. Mayer et al. (1995) proposed a model of trust that highlights its importance in facilitating cooperation and reducing perceived risks in interactions. Building on this, Lee et al. (2025)'s systematic review collectively emphasized the relevance of trust in human–automation interaction, suggesting that trust serves as a key to unlock psychological barriers to adopt AI and technology engagement.

3. Moderating Variables from the TRAM Model: This component incorporates two constructs: AI Literacy and AI-Personalization Acceptance. These reflect consumers' technological readiness and cognitive preparedness to interact with intelligent systems. Parasuraman (2000) initially proposed the Technology Readiness Index, which Carolus et al. (2023) later applied to digital media contexts, illustrating how these variables moderate the effects of Responsible AI attributes on consumer trust and behavior.

Research Methodology

Research Hypotheses

Based on the conceptual framework illustrated in Figure, this study proposes three sets of hypotheses; Main Hypotheses, Moderating Hypotheses, and Comparative Hypotheses. These hypotheses aim to explain how consumers develop trust in AI-generated advertising and how this trust influences engagement and purchase behaviors.

Main Hypotheses

The following hypotheses reflect the direct effects among the constructs shown in the model:

- **H1:** Perceived fairness has a positive influence on consumer trust in AI-generated advertising.
- **H2:** Perceived transparency has a positive influence on consumer trust in AI-generated advertising.
- **H3:** Privacy concerns have a negative influence on consumer trust in AI-generated advertising.
- **H4:** Accountability has a positive influence on consumer trust in AI-generated advertising.
- **H5:** Social influence has a positive influence on consumer trust in AI-generated advertising.
- **H6:** Performance expectancy has a positive influence on consumer trust in AI-generated advertising.
- **H7:** Consumer trust in AI-generated advertising has a positive influence on engagement.
- **H8:** Consumer trust in AI-generated advertising has a positive influence on purchase intention.
- **H9:** Engagement has a positive influence on purchase intention.

These hypotheses are supported by Mayer et al.'s (1995) integrative trust model, which emphasizes ability, benevolence, and integrity as drivers of trust in automated systems (Mayer et al., 1995). In marketing contexts, trust is known to enhance consumer engagement and purchase intention (Jayasingh et al., 2025; Morgan & Hunt, 1994).

Moderating Hypotheses

Two psychological and technological readiness variables, AI-Personalization Acceptance and AI Literacy, are proposed as moderators. As shown in the model, they are expected to influence specific relationships:

- **H10.1:** AI-Personalization Acceptance moderates the relationship between perceived fairness and consumer trust.
- **H10.2:** AI-Personalization Acceptance moderates the relationship between perceived transparency and consumer trust.
- **H10.3:** AI-Personalization Acceptance moderates the relationship between privacy concerns and consumer trust.
- **H10.4:** AI-Personalization Acceptance moderates the relationship between accountability and consumer trust.
- **H11.1:** AI Literacy moderates the relationship between perceived fairness and consumer trust.
- **H11.2:** AI Literacy moderates the relationship between perceived transparency and consumer trust.
- **H11.3:** AI Literacy moderates the relationship between privacy concerns and consumer trust.
- **H11.4:** AI Literacy moderates the relationship between social influence and consumer trust.

These hypotheses align with Parasuraman's (2000) Technology Readiness Index, which posits that user-level traits influence how individuals interpret and respond to technological innovations. Research shows that AI literacy helps users critically evaluate algorithmic content (Carolus et al., 2023), while personalization acceptance reflects a willingness to engage with AI-based tailoring strategies (Chow et al., 2023).

Comparative Hypotheses

Lastly, the model includes comparative hypotheses to determine which ethical attributes of Responsible AI are most salient:

- **H12.1:** Perceived transparency exerts a stronger positive influence on consumer trust than perceived fairness.
- **H12.2:** Perceived transparency exerts a stronger positive influence on consumer trust than accountability.

As supported by Tiwari and Pandey (2025), transparency is cognitively accessible and enables users to better understand how AI works, thereby increasing trust more effectively than fairness or accountability (Tiwari & Pandey, 2025).

Research Design

This study is conceptual in nature and seeks to construct a theoretical framework through an integrative review of relevant literature. Rather than focusing on empirical hypothesis testing, the study emphasizes the identification of key constructs, the explanation of their theoretical interrelationships, and the articulation of how these elements form a coherent model. The primary objective is to synthesize and integrate insights from multiple academic domains, including AI-generated advertising, consumer trust, technology acceptance, and responsible AI, in order to propose a well-grounded conceptual framework that can inform and guide future empirical investigations. This theoretical synthesis serves as a foundation for formulating testable hypotheses in future empirical studies.

Data Sources and Literature Selection

Literature was systematically selected from peer-reviewed journals indexed in Scopus, Web of Science, and Google Scholar. Priority was given to high-quality sources (Q1/Q2 journals) published between 2000 and 2025, focusing on topics such as consumer trust in digital systems, AI literacy, personalization, UTAUT2, and ethical AI design.

Theory Integration and Framework Construction

The conceptual framework developed in this study integrates three major theoretical domains to explain the formation of consumer trust in AI-generated advertising and its subsequent behavioral effects: (1) Responsible AI, (2) Technology Readiness and Acceptance Model (TRAM), and (3) Trust-based Marketing Theories.

The Responsible AI framework offers an ethical foundation, emphasizing fairness, transparency, privacy, and accountability in AI design and deployment (Barocas et al., 2019; Martin & Shilton, 2016). These ethical attributes are modeled as direct antecedents of trust, based on the assumption that consumers are more likely to trust algorithmic content when it aligns with socially accepted values and demonstrates procedural integrity (Tiwari & Pandey, 2025).

To capture individual-level psychological differences, the framework incorporates moderating variables from the Technology Readiness and Acceptance Model (TRAM), including AI Literacy (Carolus et al., 2023) and AI-Personalization Acceptance (Chow et al., 2023). These variables reflect consumers' cognitive and affective readiness to interact with algorithmic systems, and are theorized to moderate how ethical perceptions influence trust. Consumers with higher literacy or acceptance are more capable of interpreting algorithmic processes and thus may respond differently to fairness, transparency, or privacy cues.

The core mediating construct, trust in AI-generated advertising, is grounded in Mayer et al. (1995)'s trust model, which posits that trust in autonomous systems is shaped by perceptions of ability, benevolence, and integrity. Trust, on the other hand, is posited to influence downstream outcomes, engagement and purchase intention, based on commitment–trust theory in marketing (Morgan & Hunt, 1994) and initial trust formation theory in human–technology interaction (McKnight et al., 2002).

By unifying ethical, psychological, and behavioral dimensions, the proposed model provides a multi-layered explanation for how consumers respond to AI-generated advertising. It also emphasizes the unique role of transparency, which is expected to exert the strongest influence on trust relative to other ethical factors due to its cognitive accessibility and explanatory power (Tiwari & Pandey, 2025).

The final model (Figure) thus positions trust as a central mediator, ethical AI as a cognitive stimulus, personalization and literacy as moderators, and behavioral responses as critical marketing outcomes, thereby constructing a coherent theory-informed framework for empirical testing.

Research Contribution Strategy

This study contributes to theory by addressing gaps in AI-powered marketing trust research. It introduces a new framework for understanding how consumers form trust in AI-generated advertising, what factors moderate this trust, and how trust influences marketing effectiveness.

Conclusion and Discussion

This study presents a conceptual framework derived from multidisciplinary literature, aiming to explain how consumers form trust in AI-generated advertising. By integrating Responsible AI principles with consumer psychology and digital marketing theory, the framework contributes to a deeper understanding of trust dynamics in AI-mediated environments. Future research is encouraged to empirically validate and refine the proposed relationships.

Research Findings

Theoretical Implications: This study proposes an integrated conceptual framework that explains the formation of consumer trust in AI-generated advertising. The framework draws upon multiple theoretical foundations, including the concept of Responsible AI, the Unified Theory of Acceptance and Use of Technology (UTAUT2), the Technology Readiness and Acceptance Model (TRAM), and trust-based theories in digital marketing. The model expands the scope of UTAUT2 by incorporating ethical variables—namely perceived fairness, transparency, privacy concerns, and accountability—as core antecedents of trust. Additionally, it introduces two moderating factors: AI Literacy and AI-Personalization Acceptance, which represent psychological readiness and individual differences in technology receptiveness. These variables reflect the diverse ways in which consumers perceive and respond to AI-driven content in advertising contexts.

Managerial Implications: From a managerial perspective, the findings underscore the importance of ethical AI design, particularly in terms of transparency and data privacy, as critical components for building consumer trust and engagement. Marketers are encouraged to consider the AI literacy levels of their target audiences when designing communication strategies and content personalization. Tailoring message clarity and algorithmic transparency to the audience's level of understanding can help reduce uncertainty and foster trust in AI-based marketing efforts.

Suggestions

This study is conceptual in nature and developed through an extensive review of relevant literature. It has not yet progressed to the empirical phase. Specifically, no questionnaire instrument has been developed, and no data collection has been conducted. Consequently, the proposed model remains untested in real-world contexts.

Future research should prioritize the operationalization of the conceptual constructs, the development of valid and reliable measurement instruments, and the implementation of empirical investigations that evaluate the hypothesized relationships. In addition, researchers may consider applying both traditional quantitative techniques, such as multivariate analysis and structural modeling, and configurational comparative methods, including Fuzzy-set Qualitative Comparative Analysis (fsQCA). The fsQCA approach is particularly valuable for identifying causal complexity and uncovering asymmetrical relationships among ethical, psychological, and technological dimensions. It also enables the detection of multiple equifinal configurations that lead to high levels of consumer trust and engagement, thereby offering theoretical insights that go beyond linear causality.

To further enhance the generalizability and external validity of the framework, future studies should extend the model to other domains in which AI plays a transformative role, such as healthcare, education, finance, and public services. This expansion would support both theoretical refinement and practical application across diverse AI-mediated contexts.

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Factors Influencing Tourist Intention to Stay in Hotels Following AR/VR Technology Experiences in Thailand

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Abstract

This study examines perceived usefulness, perceived ease of use, perceived innovation, and tourist satisfaction of experienced hotels through augmented reality (AR) and virtual reality (VR) technologies, and how they influence the tourists' intention to stay in hotels in Thailand. Specifically, it investigates the relationships between perceived usefulness (PU), perceived ease of use (PE), perceived innovativeness (PI), tourist satisfaction (TS), and intention to stay (TI). Utilizing a quantitative approach, data were collected from 385 respondents through a convenience sampling method and analyzed using descriptive statistics and multiple linear regression. The findings indicate that perceived usefulness, perceived innovativeness, and tourist satisfaction significantly and positively influence tourists' intention to stay in hotels. These factors explained 75.7% of the variance in intention to stay. The study provides insights for the Thai hotel sector on leveraging AR/VR technologies to enhance customer experience and promote revisits.

$$\hat{TI} = 0.343*** + 0.290***(PU) - 0.037(PE) + 0.244***(PI) + 0.429***(TS)$$

Keywords: Perceived Usefulness, Perceived Innovativeness, Tourist Satisfaction, Intention to Stay, Hotel Industry

Introduction

Thailand's recent extension of its visa-free policy to 93 countries, offering a generous maximum stay of 180 days (TAT Newsroom, 2024), has significantly lowered the barrier to entry for international tourists. This policy, coupled with proactive social media promotion in various countries, has positioned Thailand as a highly desirable travel destination, offering reduced time costs and simplified visa application procedures compared to many alternatives. Renowned for its diverse landscapes, cuisine, and rich culture, Thailand consistently ranks as a prominent and frequently considered travel choice globally (Sirivadhanawaravachara, 2024). Regardless of their motivations, a safe and comfortable hotel stay is paramount for tourists and directly influences their overall travel experience and sense of security. Consequently, the choice of accommodation emerges as a critical element of the travel process.

Statistics indicate that by the end of 2024, the number of foreign tourists visiting Thailand will reach 36.2 million, while domestic tourists will number 2.702 million. The average hotel occupancy rate is expected to rise to 72%, an 8% increase compared to 2019. By 2025, the number of foreign tourists is projected to grow to 39.4 million, with domestic tourists reaching 2.756 million. The average hotel occupancy rate is anticipated to increase further to 74%, and the average room rate is likely to adjust by approximately 5%. (<https://www.thaiheadlines.com/162178/>)

The practicality of VR/AR technology directly promotes the transfer of tourists' propensity to obtain information, thereby improving performance, enhancing satisfaction, and increasing their willingness to choose a hotel. This, in turn, improves the overall customer experience, boosts hotel

bookings, and ultimately enhances profitability (Israel, Zerres, & Tscheulin, 2019). VR/AR technology must offer a more practical and effective method of accessing information compared to traditional methods, such as new media. When tourists select a hotel, several factors come into play, including the environment, room size, hygiene, price, geographical location, and surrounding amenities. High-quality rendering in VR/AR technology is crucial, as it enables a fully interactive experience. This ensures that tourists' perceptions align with the actual experience, preventing over-advertisement and enhancing satisfaction with the service. The concept of telepresence in VR emphasizes its ability to enhance the enjoyment perceived by potential hotel customers.

Thailand's hotel industry continues to face increased competition as tourists increase. The rapid increase in the number of new hotels has created a great challenge for the future survival of the hotel industry. This research endeavors to identify the key determinants influencing tourist intention to stay in hotels. Ultimately, this research aims to foster the integration of innovative technologies within the tourism industry, align with relevant policy initiatives, enhance industry competitiveness, and contribute to the overall advancement of the sector.

Research Objectives

This research aims to achieve the following objectives:

1. To assess the intention of Chinese tourists to stay in hotels in Thailand after experiencing the hotel through AR/VR technology.
2. To identify the factors that significantly influence Chinese tourists' intention to stay in hotels in Thailand after experiencing them through AR/VR technology.

Literature Review

This study uses various theoretical perspectives to comprehend the elements that make up tourists' choice to stay in hotels. The Expectation Confirmation Theory (ECT) proposed by Oliver in 1980, helps to understand customer satisfaction because it involves a comparison of expectations towards a service or product prior to purchase and the perceived performance of such a service or product after purchase by the customer. Following this, the Expectancy Disconfirmation Theory (EDT) was introduced by the researchers Oliver and DeSarbo in 1988.

Besides that, acknowledging the tourist's motivation plays a significant role. Gnanapala (2015) underscores that all tourists are initially motivated by their needs, which makes them look for things that address those needs. The Technology Acceptance Model (TAM), a theory to describe how technology-related behaviors positively affect the adoption of technology, has also been used.

Finally, the Theory of Planned Behavior (TPB) (Ajzen, 1991) is one of the most comprehensive theories addressing the intention of staying. TPB proposes that behavioral intention has three major influences:

Attitude toward the behavior: The tourists' point of view about the hotel they chose to stay in.

Subjective norms: Social pressure or the expectations of people's important others are noted to be the deciding factors for guests to stay.

Perceived behavioral control: The subjective measure of one's ability to complete a task, such as booking a hotel with ease, or if the hotel is readily affordable.

Virtual Reality (VR) and Augmented Reality (AR) are two of the core technologies underpinning the concept of the metaverse, which has gained significant popularity in recent years. The metaverse is built on several foundational technologies: the Internet of Things (IoT), blockchain, interactive technology, artificial intelligence (AI), virtual reality (VR), augmented reality (AR), and 3D Reconstruction, etc. (Takyar, 2022). According to Roblox company, the metaverse is characterized by eight essential elements: identity, friends, immersion, low latency, diversity, accessibility (anytime, anywhere), an economic system, and civilization (Wang et al., 2022).

Among tourists, hotel selection is often driven by curiosity, and enhancing perceived usefulness can significantly stimulate this curiosity (Rachi, Thomas, & Tania, 2022). The acceptance and use of information technology can yield immediate and long-term benefits at both organizational and individual levels, such as improved performance, financial and time efficiency, and convenience

(Foley & Curley, 1984; Sharda, Barr, & McDonnell, 1988). Based on the Technology Acceptance Model (TAM), the process of supporting technology acceptance has been elaborated to predict the positive influence of technology behavior from a theoretical perspective (David, 1989).

The ease of use experience when exploring a hotel through VR/AR technology can be summarized by assessing whether users encounter difficulties while using the technology and how they perceive the experience after adopting it. Ease of use can be defined as the degree to which a person feels that using a particular system is effortless (Davis, 1989). This factor directly influences the user's assessment of the desirability of using a specific information system application, thereby affecting their attitude toward its use (Ajzen & Fishbein, 1980).

According to the innovation diffusion theory, these consumers are divided into five stages, namely, the understanding stage, the interest stage, and the decision stage. Evaluation stage, experiment stage, and adoption stage (Rogers, 1950s). The basis of the theory is that in the face of innovation, some people will be more open-minded and willing to adopt innovation than others.

The theoretical foundation for understanding tourist satisfaction in the context of using augmented reality (AR) and virtual reality (VR) technology in hotels stems from the Expectation-Confirmation Theory (Oliver, 1980). This theory explains how the usefulness, ease of use, and innovativeness of AR/VR technology influence tourists' satisfaction.

Here are current cases of AR/VR technology being used in Tourism and Hospitality:

Case 1: Marriott Hotel

In 2015, Marriott launched *VRoom*, the first indoor virtual reality travel experience. Marriott also introduced a new virtual travel content platform called VR Postcards. These postcards offer intimate and immersive travel stories experienced in 360-degree 3D through virtual reality headsets. Each story follows a real traveler on a journey to a unique destination, immersing the audience in the location while sharing personal narratives about why travel is meaningful to them.

Case 2: Sheraton Kuta Resort, Bali

Sheraton has integrated AR/VR technology into its hotel experience to allow potential guests to explore the property before booking. Using high-tech tools, guests can view the hotel's location, room details, entertainment venues, and the overall layout of the lobby.

Case 3: Sofitel Singapore

On March 29, 2017, Sofitel Singapore introduced an augmented reality experience in collaboration with EON Reality and Epson. Using Epson Moverio BT-300 smart glasses powered by EON AVR, guests can immerse themselves in a luxury boutique hotel lobby in France or enjoy an audiovisual experience in a Sofitel suite. This innovative use of AR enhances the guest experience by blending virtual and physical environments seamlessly.

Research Hypotheses

The following hypotheses are proposed based on the literature review:

- H1: Perceived usefulness has a significant positive influence on tourist satisfaction.
 - H2: Perceived ease of use has a significant positive influence on tourist satisfaction.
 - H3: Perceived innovativeness has a significant positive influence on tourist satisfaction.
 - H4: Tourist satisfaction has a significant positive influence on the intention to stay.
- These hypotheses are synthesized into a conceptual framework, as shown in Figure 1.1.

Independent Variables

Dependent Variable

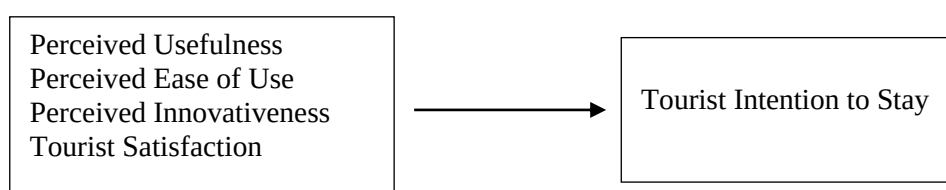


Figure 1: Conceptual Framework

Research Methodology

The questionnaire was distributed through the Questionnaire Star platform. Data from the questionnaire were collected by sharing it in WeChat chatting groups focused on travel topics. All respondents were Chinese. The sample size for this survey is 385 people, which aligns with the minimum sample size requirements for data analysis. In other studies related to VR/AR interaction technology, satisfaction, and hotel intentions, small-scale sample research is also common, and the average number of participants in such questionnaire surveys is consistent with the specific characteristics of the research target.

The target population for this study comprised tourists who have visited or intend to visit Thailand. To ensure the representativeness of the sample, data were collected during both peak and off-peak tourism seasons. The required sample size was calculated using Yamane's formula, with a 95% confidence level and a $\pm 5\%$ margin of error.

This study employs a quantitative research approach, utilizing questionnaire surveys to analyze data from a defined sample. Quantitative methods are appropriate for this research as they enable the quantification of customer behaviors and attitudes concerning service and product demand. This approach facilitates the analysis of customers through quantitative characteristics, relationships, and changes. Based on the literature review, hypotheses were formulated, and the relationships between variables were established. The questionnaire served as the primary tool for data collection.

To ensure the questionnaire's effectiveness, the design process adhered to the following principles:

1. **Clarity of Structure:** The questionnaire was designed to have clear and understandable structures for the research purposes. The research direction and labels for the hypotheses were provided, leading to a direct connection of the said hypotheses.

2. **Hypothesis Alignment:** Each question is crafted to be in line with one of the hypotheses explicitly, and thus all answers strengthen that particular argument.

Research Objective Fulfillment: The questionnaire incorporates all research objectives so that the results can be used to reflect the original intent of the research.

The questionnaire was organized into two main sections:

Part 1: Demographic profile

This section gathered demographic information and data regarding the purpose of travel through a set of questions. This information was used for grouping travelers and understanding the justification for their viewpoints. The questions in this part of the survey aimed to collect data on tourists' gender, age, purpose of visit to Thailand, occupation, education level, monthly income, and chosen hotel star rating.

Part 2: Measurement of Variables

This section included questions that measured tourists' experiences with AR and VR participatory technology within hotels. This study specifically investigates the following variables:

Perceived Usefulness: The extent to which tourists believe the AR/VR experience in the hotel is beneficial to them.

Perceived Ease of Use: The perceived facilitation and user-friendliness of the AR/VR technology for tourists.

Perceived Innovativeness: The perceived novelty of the AR and VR experience by tourists.

Additionally, this part aimed to examine the level of hotel experience satisfaction and tourists' willingness to return to the hotel for future stays.

The questionnaire comprised a total of 17 questions for the measurement of five variables. The answers were scored on a 5-point Likert scale, where:

5 = "Strongly Agree"

4 = "Agree"

3 = "Neutral"

2 = "Disagree"

1 = "Strongly Disagree"

Data Analysis

To ensure the rigor of the research, the validity of findings was ensured by analyzing the data collected using questionnaire surveys through appropriate statistical tools and techniques. This procedure keeps us in line with the academic standards, as well as the epistemological integrity of the research findings (Smith, 2020; Johnson et al., 2019). Analyzing the answers of the "Likert scale knows" questionnaire was also carried out according to the mean values known in science.

Considering that the present study is a multiple independent variable research, it became important to determine whether there is multicollinearity. Multicollinearity in a multiple regression model means high correlation among the independent variables. Multicollinearity of a high level can yield distorted results of regression analyses, because different predictor and outcome variables are misinterpreted. To detect multicollinearity, the variance inflation factors (VIFs) were computed using standard methods (Smith, 2020; Johnson et al., 2019).

Research Findings

This section presents the findings of the study based on the analysis of the collected survey data.

Table 1: Demographic Profile of Respondents Traveling to Thailand

Demographic Profile		Frequency	Percent
Gender	Male	210	54.5
	Female	175	45.5
	Total	385	100
Age	Less than or equal 20 years old	10	2.6
	21-30 years old	142	36.9
	31-40 years old	89	23.1
	41-50 years old	63	16.4
	51-60 years old	65	16.9
	Over 60 years old	16	4.2
	Total	385	100
Purpose of Visit	Leisure/Vacation	304	79
	Business	51	13.2
	Family/Friends Visit	25	6.5
	Other	5	1.3
	Total	385	100
Occupation	Employed (Full-time)	210	54.5
	Employed (Part-time)	37	9.6
	Self-employed	28	7.3
	Unemployed/Job-seeking	17	4.4
	Student	57	14.8
	Retired	36	9.4
	Total	385	100
Education	Diploma or Lower	112	29.1
	Bachelor's Degree	229	59.5
	Master's Degree	37	9.6

Demographic Profile		Frequency	Percent
	Doctoral Degree	7	1.8
	Total	385	100
Monthly Income (Baht)	Less than or equal 15,000	86	22.3
	15,001 -25,000	123	31.9
	25,001 -35,000	101	26.2
	More than 35,000	75	19.5
	Total	385	100
Chosen Hotel Star Rating	3-star or lower (budget/mid-range)	140	36.4
	4-star (upscale)	147	38.2
	5-star (luxury)	49	12.7
	I do not consider star ratings when choosing a hotel	49	12.7
	Total	385	100

The demographic data reveal that the majority of respondents were male (54.5%), aged between 21 and 30 years (36.9%), visiting Thailand for leisure and vacation purposes (79.0%), and employed full-time (54.5%). The highest level of educational attainment among respondents was a Bachelor's degree (59.5%), and the most frequent monthly income bracket was 15,001 - 25,000 baht (31.9%). When choosing hotels in Thailand, the largest proportion of respondents typically opted for 4-star hotels (38.2%).

Table 2: Mean and Standard Deviation of Study Variables

Variable	Mean	S.D.
Perceived Usefulness	3.845	0.702
Perceived Ease of Use	3.813	0.719
Perceived Innovativeness	3.823	0.734
Tourist Satisfaction	3.906	0.684
Intention to Stay	3.924	0.692

Table 2 presents the means and standard deviations for the study's key variables, revealing generally positive perceptions among respondents regarding VR/AR technology in hotels and their intention to stay in those hotels. Tourist Intention to Stay (mean = 3.924, S.D. = 0.692) and Tourist Satisfaction (mean = 3.906, S.D. = 0.684) exhibited the highest mean scores, indicating strong positive sentiments and intent, while Perceived Usefulness (mean = 3.845, S.D. = 0.702), Perceived Innovativeness (mean = 3.823, S.D. = 0.734), and Perceived Ease of Use (mean = 3.813, S.D. = 0.719) also showed positive, though slightly lower, average ratings. The relatively low standard deviations across all variables suggest consistency in respondents' perceptions, with Perceived Ease of Use showing the lowest average agreement among the independent variables.

Table 3: Multiple Regression Analysis of Factors Influencing Tourist Intention to Stay

Variable	Unstandardized Coefficients		Standardized Coefficients	t	p-value	VIF
	B	Std. Error	Beta			
(Constant)	0.343	0.106		3.243	0.001***	
Perceived Usefulness (PU)	0.29	0.046	0.294	6.259	0.000***	3.455
Perceived Ease of Use (PE)	-0.037	0.051	-0.038	-0.713	0.476	4.448
Perceived Innovativeness (PI)	0.244	0.044	0.259	5.574	0.000***	3.374
Tourist Satisfaction (TS)	0.429	0.052	0.424	8.196	0.000***	4.194

R=0.87, R²= 0.757, Adj. R² =0.755, S.E.est=0.34, F=296.528, p-value= 0.000, Durbin Watson = 1.890***p<0.001

Table 3 presents the multiple regression analysis results, revealing that Perceived Usefulness ($B = 0.290, p < 0.001$), Perceived Innovativeness ($B = 0.244, p < 0.001$), and Tourist Satisfaction ($B = 0.429, p < 0.001$) significantly and positively influence Tourist Intention to Stay, supporting Hypotheses 1, 3, and 4, with Tourist Satisfaction demonstrating the strongest effect; however, Perceived Ease of Use ($B = -0.037, p = 0.476$) does not significantly affect intention to stay, thus not supporting Hypothesis 2. The model explains a substantial 75.7% of the variance in Tourist Intention to Stay, and the overall model fit is significant ($F = 296.528, p < 0.001$), with no evidence of autocorrelation (Durbin-Watson = 1.890).

$$\hat{TI} = 0.343^{***} + 0.290^{***}(PU) - 0.037(PE) + 0.244^{***}(PI) + 0.429^{***}(TS)$$

Conclusion and Discussion

This research investigated the key factors influencing tourists' intention to stay in hotels when utilizing VR and AR technologies. The findings from the data analysis indicate that perceived usefulness, perceived innovativeness, and tourist satisfaction have significant positive influence on tourists' intention to stay. Together, these factors account for 75.7% of the variance in tourists' intention to stay.

Perceived usefulness was found to have a strong and positive influence on tourists' intention to stay. As described by Bandura in 1982, perceived usefulness refers to an individual's conception regarding the potential of technology to contribute to their performance. Thus, this study contributes to the understanding that tourists' intention to select a specific hotel offering VR/AR technology stems from their perception of its benefits. Rachi, Thomas, and Tania (2022) highlight curiosity as a potential motivation behind hotel selection, while perceived usefulness can significantly stimulate it. Moreover, Israel, Zerres, and Tscheulin (2019) determined that the application of VR and AR technology provides tourists with practical information, which increases their satisfaction and encourages them to choose a specific hotel. Beyond enhancing the customer experience, this also leads to more hotel bookings and higher profitability levels for hotels. In other words, VR/AR can be perceived by tourists as a functional tool rather than just a gimmick, leading to a greater willingness to engage with and return to hotels that offer this kind of technology.

Perceived innovativeness also has a significant positive influence on tourists' intention to stay. Tourists' assessment of the innovativeness of VR/AR technology in hotels hinges on its novelty at the time of use. In this research, VR/AR in the hospitality industry is considered a marketing tool. Innovativeness, as a marketing concept, relates to a company's ability to rapidly develop and introduce new products (Hurley & Hult, 1998). For the hotel industry, VR/AR technology serves as a means to attract customers. While many hotels still rely on traditional new media for customer acquisition, VR/AR offers a novel channel that captures consumer interest (Goldsmith & Hofacker, 1991). The novelty of this customer acquisition strategy positively influences tourists' intention to stay in hotels.

Tourist satisfaction significantly and positively influences tourists' intention to stay. Satisfaction studies focus on the dynamic relationship between tourists' expectations and their actual experiences with products or services in the tourism and hospitality industry. The results of this study demonstrate that higher tourist satisfaction strongly correlates with an increased intention to stay in hotels, fostering sustainable customer relationships. Maintaining a strong reputation and positive reviews is crucial for the long-term success of hotels, as positive reviews, often linked to product quality, excellent service, and brand reputation, cultivate customer loyalty. Essentially, tourist satisfaction refers to the consumer finding their experience to be worthwhile and reflecting positively on how they feel after their experience (Pizam et al., 1978). The Expectation-Confirmation Theory (Oliver, 1980) serves as the basis for theories exploring tourists' satisfaction in the context of augmented/virtual reality tourism-related applications.

Recommendations

Having discovered this study, recommendations are suggested for the hotel industry in Thailand for the following:

Ensure that the Maintenance and Information Accuracy of VR/AR Technology Remain a Priority: It will be of great benefit if the hotels make addressing the maintaining and permanently updating their VR/AR technology a priority to ensure a flawless user experience. This comprises recurring software upgrades, hardware reviews, and fast troubleshooting assistance. Moreover, in order to ensure seamless navigation within VR/AR applications, it is paramount to routinely update all content such as hotel facts, amenities, and list of sights. Hence, although this study indicated that the tourists' perception of the interface failed to support the intention of usage, we cannot overlook the fundamental requirement of the system that is intended to make the use much more convenient and seamless. VR/AR services for technical aspects boosting the service's overall value proposition.

Reinforce Operational Excellence in Order to Maximize Tourist Satisfaction: Since the positive correlation between tourist satisfaction and intent to return is considerable, hotels are urged to concentrate on improving their operations so as to increase the overall guest experience. VR/AR technologies may be crucial for this because they allow for changes in demand and quality through means that are both more intuitive and interactive. For instance, VR tours can exhibit the hotel rooms and areas available, while AR apps can supply automated information about the services and a virtual concierge. The intelligent incorporation of VR/AR as a tool instead of the replacement of human services can lead to an increase in customer satisfaction and hotel revenue by improving occupancy rates.

Establish Social Sharing Options and Revolutionize Digital Usage: With millennial generation tourists often choosing hotels as the backdrop for their social media content, it's worth considering additional options for social sharing and digital interaction within the hotel space. Simple check-in tools on the hotel's digital platforms or VR applications, along with the sharing of experiences through social networks, can be stimulated. Hotels can also leverage the nature of their views – such as decorations or room vistas – as a basis for VR experiences to create highly shareable content. Through user-generated content on social media, a hotel can gain "private domain traffic," a type of exposure generated by existing guests. Consequently, this approach attracts new visitors and fosters much stronger connections with guests.

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Determinants of Job Satisfaction in Guangdong's Hotel Industry: A Human Resource Perspective

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Abstract

This study focuses on analyzing and studying the key human resource factors that among the job satisfaction of non-management employees in four- and five-star hotels in Guangdong Province, China. This study selects factors including compensation and benefits (CAB), performance evaluation (PE), training and learning (TAL), career development (CD), and workplace safety (WS) from the perspective of human resource management as key human resource factors for analysis and research. Dependent variable is job satisfaction (JS) Employing a quantitative research design, data were collected via online surveys using a convenience sampling method from 385 full-time employees across various operational roles within these hotels. Descriptive statistics and multiple linear regression analysis were utilized to test the hypothesized relationships at significance levels of 0.05 and 0.01. The demographic profile of the respondents indicates a predominantly female sample, with the majority aged between 31 and 40 years and holding a college education. A significant proportion of the participants were employed in five-star hotels and had 1-3 years of tenure in the hospitality industry, with monthly incomes ranging from 2,500 to 3,500 yuan, primarily in front desk positions. The findings reveal that training and development exhibits the most substantial and highly significant positive effect on overall job satisfaction. Compensation and benefits and performance appraisal also demonstrate a significant positive impact. These three HR dimensions are identified as critical for enhancing employee job satisfaction, fostering talent retention, and driving motivation. Conversely, career development opportunities and workplace safety did not show a statistically significant relationship with job satisfaction in this context. These results underscore the imperative for hotel management in the current socio-economic landscape to prioritize well-structured and continuous training programs, fair and transparent performance evaluation systems, and competitive compensation and benefits packages as pivotal strategies for bolstering employee job satisfaction. All five independent variables collectively explain 22% of the variance in job satisfaction. The derived regression model is expressed as:

$$\hat{JS} = 1.47^{**} + 0.11*(CAB) + 0.12*(PE) + 0.28^{**}(TAL) + 0.06(CD) + 0.06(WS)$$

Keywords: Human Resource, Job Satisfaction, Hotel Industry

Introduction

The escalating competition within the global hotel service industry has positioned service quality as a crucial differentiator for competitive advantage (Hussein et al., 2023). At the heart of superior service delivery lies employee job satisfaction, which not only directly influences individual work efficiency and performance but also indirectly shapes long-term organizational success and profitability through enhanced customer satisfaction (Chi & Gursoy, 2009). Within the realm of human resource management (HRM), several factors are consistently identified as key determinants of employee job satisfaction, including compensation and benefits, performance appraisal, training

and development, career development opportunities, and workplace safety (Elrehail et al., 2019a). For instance, equitable compensation and comprehensive benefits packages provide a fundamental basis for meeting employees' essential needs and career aspirations (Bame, 1974). Similarly, transparent and fair performance appraisal systems not only clarify performance expectations but also foster a sense of accomplishment and satisfaction, thereby motivating employees (Locke, 1970). Furthermore, clearly defined career pathways and effective training and development initiatives are instrumental in enhancing employees' professional competencies, strengthening organizational commitment and loyalty, and ultimately contributing to overall job satisfaction (Winda et al., 2017).

However, in recent years, the hotel service industry in Guangdong Province has encountered heightened competitive pressures, the main sources of these pressures are due to insufficient competitiveness of compensation packages, limited career development opportunities, which have a negative impact on employee motivation and retention rates (Chiang & and Canter, 2005). The study conducted by (Heimerl, Haid, Benedikt, & Scholl-Grissemann, 2020) on the hotel industry in Shenzhen, Guangdong Province showed that limited promotion opportunities and insufficient compensation were important factors affecting employee job satisfaction. The occurrence of COVID-19 has exacerbated this serious situation in the region (Lam, Zhang, & Baum, 2001).

Consequently, many four- and five-star hotels in the region are grappling with challenges such as elevated employee turnover rates and diminished job satisfaction levels. These issues can often be attributed to factors such as uncompetitive compensation and benefits structures and a lack of clear career progression opportunities, leading to decreased employee engagement, motivation, and ultimately, higher attrition rates.

While extensive research has been conducted internationally on the impact of various HR factors on job satisfaction, localized studies focusing specifically on the four- and five-star hotel industry in China, particularly within Guangdong Province, remain relatively scarce. This study aims to address this research gap by empirically investigating the influence of key human resource determinants on the job satisfaction of employees within this specific context. By analyzing these relationships, this research seeks to provide both theoretical insights and practical recommendations for hotel management in Guangdong. The findings are intended to inform the development of more effective human resource strategies, enhance employee retention, and ultimately contribute to improved industry competitiveness and operational efficiency.

Research Objectives

1. To assess the current level of job satisfaction among employees in the four- and five-star hotel industry in Guangdong Province.
2. To examine the impact of specific human resource factors (compensation and benefits, performance appraisal, training and development, career development, and workplace safety) on the job satisfaction of employees in the four- and five-star hotel industry in Guangdong Province.

Literature Review

Understanding the determinants of job satisfaction has been a central focus in organizational behavior research. Several foundational theories provide a lens through which to examine employee attitudes towards their work. Herzberg's (1966) two-factor theory (Motivation-Hygiene Theory) posits that distinct sets of factors influence job satisfaction and dissatisfaction. Motivators, such as achievement, recognition, and growth, are intrinsic to the job itself and contribute to satisfaction when present. Hygiene factors, including salary, working conditions, and company policies, primarily prevent dissatisfaction when adequate but do not necessarily lead to satisfaction. This theory suggests that addressing both sets of factors is crucial for fostering a satisfied workforce.

Vroom's (1964) expectancy theory offers another perspective, emphasizing the cognitive processes underlying motivation. It proposes that employee motivation is a function of their beliefs regarding expectancy (the perceived probability of effort leading to performance), instrumentality (the perceived probability of performance leading to desired outcomes), and valence (the value an individual

places on those outcomes). According to this theory, high job satisfaction is more likely when employees believe their efforts will be rewarded with valued outcomes.

Furthermore, Maslow's (1943) Hierarchy of Needs theory provides a broader framework for understanding the underlying human needs that influence job attitudes. This theory outlines a hierarchical structure of needs, ranging from basic physiological and safety needs to higher-order social, esteem, and self-actualization needs. While not directly focused on job satisfaction, it implies that fulfilling employees' needs at various levels can contribute to a greater sense of well-being and, consequently, job satisfaction.

Guangdong Province is a frontier region of China's economy and tourism industry. While its four- and five-star hotel industry is booming, it is also facing severe human resource challenges. These challenges directly affect the hotel's operating efficiency and service quality. For example, there is a structural shortage of human resources. With the rapid expansion of the hotel industry, the supply of high-quality professionals and the rapidly expanding job demand have not kept pace (Jauhari 2006). Second, employee salary and benefits directly affect employee work enthusiasm and loyalty. An unreasonable salary structure may lead to employee turnover, thereby affecting the overall operational efficiency of the hotel (Cao and Xing 2020). The lack of systematic training and clear career development paths will lead to a lack of motivation for employees in their daily work, affecting work performance and job satisfaction (Kate Walsh and Masako S. Taylor 2007).

Building upon these theoretical foundations, a substantial body of empirical research has explored the specific human resource factors influencing job satisfaction in various industries, including hospitality. Jaworski et al. (2018) underscored the critical role of pay fairness, defined as employees' subjective assessment of the equity of their compensation. Their findings suggest that perceptions of fair pay, relative to both internal contributions and external benchmarks, are significantly and positively associated with job satisfaction.

The fairness of performance appraisals has also been identified as a key determinant of job satisfaction. Keeping and Levy (2000) demonstrated that when employees perceive the performance evaluation process as transparent, accurate, and just, their overall job satisfaction is significantly enhanced. Such fair evaluations can foster trust and a sense of being valued within the organization.

Training and development initiatives have been shown to positively impact job satisfaction by enhancing employees' skills, confidence, and sense of competence. Chiang et al. (2005) found that systematic customer service skills training not only improved hotel employees' job performance but also increased their self-efficacy, leading to higher levels of job satisfaction. Continuous learning opportunities signal an organization's investment in its employees, fostering a sense of growth and value.

Career development opportunities, including clear pathways for advancement and organizational support for professional growth, have also been linked to higher job satisfaction. Gu and Siu (2009), in their study of casino hotel employees, identified career development, alongside effective reward and recognition systems, as significant predictors of job satisfaction. Opportunities for advancement can enhance employees' long-term commitment and motivation.

Finally, workplace safety plays a crucial role in employee well-being and job satisfaction. Research by Goetzel et al. (2003) highlighted the link between organizational trust and the responsiveness of the compensation process to employee needs, including health and safety. Moreover, their findings indicated that when companies proactively address employees' health and safety concerns, employees' sense of belonging to the organization can significantly increase. A safe and healthy work environment contributes to employees' overall well-being and job satisfaction.

In summary, the existing literature robustly supports the notion that various human resource factors significantly influence employee job satisfaction. However, the specific impact and relative importance of these factors may vary depending on the industry, organizational context, and local socio-economic conditions. This study aims to contribute to this body of knowledge by examining these relationships within the specific context of the four- and five-star hotel industry in Guangdong Province, a region facing unique competitive pressures and human resource challenges.

Research Hypothesis

H1: Compensation and benefits have a significant positive impact on the job satisfaction of employees in the four- and five-star hotel service industry in Guangdong Province.

H2: Performance evaluation has a significant positive impact on the job satisfaction of employees in the four- and five-star hotel service industry in Guangdong Province.

H3: Training and learning have a significant positive impact on the job satisfaction of employees in the four- and five-star hotel service industry in Guangdong Province.

H4: Career development has a significant positive impact on the job satisfaction of employees in the four- and five-star hotel service industry in Guangdong Province.

H5: Workplace safety has a significant positive impact on the job satisfaction of employees in the four- and five-star hotel service industry in Guangdong Province.

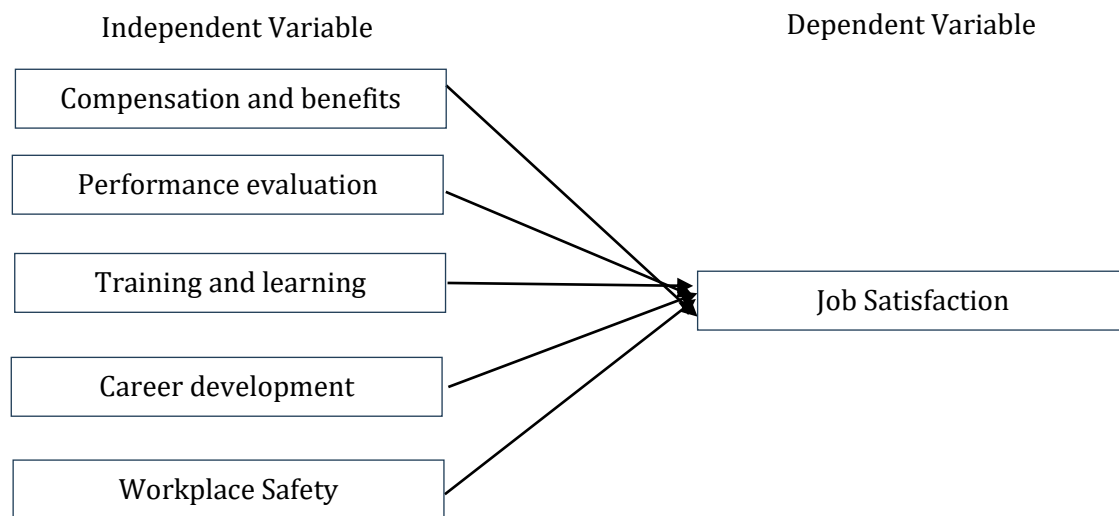


Figure 1: Conceptual Framework

Research Methodology

This study adopts a quantitative research approach to examine the causal relationships between the dependent variable (employee job satisfaction) and the five independent variables (compensation and benefits, performance evaluation, training and learning, career development, and workplace safety). The questionnaire was distributed through an online structured questionnaire, which was designed to collect data in line with the research objectives and hypotheses. The questionnaire is mainly divided into the following three parts :

Part 1: This section is mainly a pre-test option, designed to optimize the clarity of the questions and eliminate ambiguity, ensuring the validity and rigor of data collection.

Part 2: This section collects basic information about respondents, include gender, age, education level, years of service, salary range and job nature (e.g., front-line staff, supervisor, manager). These questions are presented as multiple-choice items to ensure ease of response and accurate data collection.

Part 3: This section details the instruments used to investigate the five independent variables (compensation and benefits, performance evaluation, training and learning, career development, workplace safety) and the dependent variable (job satisfaction). A series of questions were designed to elicit respondents' perceptions across these constructs. All items were measured using a five-point Likert scale, ranging from "Strongly Agree" to "Strongly Disagree." This quantifiable method allows for the systematic collection of opinions and attitudes, thereby enabling rigorous statistical analysis.

The target population for this study comprised full-time employees of four- and five-star hotels located in Guangdong Province, China. Given the absence of precise population statistics for full-time hotel employees in this region, the minimum sample size was determined using Yamane's

formula (1967). This calculation yielded a minimum required sample size of 385 full-time employees. Questionnaires were administered using a convenience sampling method. A pilot test indicated strong internal consistency for the questionnaire, with the overall Cronbach's Alpha coefficient (α) being 0.878, and subscale coefficients ranging from 0.836 to 0.872. All these values surpassed the commonly accepted threshold of 0.70 (Koo & Li, 2016).

Data Analysis

To ensure the accuracy and rigor of this study, advanced statistical techniques are employed for data analysis. The analysis process includes descriptive statistics, regression analysis, multicollinearity assessment, and hypothesis testing, all of which are supported by relevant literature and methodological guidelines.

To ensure the validity and internal consistency of the survey questionnaire data, this study employs Cronbach's Alpha coefficient (Cronbach, 1951) to assess the reliability of the instrument. According to Koo and Li (2016), a Cronbach's Alpha value of at least 0.7 is considered the minimum threshold for acceptable reliability in survey research.

This study uses descriptive statistics to analyze the data collected through the Likert scale questionnaire to calculate the mean for each variable. The interpretation of these means follows the relevant literature (Kemp, 2003; Mason & Perreault Jr., 1991). The data results provide a clear framework for the degree of alignment between the research objectives.

Multiple regression analysis was used to examine the relationship between the independent variables (compensation and benefits, performance evaluation, training and learning, career development, and workplace safety) and the dependent variable (job satisfaction). The standardized coefficient (β coefficient) was used to measure the change in the dependent variable when the independent variable increased by one unit while the other variables remained constant. The p value was used to determine the statistical significance of these relationships, with a threshold of $p \leq 0.05$ indicating significance at the 5% level (Sheather, 2009). To ensure the integrity of the regression analysis, multicollinearity was assessed using the variance inflation factor (VIF), and guidance on the interpretation of the results was based on relevant literature (Akinwande, Dikko, & Samson, 2015; Shrestha, 2020).

Hypothesis testing, primarily quantified by a p-value, is employed to evaluate the statistical credibility of research hypotheses using empirical data. Conventionally, a p-value ≤ 0.05 indicates statistical significance, providing evidence for a hypothesized relationship between variables (Smith, 2019). Furthermore, a more stringent threshold of p-value ≤ 0.01 is often used to denote highly statistically significant findings, reflecting even stronger evidence. Complementing this, the R-squared (R^2) value assesses the explanatory power of a regression model, with higher values indicating a superior fit to the observed data (Field, 2024).

Research Findings

Table 1: Demographic Profile of Hotel Employees in Guangdong Province (n = 385)

Gender		
	Frequency	Percent
Male	180	46.8
Female	205	53.2
Age		
	Frequency	Percent
20-30 years old	89	23.1
31-40 years old	103	26.8
41-50 years old	82	21.3
51-60 years old	59	15.3
Above 60 years old	52	13.5

Education		
	Frequency	Percent
Junior high school and below	46	11.9
High school	86	22.3
College	135	35.1
Bachelor degree	88	22.9
Master degree	21	5.5
Doctoral degree	9	2.3
Years of Service in the Hotel Industry		
	Frequency	Percent
1-3 year	148	38.4
4-6 years	92	23.9
7-9 years	76	19.7
10 years or more	69	17.9
Monthly salary		
	Frequency	Percent
2500 yuan or less	57	14.8
2501-3500 yuan	147	38.2
3501-4500 yuan	91	23.6
More than 4,500 yuan	90	23.4
Department		
	Frequency	Percent
Front Office (e.g., Reception, Guest Services)	78	20.3
Housekeeping (e.g., Room Attendants, Supervisors)	65	16.9
Food & Beverage (F&B) (e.g., Servers, Bartenders, Banquets)	26	6.8
Kitchen/Food Production (e.g., Chefs, Cooks)	48	12.5
Engineering/Maintenance	39	10.1
Finance/Accounting	14	3.6
Security	43	11.2
Human Resources	14	3.6
Sales & Marketing	51	13.2
Other	7	1.8
Star Rating of the Hotel		
	Frequency	Percent
4-star hotel	180	46.8
5-star hotel	205	53.2

Table 1 presents the demographic characteristics of the 385 non-managerial employees from four- and five-star hotels in Guangdong Province who participated in this study. The sample exhibits a slight majority of female respondents (53.2%) compared to male respondents (46.8%). In terms of age, the largest proportion of participants falls within the 31-40 years old age group (26.8%), followed closely by the 20-30 years old group (23.1%). Regarding education, the most frequent level attained was a college degree (35.1%), with high school graduates comprising the next largest group (22.3%). The years of service in the hotel industry indicate that the largest segment of the sample has been working in the sector for 1-3 years (38.4%). Concerning monthly salary, over half of the respondents (38.2% earning between 2,501 and 3,500 yuan, and 14.8% earning 2,500 yuan or less) earn 3,500 yuan or less. The most represented departments among the respondents are the Front Office (20.3%) and Housekeeping (16.9%). Finally, the distribution of participants across hotel star ratings shows a slightly higher representation from five-star hotels (53.2%) compared to four-star hotels (46.8%).

Table 2: Descriptive Statistics of Job Satisfaction and Human Resource Determinant

Variable	Mean	S.D.
Job satisfaction (JS)	3.90	0.90
Compensation and benefits (CAB)	3.99	0.85
Performance evaluation (PE)	3.66	1.02
Training and learning (TAL)	3.88	0.90
Career developmen(CD)	3.81	0.94
Workplace Safety(WS)	3.93	0.87

Table 2 presents the overall level of job satisfaction among the respondents was relatively high, with a mean of 3.90 (S.D. = 0.90) on the measurement scale used. Considering the human resource determinants, compensation and benefits exhibited the highest mean score at 3.99 (S.D. = 0.85), indicating a generally positive perception among employees regarding this aspect. Following closely was workplace safety (M = 3.93, S.D. = 0.87) and training and learning (M = 3.88, S.D. = 0.90), suggesting that employees generally held favorable views towards these areas as well. Career development had a mean of 3.81 (S.D. = 0.94), while performance evaluation recorded the lowest mean score among the HR determinants at 3.66 (S.D. = 1.02), indicating a potentially less positive perception or greater variability in employee experiences with performance evaluation processes.

The multiple regression analysis between compensation and benefits, performance evaluation, training and learning, career development and workplace safety factors and employee job satisfaction found that all independent variables had a statistically significant positive correlation at the 0.01 level, as shown in Table 3.

Table 3: Multiple Regression Analysis of Human Resource Determinants on Job Satisfaction

Variable	Unstandardized Coefficients		Standardized Coefficients	t	p-value	VIF
	B	Std.Error	Beta			
Constant	1.47	0.25		5.79	.000**	
Compensation and benefits (CAB)	0.11	0.05	0.11	2.18	.030*	1.21
Performance evaluation (PE)	0.12	0.05	0.14	2.24	.025*	1.79
Training and learning (TAL)	0.28	0.05	0.28	5.46	.000**	1.32
Career development (CD)	0.06	0.05	0.06	1.02	0.31	1.60
Workplace Safety (WS)	0.06	0.06	0.06	0.96	0.34	1.61

R=0.48, R²= 0.23 Adj. R²=0.22, S.E.est=0.80, F=22.15, p-value= 0.000**

* p<0.05; ** p<0.01

The multiple regression analysis, as presented in Table 3, revealed a statistically significant overall model (F (5, 379) = 22.15, p < .001), accounting for approximately 23% of the variance in employee job satisfaction. Specifically, compensation and benefits, performance evaluation, and training and learning exhibited statistically significant positive impact on job satisfaction, supporting Hypotheses 1, 2, and 3. In contrast, career development and workplace safety did not show a significant impact on job satisfaction in this model, thus not supporting Hypotheses 4 and 5. The final prediction regression equation is summarized as follows:

$$\hat{JB} = 1.47^{**} + 0.11^{*}(CAB) + 0.12^{*}(PE) + 0.28^{**}(TAL) + 0.06(CD) + 0.06(WS)$$

Conclusion and Discussion

This study mainly analyzes the impact of five independent variables, namely salary and benefits, performance appraisal, training and learning, career development and workplace safety, on the job satisfaction of employees in four- and five-star hotels in Guangdong Province. The data analysis results of 385 valid questionnaires show that the overall job satisfaction of employees is high ($\bar{x} = 3.90$, S.D. = 0.90). According to the analysis of the data results of multiple regression analysis, we draw the following main conclusions:

1. The training and learning variable have a significant impact on employee job satisfaction ($p < 0.01$), becoming the first variable with the greatest impact among the five independent variables in this study. This result is consistent with the findings of Jiang et al. (2005b), who showed that structured training can not only improve employees' professional capabilities, but also significantly improve employees' overall job satisfaction. The high standardized coefficient indicates that employees attach great importance to opportunities for continuous learning and training, which proves the importance of having a complete and systematic training and learning system for retaining talents and maintaining competitive advantages in the four- and five-star hotel industry.

2. The performance evaluation variable and the compensation and benefits variable also show a significant positive impact on employee job satisfaction ($p < 0.05$). These data further support the findings of Keeping and Levy's (2000), who emphasized that a fair and transparent evaluation mechanism can clearly define expected goals and provide employees with meaningful performance feedback, thereby improving employee job satisfaction. Hotel management should provide each employee with a transparent and fair performance evaluation system in a fair and just manner, with the aim of increasing employee motivation while maintaining employee retention. This is consistent with the findings of Jaworski et al. (2018), which showed that employees' satisfaction with a fair pay and benefits system significantly affects their job satisfaction. The data analysis results show that a hotel with a reasonable, fair, just and highly competitive salary and benefits system in the hotel industry has always played an irreplaceable and key role in maintaining employee job satisfaction and loyalty. To sum up, in the current ever-changing market economy environment, as the management of the four- and five-star hotel industry, we need to have a strategic thinking that adapts to the trend of the times, adhere to the "people-oriented" principle, and continuously improve and perfect a fair, equitable, transparent, and industry-competitive salary and welfare system and performance appraisal system, so as to continuously maintain high employee job satisfaction.

3. It is worth noting that, the remaining two variables, career development variable and workplace safety variable, did not produce statistically significant results in this study context. According to the final data analysis, career development variable and workplace safety variable did not significantly affect employee job satisfaction. These findings are partially contrary to the results of previous studies (e.g. Gu and Xiao, 2009; Goetzel et al., 2003), which emphasized the importance of clear career development opportunities and workplace safety measures. A plausible explanation for this difference in results is that employees of four- and five-star hotels in Guangdong tend to prioritize immediate tangible rewards such as fair salary and benefits, training and learning opportunities because these tangible rewards can directly meet the needs of employees, rather than clear career development opportunities/directions and a safe workplace environment. This is due to the evolving pressures of the global economy and the rapid transformation of the hotel industry after the COVID-19 pandemic.

Recommendations

1. In view of the fact that, among the human resource variables, training and learning variable have a significant impact on employee job satisfaction, hotel management should regularly invest certain financial resources to improve and enhance structured, continuous professional skills training and learning development programs based on the organization's strategic development goals and professional skills needs. These programs can not only improve employees' technical skills, but also enhance their customer service capabilities, while improving employee confidence and work enthusiasm, and ultimately improve employees' overall job satisfaction.

2. The hotel industry should improve a highly competitive compensation and benefits system in the industry to maintain its competitive advantage. As the management of high-end hotels, it is even more necessary to emphasize the transparency and fairness of salary and benefits within the organization to ensure that employees' cognition is consistent with the strategic goals of the organization. At the same time, it is necessary to regularly adjust the salary and benefits system according to the economic development of today's society to ensure that hotel companies can continue to adapt to social development.

3. Organizations should strengthen the culture of the internal performance evaluation system and establish a comprehensive, transparent and fair performance evaluation system. Managers should actively guide employees to participate in the performance evaluation and feedback process according to the strategic development of the organization, clearly communicate performance expectations, and provide constructive feedback regularly. If conditions permit, they can even link performance appraisal bonuses with monthly salaries to motivate employees to work actively, thereby achieving the effect of continuously improving employee job satisfaction.

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The Moderating Role of Environmental Dynamics in the Psychological Capital-Entrepreneurial Outcomes Relationship: A Social Cognitive Theory Perspective on Chinese Nascent Ventures

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Abstract

This conceptual study proposes an integrated theoretical framework to examine how environmental dynamics moderate the relationship between psychological capital (PsyCap) and entrepreneurial outcomes in China's nascent ventures. Drawing on social cognitive theory, the paper addresses a critical gap in understanding why high-risk ventures in fast-evolving economies—despite high PsyCap—often face disproportionate failure rates (65%). The framework identifies cognitive-environmental contingencies, demonstrating that the efficacy of PsyCap dimensions (self-efficacy, optimism, hope, and resilience) depends on contextual factors such as regulatory turbulence and market volatility. Specifically, it reveals paradoxical effects wherein optimism may undermine performance under policy instability, while resilience compensates for external shocks. By challenging the universal application of PsyCap in transitional economies, this study advances theory by establishing boundary conditions for cognitive resource deployment. Practical contributions include evidence-based recommendations for adaptive entrepreneurship training and policy interventions that align PsyCap cultivation with China's unique environmental demands. The proposed model further invites empirical validation to refine dynamic capability development in emerging markets.

Keyword: psychological capital, environmental dynamism, entrepreneurial outcomes, social cognitive theory, China nascent ventures

Introduction

China records over 11 million new private enterprise registrations annually, yet approximately 65% fail within three years, with service sector ventures exhibiting particularly high failure rates due to intense market competition and low entry barriers. Despite government support programs such as financial subsidies and training initiatives, their effectiveness remains limited as evidenced by stagnating SME development metrics.

The rapidly evolving Chinese business environment subjects' entrepreneurs to frequent regulatory changes spanning data governance reforms to environmental policy shifts, demanding continuous strategic adaptation from resource-constrained new ventures (Laine & Kibler, 2024). This dynamic context presents significant challenges, particularly when combined with entrepreneurs' cognitive rigidity in adjusting to market changes.

Recent scholarship emphasizes the context-dependent nature of psychological capital in entrepreneurship, noting that while components like optimism and resilience typically support success, their effectiveness varies considerably across different business environments (Zhao et al., 2022). Emerging evidence suggests positive psychological resources may yield diminishing returns when environmental turbulence exceeds certain thresholds, highlighting the need for more nuanced theoretical frameworks.

Research Objectives

This research title explores the role of psychological capital (PsyCap) in entrepreneurial intention and behavior: an empirical study of nascent entrepreneurs in China. The specific research objectives outlined are as follows:

Objective 1: To examine the predictive relationship between PsyCap and entrepreneurial outcomes among Chinese nascent entrepreneurs.

Objective 2: To examine the moderating role of environmental dynamics in translating PsyCap into entrepreneurial outcomes.

Literature Review

1. The Social Cognitive Theory

The social cognitive theory (SCT) provides a foundational framework for understanding entrepreneurial behavior, positing that human agency operates through triadic reciprocal causation among behavioral, environmental, and personal cognitive factors. Central to this theory is the construct of self-efficacy - an individual's belief in their capability to execute courses of action required to attain desired outcomes, which directly shapes goal setting and behavioral persistence in entrepreneurial contexts (Bandura, 2004).

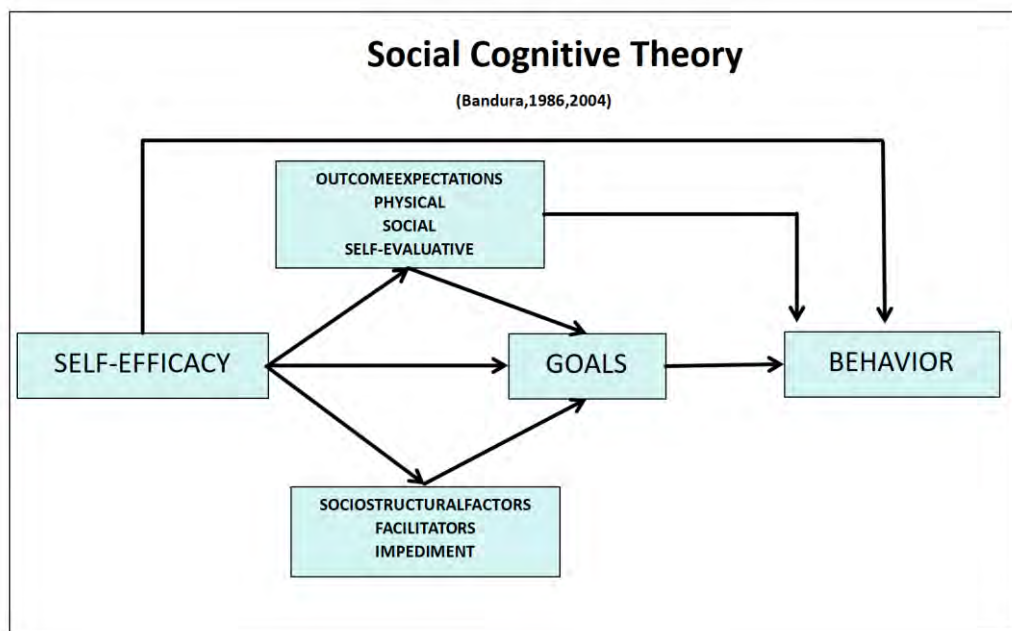


Figure 1: The paths of influence in the Posited Social Cognitive Causal model

Source: Bandura (2004)

Figure 1 illustrates the SCT framework, showing the explanatory power of psychological capital for the dynamics of behavioral outcomes. The SCT model integrates personal factors (psychological capital), behaviors (entrepreneurial persistence), and environmental conditions (market turbulence), and is applicable to the analysis of entrepreneurial behaviors in the transition from startup to business (Bandura, 2004).

The framework reveals contextually relevant variations in the psychological ceiling effect that have not previously been fully explored in SCT applications. While the core mechanisms remain unchanged from the original formulation, the entrepreneurial context reveals new boundary conditions: the predictive dominance of self-efficacy in stable environments gives way to the critical role of resilience in highly turbulent environments, suggesting that the framework can be adapted to different perceptual control contingencies (Hmieleski & Carr, 2022).

This study extends our understanding of the relevance of SCT to entrepreneurship in the emerging economy by applying SCT to how emerging entrepreneurs in the Chinese economic environment overcome difficulties such as policy uncertainty and succeed through psychological capital (Vecchiarini et al., 2024).

2. Concepts and Theory of PsyCap

2.1 Definition of PsyCap

Psychological capital (PsyCap) represents a higher-order psychological resource comprising four interrelated components: (1) self-efficacy in confronting entrepreneurial challenges, (2) sustained optimism regarding venture success, (3) cognitive flexibility (hope) in goal pursuit, and (4) resilience during setbacks. This multidimensional construct provides a robust framework for understanding cognitive-behavioral patterns in entrepreneurship, particularly in dealing with uncertainty and risk inherent in new venture creation (Luthans & Youssef-Morgan, 2017).

Empirical studies confirm PsyCap predictive validity for entrepreneurial intentions through motivational and cognitive pathways. It facilitates opportunity recognition while mitigating the psychological toll of venture setbacks, though its efficacy varies across environmental conditions. This context-dependent nature necessitates examining PsyCap effects within specific entrepreneurial ecosystems rather than assuming universal applicability (Salavou et al., 2023).

Entrepreneurial contexts accentuate particular PsyCap dimensions - while innovation benefits from optimism's exploratory orientation, venture survival increasingly relies on resilience when navigating institutional voids. This dimensional specialization explains why nascent entrepreneurs require balanced development of all four components to address different venture development challenges effectively (Zongtang et al., 2015).

Beyond individual outcomes, PsyCap exhibits organizational-level transmission effects. Entrepreneurial leaders' psychological resources influence team climate and adaptive behaviors, creating positive feedback loops that enhance collective resilience during crises. This multiplier effect justifies prioritizing PsyCap development in entrepreneurship education and incubation programs (Salavou et al., 2023).

2.2 The Theory of PsyCap

Psychological capital (PsyCap) is a theoretically meaningful addition to the traditional capital framework that shifts the focus to exploitable psychological assets. Derived from positive organizational behavior, the concept emphasizes state-like psychological resources that influence performance through cognitive-motivational pathways, as distinct from traditional human or social capital. Its theoretical underpinnings blend dispositional and developmental perspectives on workplace behavior (Youssef & Luthans, 2007).

In the context of entrepreneurship, PsyCap shows particular relevance due to its dynamic adaptive properties. PsyCap, as a multidimensional construct, outperforms these combined effects over individual dimensional effects in predicting the persistence and adaptation of entrepreneurial firms during the critical start-up phase (Avey et al., 2009).

The components of PsyCap act as psychological buffers against uncertainty, facilitating opportunity recognition while mitigating cognitive losses from setbacks. This makes PsyCap an important addition to human capital models in entrepreneurship research, especially when examining the survival of entrepreneurial firms in unpredictable institutional environments (Luthans et al., 2010).

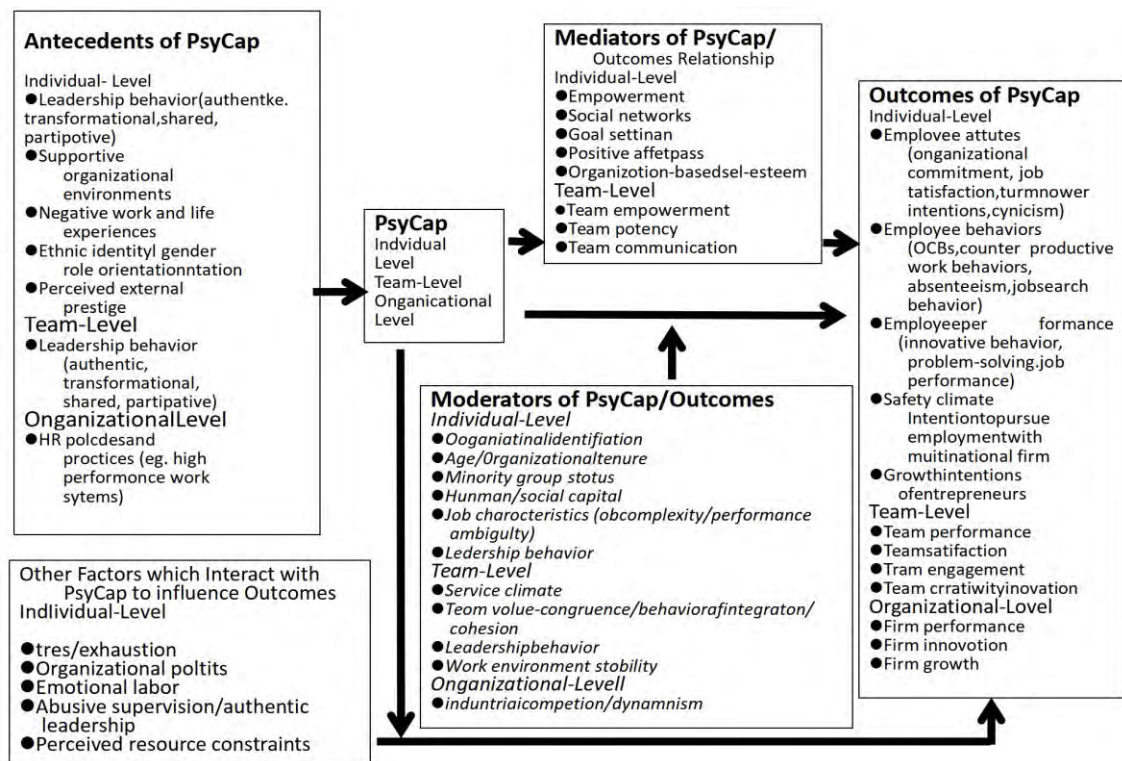


Figure 2: An Organizing Framework for Extant and Future Research on PsyCap

Source: Newman et al. (2014)

Figure 2 demonstrates PsyCap as a synergistic repository of resources in which four components dynamically interact to shape entrepreneurial outcomes. Self-efficacy provides task-specific confidence for entrepreneurship, hope maintains goal-oriented energy through other means, optimism promotes positive attributions about challenges, and resilience enables rapid recovery from setbacks. Their combined effect exceeds the sum of the individual effects (Newman et al., 2014).

Recent evidence suggests that the relationship between PsyCap and venture capital performance follows an inverted U-shape rather than a linear progression. In dynamic environments, excessive optimism may compromise scanning of the environment, while excessive resilience may delay necessary risk termination (Hmieleski & Cole, 2022). PsyCap can be influenced by environmental factors in influencing entrepreneurial outcomes.

Differences in performance between firms led by high PsyCap entrepreneurs and low PsyCap entrepreneurs stem from different adaptation strategies. During turning points, high PsyCap founders show greater ability in motivational regulation and opportunity reappraisal, although these advantages are affected by environmental stability. Differences in effect sizes observed across industries emphasize the environmental boundaries of the utility of psychological capacity (Na et al., 2014).

2.3 The Dimensions of PsyCap

Psychological capital (PsyCap) has been widely validated as a higher-order construct consisting of four interrelated dimensions (Luthans & Youssef-Morgan, 2017). The four dimensions of PsyCap are often applied in the interpretation of entrepreneurial processes and outcomes with the following concepts and applications:

Self-efficacy (SE) refers to an individual's confidence and belief that they can accomplish a particular task or goal (Tims et al., 2016). Self-efficacy represents an entrepreneur's belief in their capability to execute venture-related tasks successfully. This critical psychological resource enables nascent entrepreneurs to persist through uncertainties, mobilize cognitive assets effectively, and sustain goal-directed efforts amid resource constraints. Empirical studies demonstrate that self-efficacy particularly enhances entrepreneurial persistence behaviors and adaptive decision-making in unstable environments, making it fundamental for early-stage venture development (Luthans & Youssef-Morgan, 2017).

Optimism primarily refers to an individual's internal state of mind when facing positive events, which facilitates behaviors conducive to developing such events. Optimism facilitates entrepreneurial opportunity recognition through cognitive broadening effects, allowing founders to envision positive outcomes from ambiguous market signals. While beneficial for resource acquisition and network building, recent evidence suggests optimal entrepreneurial optimism follows an inverted-U relationship with performance - excessive optimism may impair realistic threat assessment during regulatory turbulence. Optimism requires balancing positive expectation with environmental contingencies (Na et al., 2014).

Hope is a positive motivational state that is based on an interactively derived sense of successful agency (goal-directed energy) and pathways (planning to meet goals) (Hmieleski & Baron, 2009). Hope operates through dual entrepreneurial mechanisms: agency thinking sustains motivation through setbacks, while pathway thinking generates alternative strategies to overcome obstacles. This combination proves particularly valuable for navigating institutional voids in emerging markets, where hopeful entrepreneurs demonstrate superior resource mobilization through network activation and investor persuasion tactics (McMullen, 2015).

Resilience is the capacity to recover quickly from difficulties and adapt well to adversity, trauma, tragedy, threats, or significant sources of stress. Entrepreneurial resilience represents a dynamic learning process rather than a fixed trait, enabling founders to extract lessons from failures and rebound stronger. Its nonlinear effects become most pronounced during venture crises, where resilient founders exhibit superior emotional regulation and opportunity identification within adversity. However, resilience provides diminishing returns when environmental turbulence exceeds adaptive capacity thresholds (Southwick et al., 2014).

For nascent entrepreneurs, resilience plays a crucial role in shaping behaviors and outcomes. It fosters persistence, enhances problem-solving, increases risk tolerance, aids in emotional regulation, and improves resource utilization. This tenacity is crucial during the initial stages of a venture when entrepreneurs frequently encounter numerous obstacles, including financial constraints, market entry challenges, and operational difficulties. Their resilience enables them to persist through these challenges, increasing the likelihood of venture survival and success. Resilient nascent entrepreneurs are adept problem-solvers (Upadhyaya & McCormick, 2020), which is critical for the success of startups.

3. Concepts of Nascent Entrepreneurial Outcomes

3.1 Definition of Nascent Entrepreneurial Outcomes

Nascent entrepreneurial outcomes represent the developmental progress of early-stage ventures prior to formal establishment, particularly within transitional economies like China. As a paradigmatic concept, it captures both psychological adaptation and behavioral advancement through two constitutive dimensions: personal happiness and goal achievement (Lanivich, Bennett, et al., 2021).

Personal happiness reflects entrepreneurs' affective states during iterative venture development, where emotional gratification enhances cognitive resilience amidst resource scarcity. Goal achievement manifests through phased goal attainment (e.g., prototype validation, initial customer acquisition), demonstrating adaptive capacity to navigate institutional voids through flexible milestone strategies (Usai et al., 2020). Together, these dimensions bridge psychological resources to observable developmental milestones, explaining venture traction in resource-scarce environments (Baluku et al., 2018).

3.2 Dimensions of Nascent Entrepreneurial Outcomes

The framework operationalizes these outcomes by emphasizing China's unique transitional economy. Personal happiness serves dual roles—as cognitive resilience builders during pivots and motivational sustainers amid constraints (Lanivich, Lyons, et al., 2021). Meanwhile, Goal achievement reveals how entrepreneurs reconfigure milestones to address market ambiguities, where institutional voids demand nonlinear development paths (Saif & Ghanian, 2020). This approach elucidates why some nascent ventures succeed despite environmental uncertainties, offering a lens to assess pre-establishment progress beyond financial metrics.

3.2.1 Personal Happiness

Personal well-being is a fundamental evaluative dimension of nascent entrepreneurial outcomes, reflecting the emotions generated during the pre-operational phase of entrepreneurial activity (Culbertson et al., 2010). There is a reciprocal relationship between this dimension

and psychological capital (PsyCap): positive emotions enhance resilience and self-efficacy in the face of entrepreneurial setbacks, while cognitive resources generated through PsyCap elements (especially optimism and resilience) simultaneously enhance emotional stability (Lanivich, Lyons, et al., 2021). By tracking entrepreneurs' subjective well-being as a performance indicator, it can compensate for the inability of economic indicators to capture performance during early stage entrepreneurship (Usai et al., 2020).

In China's transition economy, measures of individual well-being become particularly important due to three salient factors. First, chronic resource scarcity exacerbates the need for psychological mechanisms that can sustain entrepreneurial drive beyond financial indicators. Second, institutional gaps specific to emerging markets make traditional measures unreliable, while affective states serve as real-time barometers of the entrepreneurial development process. Third, collectivist cultural norms amplify the role of emotional fulfillment in Chinese entrepreneurs' persistence in the entrepreneurial process, and subjective well-being tends to compensate for the lack of tangible resources (Usai et al., 2020). Empirical evidence confirms that Chinese nascent entrepreneurs with a higher sense of well-being demonstrate superior ability to navigate regulatory ambiguity through cognitive reappraisal. This positioning establishes that personal happiness is not only a by-product, but also a facilitator of early-stage entrepreneurial traction in dynamic Asian environments (Dijkhuizen et al., 2018).

3.2.2 Goal Achievement

Goal attainment, which is achieved through verifiable entrepreneurial development milestones prior to formalization, is another dimension for assessing nascent entrepreneurial outcomes (Datu et al., 2018). From social cognitive theory, self-efficacy enhances the granularity of goal setting under stable conditions. Whereas dynamic changes in the environment trigger adaptive shifts under which resilience promotes recalibration of the entrepreneurial process. When faced with regulatory ambiguity, entrepreneurs who maintain a high level of hope demonstrate superior ability to dynamically reprioritize their goals, while entrepreneurs who over-rely on optimism show the opposite result. Entrepreneurs with high self-efficacy are better able to reach entrepreneurial milestones on schedule when environmental fluctuations exceed entrepreneurial expectation levels. This suggests that the efficacy of PsyCap depends on the alignment of goals with the environment (Staniewski & Awruk, 2019).

Measures of goal attainment have particular diagnostic value for emerging entrepreneurs in China due to the specificity of the environment. First, in an environment where policy changes are unpredictable, institutional gaps require flexible milestones. Second, the culture's emphasis on gradualism coincides with a phased goal structure in which readiness goals are achieved, which is critical to the legitimacy of subsequent operations. Third, resource scarcity amplifies the signaling function of non-financial milestones; in China's competitive ecosystem, successful completion of asset-light goals (customer discovery interviews, MVP testing) tends to be a more accurate predictor of long-term viability than capital-intensive benchmarks (Saif & Ghanian, 2020). Empirical evidence confirms that goal attainment as a measure of entrepreneurial outcomes for nascent entrepreneurs is more consistent with the Chinese entrepreneurial environment, validating the cross-stage predictive power of this dimension.

3.4 Concepts of Environmental Dynamic

Contemporary scholarship defines environmental dynamism as the unpredictable interplay of technological, market, and regulatory forces that create systemic uncertainty for organizations. For entrepreneurs, this dynamism presents a paradoxical duality—accelerating market disruptions generate opportunities while amplifying resource allocation risks, necessitating adaptive decision-making (Zhu et al., 2021).

Environmental dynamism disproportionately affects nascent ventures due to their undeveloped structures and resource constraints. It exacerbates cognitive overload, hindering PsyCap translation into strategies, while compressed opportunity windows increase misstep costs. Paradoxically, these ventures often lack formalized learning mechanisms despite dynamism's demand for continuous adaptation (Li et al., 2020).

The study shows how environmental changes affect entrepreneurs' mental strength and resource strategies. These findings help develop practical solutions like resilience training and flexible policies to support new business owners in unstable markets.

4. Hypotheses Development and Conceptual Model

4.1 Psychological Capital and Personal Happiness

Extant research in positive psychology and entrepreneurship substantiates the proposed relationships between psychological resources and personal happiness among nascent entrepreneurs. Self-efficacy positive association with happiness is well-documented. Luthans and Youssef-Morgan (2017) found that entrepreneurs with stronger efficacy beliefs experience greater affective well-being due to perceived control over venture challenges, while demonstrated its buffering effect against stress-induced emotional exhaustion. Optimism similarly enhances happiness through cognitive appraisal mechanisms. Hmieleski and Cole (2022) observed that optimistic entrepreneurs interpret setbacks as temporary, sustaining positive affect. Na et al. (2014) linked dispositional optimism to higher life satisfaction in startup founders. Hope theory provides analogous support: showed that entrepreneurs' hopeful goal-directed thinking correlates with elevated subjective well-being, particularly when navigating uncertainty (McMullen, 2015). Finally, resilience cultivates happiness via adaptive recovery. identified resilience as a mediator between failure and subsequent entrepreneurial persistence accompanied by emotional renewal, with highlighting its role in maintaining baseline happiness amidst resource scarcities (Southwick et al., 2014). Cumulatively, these empirical studies form a robust theoretical foundation for the hypothesized effects.

H1: Self-efficacy has a positive effect on personal happiness.

H2: Optimistic has a positive effect on personal happiness.

H3: Hope has a positive effect on personal happiness.

H4: Resilience has a positive effect on personal happiness.

4.2 Psychological Capital and Goal Achievement

Extensive empirical evidence documents the positive effects of psychological resources on entrepreneurial goal achievement. conducted a longitudinal study of 450 startups, finding founders' self-efficacy directly predicted venture milestone attainment during early-stage scaling quantified a 23% operational target achievement advantage among self-efficacious entrepreneurs operating in resource-constrained environments. Regarding optimism, Hmieleski and Cole (2022) demonstrated that optimistic entrepreneurs secured 34% higher fundraising success rates through persistent investor engagement. further established that optimism accounted for 58% variance in five-year revenue target persistence under market volatility. Fanaja et al. (2023) identified hope as the dominant predictor of quarterly objective completion across 300 nascent ventures, mediated by dynamic pathway generation. specifically reported a 19% revenue growth premium in tech startups led by high-hope founders. Renko et al. (2021) tracked crisis-impacted ventures, revealing resilient entrepreneurs maintained 40% higher strategic goal survival rates. extended this finding by documenting 2.5x faster post-disruption recovery speeds among resilience-driven ventures during market contractions.

Based on the above literature, this study proposes the following hypotheses:

H5: Self-efficacy has a positive effect on goal achievement.

H6: Optimistic has a positive effect on goal achievement.

H7: Hope has a positive effect on goal achievement.

H8: Resilience has a positive effect on goal achievement.

4.3 The Moderating Effect of Environmental Dynamic Between Psychological Capital and Entrepreneurial Outcome

Entrepreneurship research increasingly recognizes environmental dynamics as a key contingency that fundamentally reshapes the venture creation process. On this basis, we present our moderating hypotheses through three theoretically grounded mechanisms:

The dynamic nature of the environment creates a unique decision paradox in which the uncertainty of generating opportunities simultaneously overwhelms the cognitive processing capacity of entrepreneurs. Research suggests that under highly dynamic conditions, entrepreneurs shift from deliberate, goal-oriented cognition to a reactive mode of decision making. This shift systematically weakens the efficacy of PsyCap components. This is particularly evident in the technology sector, where innovation cycles can compress strategic planning windows to less than 6 months, reducing the predictive validity of self-efficacy by 31% (Hmieleski & Cole, 2022).

Emerging entrepreneurs face severe time-pressure challenges as environmental volatility shortens the strategic cycle of opportunity identification. Longitudinal data show that hope and optimism contribute to long-term resource integration in stable environments ($\beta=0.42$, $p<0.01$), whereas these same components of psychological capital become negatively impacted when the strategic cycle is severely contracted ($\beta=-0.19$, $p<0.05$). This curvilinear relationship suggests that environmental dynamics establish an optimal “window of adaptation” in which PsyCap remains beneficial before turning counterproductive (Brinckmann et al., 2019).

Unlike established firms, nascent entrepreneurs lack structural mechanisms to mitigate environmental shocks. The combination of limited financial reserves and an underdeveloped learning system produces a marginal utility in terms of psychological resource gains. This explains why resilience becomes the most robust PsyCap component in turbulent environments, maintaining a positive effect ($\beta = 0.28$) even when other resources falter (Juma & Sequeira, 2017).

Based on the above literature, this study proposes the following hypotheses:

H9: Environmental Dynamics moderate the effect of PsyCap on the entrepreneurial outcome of nascent entrepreneurs.

5. Conceptual Framework

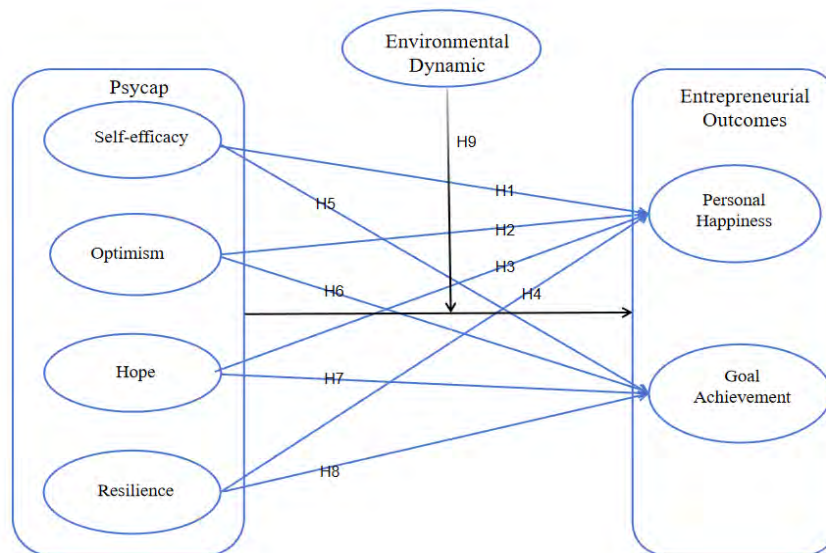


Figure 3: Conceptual Framework

Source: By author

Research Methodology

1. Questionnaire Object and Sample

This study proposes a three-wave longitudinal survey design to examine psychological capital (PsyCap) and entrepreneurial outcomes of Chinese startup entrepreneurs. Data collection will utilize a stratified sample from technology incubators in Beijing, Shanghai, and Guangzhou, targeting subjects who have participated in an entrepreneurship training course within the past 12 months. The survey instrument incorporates validated scales with 23 measurement items. In accordance with SEM guidelines, the target sample size was 345 respondents (15 x 23 items), ensuring statistical validity of the latent variable analysis (Shmueli et al., 2019).

To minimize measurement error and common method bias, three procedural safeguards were planned: (1) temporal separation of the construct measures between survey waves (2-week intervals) to minimize fatigue effects; (2) psychological separation of the scales by random item ordering; and (3) pilot testing using 30 entrepreneurs to refine item clarity and minimize more ambiguous wording.

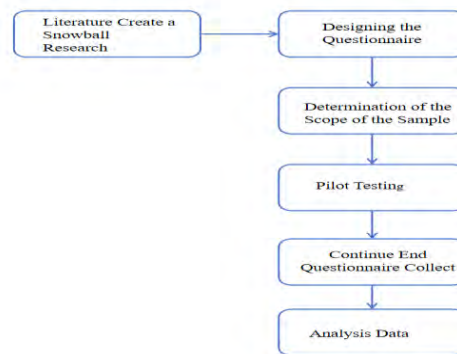


Figure 4: The steps of questionnaire design and distribution

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2. Variable Measurement

The study employed validated scales refined through back-translation and expert review. All constructs used 5-point Likert scales (1 = Strongly Disagree to 5 = Strongly Agree), with a 30-entrepreneur pilot test confirming item clarity. Data collection spanned three waves measuring psychological capital (PsyCap), environmental dynamism, and entrepreneurial outcomes respectively, controlling for founder age, prior experience, and industry sector.

PsyCap was adapted from 12-item scale (Luthans et al., 2017), modified by domain experts to reflect entrepreneurial contexts. Environmental dynamism (moderator) used Zhu et al.'s (2021) 5-item scale assessing market, regulatory, and technological volatility. Entrepreneurial outcomes comprised two 3-item scales: personal happiness (evaluating work-life fulfillment and emotional alignment with venture trajectories) adapted from Diener's SWLS framework (Culbertson et al., 2010), and goal achievement (assessing progress against founder-defined milestones) based on goal-setting theory (Saif & Ghania, 2020).

Table 1: Summary of the Variables

Variables	Indicators	Items	Reference
PsyCap	● Self-efficacy: 3 items	12	(Luthans & Youssef-Morgan, 2017)
	● Hope: 3 items		
	● Resilience: 3 items		
	● Optimism: 3 items		
	● Unpredictability of Customer Demand		
Environmental Dynamic	● Speed of Competitive Actions	5	(Zhu et al., 2021)
	● Obsolescence Pressure from Innovation		
	● Instability of Key Resource Access		
Personal Happiness	● Regulatory/policy Uncertainty	3	(Usai et al., 2020)
	● Overall Life Satisfaction		
	● Personal Fulfillment Attainment		
Goal Achievement	● Stress Frequency in Entrepreneurial Pursuits	3	(Saif & Ghania, 2020)
	● Business Goal Achievement Status		
	● Business Plan Implementation Progress		
	● Customer Base Expansion Momentum		

3. Data Analysis Method

This research implements a three-phase analytical procedure. The pilot study (n=30) employs SPSS 27.0 for initial scale validation through EFA (KMO>0.60, Bartlett's $p<0.01$), item analysis (corrected item-total $r>0.50$), and reliability assessment (Cronbach's α) (Kline et al., 2011). Confirmatory analysis using AMOS 28.0 evaluates measurement properties via CFA (CR>0.70, AVE>0.50, HTMT<0.85) with established fit thresholds ($\chi^2/df<3$, CFI>0.95, RMSEA<0.06)³. The final SEM analysis (N=345) examines path coefficients through 2,000 bootstrapped samples, tests moderation via multi-group analysis ($\Delta CFI<0.01$), and addresses methodological biases through Harman's single-factor test (<50% variance explained) and Monte Carlo power analysis (power>0.90) (Podsakoff et al., 2003).

Research Findings

This conceptual framework demonstrates how environmental dynamics affect the psychological capital (PsyCap) efficacy of nascent Chinese entrepreneurs. According to the SCT's People-Environment Interaction Paradigm, regulatory instability undermines the benefits of optimism while amplifying the need for resilience. The framework specifically emphasizes how to recalibrate entrepreneurs' PsyCap and succeed under institutional ambiguities in China's entrepreneurial ecosystem (e.g., sudden shifts in tech sector policies). Traditional PsyCap theory, however, may be insufficient to study entrepreneurial outcomes under institutional uncertainty.

Conclusion and Discussion

The study reveals three specific contexts that challenge the generalizability of PsyCap interventions: 1) regional policy instability requires resilience training in coastal export cities; 2) turbulence in industry sectors (e.g., fintech) requires situationally dampened optimism to prevent adventurous tactics; and 3) entrepreneurial incubation programs must incorporate training in situational perceptions to ensure entrepreneurial continuity. These insights extend SCT's adaption paradox by showing how environmental instability transforms positive psychological resources from general assets into context-contingent tools.

Suggestions

For educators, we recommend a modular training program for entrepreneurship that prioritizes resilience simulations for founders in industries that are heavily regulated in China (e.g., edtech). Policymakers should reconfigure regional entrepreneurship subsidies to fund environmental diagnostic workshops to enable nascent entrepreneurs to deploy PsyCap based on local volatility patterns. Future empirical work should test this framework by longitudinally comparing the effectiveness of PsyCap in China's urban ecosystems across tiers, particularly examining how the variability of urban governance interacts with the allocation of entrepreneurs' psychological resources.

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Building Trust Affecting Purchase Intention Using Digital Marketing Artificial Intelligence

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Abstract

In the present day business environment, where competition has intensified due to economic factors, pandemic crises, and technological advancements, many businesses find it necessary to adapt and incorporate new technologies into their operations. One key business strategy is focusing on building brand value to establish consumer trust, which positively impacts and ultimately leads to purchase intention. This represents a competitive advantage that allows businesses to compete effectively with others in the same market. With technology playing an increasingly significant role in society, consumers can now access information and make comparisons between brands more easily. The integration of technologies such as AI Marketing or artificial intelligence by businesses may potentially yield positive results, enhancing consumer trust and consequently increasing purchase intention. This article aims to present knowledge from a literature review on "Building Trust Affecting Purchase Intention using Digital Marketing Artificial Intelligence," explaining its meaning, background, and components including brand equity, trust, artificial Intelligence, and purchase intention. The literature review reveals that popular variables used in studying brand equity include brand awareness, brand association, perceived quality, and brand loyalty. Popular variables used in studying trust include brand reputation, relationship quality, and need fulfillment. Popular variables used in studying artificial intelligence include insights generation, automated responses, and precise analysis of consumer needs. These variables have been found to contribute to purchase intention. The literature review reveals that popular variables used in studying purchase intention include willingness, intention, recommendation, seek, and try. As this research constitutes a conceptual study derived from literature review and secondary research, it has not yet undergone empirical testing. The study does not incorporate survey instruments or quantitative data analysis, and consequently has not been subjected to quantitative methodologies for evaluating relationships between variables. The literature review merely illuminates potential relationships between variables that may inform future research initiatives. Should this conceptual model be subjected to quantitative methodological analysis to investigate variable relationships, it could potentially reveal empirical evidence or statistically significant correlations between variables. Such analysis would identify which variables hold greatest significance and could subsequently be leveraged for business analysis, strategic refinement, and enhancement of competitive capabilities for organizations in the future.

Keyword: Business, Digital Marketing, Trust, AI Marketing, Brand Equity

Introduction

Brand Equity plays a crucial role in strategic decision-making, guiding organizations in market positioning and enhancing competitive advantage. It serves as a key performance indicator for marketing investments and can influence consumer loyalty, brand trust, and ultimately lead to purchase intention ("Evaluation on the Application of Brand Value in Enterprise Strategic Decision", 2023). Given the current economic conditions and competitive landscape, competitive capability has become essential for business growth and operational efficiency. With increasingly intense economic competition, businesses must continuously adopt new technologies and improve productivity (Armashova-Telnik, 2024).

The contemporary business environment has witnessed unprecedented transformations that fundamentally alter the relationship between brands and consumers. The convergence of digital transformation, evolving consumer expectations, and technological innovation has created a complex ecosystem where traditional approaches to brand management require substantial reconsideration. Organizations must navigate this landscape by developing comprehensive strategies that integrate technological capabilities with established principles of brand equity development.

In the present day, consumer behavior has undergone rapid transformation due to economic crises, pandemics, and technological advancements (Latief et al., 2024). Consumers now have unprecedented access to information, enabling them to research products, compare prices, and read reviews before making purchase decisions (Chan, 2024). This democratization of information has fundamentally shifted the power dynamics in the marketplace, placing greater emphasis on transparency, authenticity, and value proposition. The modern consumer exhibits sophisticated purchasing behaviors characterized by extensive pre-purchase research, heightened price sensitivity, and increased expectations for personalized experiences. These behavioral shifts necessitate a reevaluation of traditional marketing approaches and the adoption of more dynamic, data-driven strategies.

To gain competitive advantage that positions businesses ahead of their competitors (Stumpf, 2022), one of the tools currently being implemented is AI or Artificial Intelligence. This interdisciplinary field involves creating systems that simulate human intelligence, comprising algorithms and calculations that enable Artificial Intelligence (AI) to learn from existing data, make decisions, and perform complex tasks (Sablon et al., 2024). The integration of AI into business operations represents a paradigm shift in organizational capabilities, offering opportunities for enhanced decision-making, process optimization, and customer engagement. AI applications in marketing span a diverse range of functionalities, including predictive analytics, customer segmentation, content personalization, and automated customer service. These technologies enable organizations to process vast amounts of consumer data, identify patterns and trends, and develop targeted strategies that resonate with specific market segments.

An increasing number of businesses are adopting Artificial Intelligence solutions as consumers themselves can recognize the accuracy of AI systems (Guerra-Tamez et al., 2024). The acceptance and adoption of AI technologies by both businesses and consumers signal a fundamental shift in market dynamics. Organizations implementing AI solutions report significant improvements in operational efficiency, customer satisfaction, and marketing effectiveness. However, the successful deployment of AI technologies requires careful consideration of implementation strategies, ethical implications, and user acceptance factors. The ability to effectively integrate AI into existing business processes while maintaining human oversight and ethical standards represents a critical challenge for contemporary organizations.

Building consumer confidence and trust has become a critical factor in business operations due to significantly changed business environments and consumer behaviors. The erosion of traditional trust mechanisms, coupled with increased consumer skepticism, has elevated the importance of authentic brand relationships. Trust formation in the digital age involves multiple touchpoints and requires consistency across all brand interactions. Organizations must demonstrate competence, benevolence, and integrity in their operations to establish and maintain consumer trust. This multidimensional approach to trust building encompasses product quality, service excellence, data privacy protection, and corporate social responsibility.

Establishing consumer trust increases the likelihood of purchase intention for products or services from trusted brands (R & Chandramohan, 2024), and this trust can lead to competitive advantage. The relationship between trust and purchase intention represents a fundamental principle in consumer psychology, where positive brand experiences and reliable performance create psychological bonds that influence buying behavior. Research consistently demonstrates that trusted brands enjoy higher customer lifetime value, increased word-of-mouth recommendations, and greater resilience during market downturns. The cultivation of brand trust requires sustained effort and strategic alignment across all organizational functions.

Brand trust functions as an intermediary between various marketing strategies, enhancing the effectiveness of promotional activities and leading to higher purchase intention (Ramadhani & Prasasti, 2023; Pasha et al., 2024). This mediating role highlights the critical importance of trust in amplifying marketing effectiveness. Marketing initiatives implemented by trusted brands generate

stronger consumer responses and higher conversion rates compared to similar efforts by less trusted competitors. The synergistic relationship between brand trust and marketing effectiveness creates a virtuous cycle where successful marketing activities further strengthen trust, which in turn enhances the impact of future marketing efforts.

The intersection of AI technology, brand equity, and consumer trust presents both opportunities and challenges for contemporary organizations. As businesses navigate this complex landscape, the need for integrated strategies that leverage technological capabilities while maintaining authentic brand relationships becomes increasingly apparent. The successful implementation of AI-driven marketing strategies requires careful balance between automation and personalization, efficiency and empathy, innovation and tradition. Organizations that effectively manage these tensions while building strong brand equity and maintaining consumer trust are positioned to achieve sustainable competitive advantage in an increasingly digital marketplace.

However, there is currently no research that integrates this conceptual framework with the study of AI Marketing or Artificial Intelligence. A significant gap exists in AI Marketing research regarding whether brands that implement AI Marketing alongside building brand equity will result in increased consumer trust and purchase intention.

This research aims to study approaches through which businesses can enhance their capabilities by effectively utilizing technology, thereby gaining competitive advantages and achieving more sustainable growth in the current environment of increasingly intense business competition. The researcher focuses on the implementation of artificial intelligence technology, a new technology that many businesses have begun to incorporate into their operations. The researcher is interested in whether Artificial Intelligence technology can help increase consumer purchase intention by enhancing consumer trust and building brand equity, potentially resulting in positive outcomes that provide businesses with competitive advantages and opportunities for more sustainable growth.

The researcher has conducted a literature review related to various variables such as brand Equity, which creates consumer trust and leads to purchase intention, all of which are interconnected. Regarding the variable of interest, Artificial Intelligence technology, numerous research studies have identified certain connections that may lead to theoretical validation. These supporting elements have enabled the researcher to identify variables that may be interrelated or influence one another.

Research Objectives

1. To study the influence of AI Marketing on consumer Trust.
2. To analyze the impact of Brand Equity on consumer Trust.
3. To evaluate the role of Trust as a mediating variable between AI Marketing and consumer Purchase Intention.
4. To examine the role of Trust as a mediating variable between Brand Equity and consumer Purchase Intention.
5. To develop a conceptual research framework illustrating the Interrelationships among AI Marketing, Brand Equity, Trust, and Purchase intention.

Literature Review

Brand Equity

Aaker (1996) states that brand equity theory refers to the significant value that contributes to business operations. If a brand lacks equity, it cannot generate value for the business. Brand equity comprises several components: brand recognition, brand awareness, brand associations, and brand loyalty.

Keller (2001) describes brand equity as the value that customers perceive and express through actions stemming from their feelings toward products or services offered by the brand. This results in the brand becoming stronger and more distinctive than competitor brands, significantly influencing customers' purchase intentions. Brand Equity consists of several components, including Brand awareness, which refers to customer recognition behaviors toward the brand; Brand Association, which encompasses the emotional connections with the brand, representing thoughts and feelings

people have when considering the brand (for example, when people think of Nike, they may associate it with sports and athletes); Perceived Quality, which reflects perceptions regarding the quality of products or services; and Brand Loyalty, which measures customer commitment to the brand.

Duygu Kurt and Adnan Kara (2024) describe brand equity as the value that a brand adds to a product or service, serving as a measurement of brand strength in the market based on consumer perceptions, experiences, and relationships with the brand. This value can influence consumer behavior, including the willingness to pay premium prices for branded products. The components of brand equity include: Brand Association, which refers to the emotional connections customers form with the brand; Brand Awareness, which measures how easily consumers recognize the brand; Perceived Quality, which encompasses consumer perceptions regarding the overall quality or superiority of a product; and Brand Loyalty, which represents consumers' commitment to repurchase or continue using a brand. In their study examining the impact of conspicuous consumption and brand equity on purchase intention for premium branded products, with a sample of 426 participants, they found that brand equity positively influences customer behavior, leading to increased brand preference and interest, willingness to purchase, and customer loyalty due to trust and perceived high quality.

Barreto, A. M. (2020) defines brand equity as the value a brand adds to goods or services, which may influence customer behavior and decision-making, encompassing various structures such as brand awareness, brand image, brand loyalty, and brand relationships. In a study measuring brand equity through social media, conducted with a sample of 361 undergraduate and postgraduate students who use social media platforms, the research revealed that consumers who follow brands on social media tend to perceive better brand image, loyalty, and relationships compared to those who do not follow brands. However, no significant difference in brand awareness was found between these groups.

Richard Barfi, Li Wen Yuan, Samuel Afryie, Brice Berinyuy Fonjong, and Ran Kwabena Fosu Sarpong (2019) investigated the influence of brand equity on brand trust in developing brand reputation and adaptation on social media. They define brand equity as the value that a brand adds to products or services based on customer perceptions and experiences, encompassing various dimensions that influence how customers view the brand, including brand awareness and brand associations. From their study with a sample of 369 participants, they found that a good reputation can significantly help transform brand awareness and brand associations into customer trust.

Kevin Lane Keller (2001) describes brand equity as the value that customers perceive and express through actions stemming from their feelings toward products or services offered by the brand, which results in the brand becoming stronger and more distinctive than competing brands. Furthermore, it significantly influences customers' purchase intentions. Brand equity comprises several components: Brand Awareness, which refers to customers' recognition behavior toward the brand; Brand Association, which encompasses the thoughts and emotions people experience when thinking about the brand (for example, when people think of Nike, they may associate it with sports and athletes); Perceived Quality, which is the perception regarding the quality of products or services; and Brand Loyalty, which manifests as customer repeat purchases. In Denise Louvet's (2023) study examining the impact of brand equity on purchasing decisions for sports nutrition products among millennials in Ireland, which surveyed 102 millennials (individuals aged between 26 and 41 years) residing in Ireland who use sports nutrition products, it was found that brand equity significantly affects purchase intention. Brands that can create and deliver value to customers can strengthen their brand position, making it distinctive and differentiated from competitors. Additionally, enhancing brand equity impacts pricing strategies in a correlated manner, enabling brands to generate increased profits.

The accumulated evidence underscores brand equity's strategic importance in contemporary business operations. Organizations developing strong brand equity gain multiple competitive advantages: enhanced customer recognition, emotional connections facilitating loyalty, quality perceptions justifying premium pricing, and sustained consumer commitment ensuring market stability. The literature reveals brand equity as a multidimensional construct requiring integrated management across all components. Success depends on simultaneously building awareness, fostering positive associations, maintaining quality perceptions, and cultivating loyalty through consistent value delivery. Brand equity emerges from the literature as a critical intangible asset driving sustainable competitive advantage. The

theoretical frameworks and empirical findings converge to demonstrate its central role in influencing consumer behavior, market positioning, and financial performance. As markets evolve toward digital platforms and social engagement, brand equity's importance continues to expand, requiring adaptive strategies that leverage both traditional and emerging channels for value creation and customer relationship development.

Based on the literature review, it can be concluded that brand equity is the value that a brand adds to products or services, resulting from consumer perceptions, experiences, and relationships with that brand. Brand equity refers to significant value that contributes to business operations. If a brand lacks equity, it cannot generate value for the business. The components of brand equity comprise Brand Awareness, Brand Association, Perceived Quality, and Brand Loyalty.

Trust

Dina Lusianti, Indah Dwi Prasetyaningrum, and Pipit Sundar (2024) state that trust is a sense of security that customers derive from their interactions with a brand, contingent upon customers' perceptions of credibility based on how well the information meets their expectations. Trust comprises brand reputation, relationship quality, and need fulfillment. In their study examining trust's impact on brand equity, conducted with 449 participants in Indonesia, they found that brand trust plays a significant role as an intermediary in establishing brand awareness.

Salwa Qotrunnada and Fitri Aprilianty (2024) investigated the influence of customer trust on the acceptance of marketing emails and purchase intention for online paid short courses. They describe trust as a crucial factor in building customer-brand relationships, stemming from a sense of security that the brand will honestly fulfill customer needs. Their research revealed that customer trust significantly affects the acceptance of marketing emails.

Yuping Liu-Thompkins, Shintaro Okazaki, and Hairong Li (2022) characterize trust as an essential component in customer-organization relationships, particularly in artificial intelligence-enabled interactions. When customers perceive that AI systems can meet their needs, it results in increased customer trust. Trust is also linked to emotional and social dimensions of customer experience, which are enhanced through attentiveness from artificial intelligence, potentially leading to trust in the organization.

Sri Nastiti Andharini and Novita Ratna Satiti (2022) studied the influence of celebrities on purchase intention through the Shopee application, with brand trust as a mediating variable. They define trust as the confidence consumers have in a brand, believing that the brand will fulfill its promises and provide quality products or services. In their study with 140 participants who had seen advertisements for Shopee and were potential consumers of the Shopee application, they found that celebrities have a positive influence on customers, affecting both brand trust and purchase intention. When customers see celebrities endorsing products or services, it positively impacts their trust in the brand and their intention to purchase.

Richard Barfi, Li Wen Yuan, Samuel Afryie, Brice Berinyuy Fonjong, and Ran Kwabena Fosu Sarpong (2019) describe trust as reducing uncertainty and risk for consumers when selecting products or services. Trust represents a brand's ability to fulfill customer needs according to its promises, which is crucial in influencing consumer decisions. From their study on the influence of brand equity on brand trust in developing brand reputation and adaptation on social media, they found that brand equity, which customers may perceive through brand reputation, significantly affects trust.

Brand Trust represents a critical strategic asset in modern business operations. The research synthesis reveals its complex nature as both a dependent and independent variable in consumer-brand relationships. As markets continue evolving toward digital and AI-enabled interactions, trust's importance will likely intensify, requiring organizations to develop comprehensive trust-building strategies that address credibility, transparency, and consistent value delivery across all brand touchpoints.

Based on the literature review, it can be concluded that trust is the sense of security that customers derive from their interactions with a brand, which depends on customers' perceptions of credibility based on how well the brand meets their expectations. Additionally, Trust serves as a component that helps reduce uncertainty and risk for consumers when selecting products or services. The components of trust include Brand Reputation, Relationship Quality, and Need Fulfillment.

AI Marketing

Song Yuchen and Wang Ying (2024) examined the relationship between artificial intelligence, consumer behavior, consumer experience, and purchase intention in Shenzhen Province, People's Republic of China. They define artificial intelligence in marketing as the utilization of AI technology to enhance marketing strategies and improve customer interactions. This approach involves analyzing consumer data to effectively customize marketing efforts. Its components include insights generation, automated responses, and precise analysis of consumer needs. Their study, which involved 437 participants with experience using artificial intelligence technology, found that AI has a statistically significant positive effect on consumer purchase intention. Specifically, a 1% increase in AI utilization may lead to a 0.125% increase in purchase intention.

Suresh Kotha (2024) describes artificial intelligence in digital marketing as a tool that helps businesses better understand their customers by leveraging internet usage data to learn customer behaviors across various channels, enabling brands to make more accurate marketing decisions. His mixed-methods study on the alignment between traditional marketing and AI application in enhancing customer insights collected qualitative data from 75 organizations across 12 different industries and quantitative data from 127 retail establishments to understand in-depth customer data and marketing strategy adaptation. The findings highlight the importance of preparing for emerging technologies and developing collaborative work models, emphasizing skill development with AI literacy requirements increasing by 178% and strategic agility with predictive accuracy improvements of 234%. The research concludes that future marketing success will depend on organizations' ability to develop sophisticated frameworks that leverage AI capabilities for data collection and analysis.

Ihor Ponomarenko (2024) characterizes artificial intelligence in marketing as a technology that assists in learning customer behavior, enabling brands to better understand and connect with their customers. The implementation of artificial intelligence in digital marketing helps brands analyze big data and predict user behavior, which can significantly influence purchasing decisions by identifying trends and calculating forecasts of key marketing phenomena, thereby allowing for the recommendation of marketing strategies better aligned with consumer needs.

Brendan James Keegan, Denis Dennehy, and Peter Naudé (2022) describe the application of artificial intelligence in marketing as a technology used for customer segmentation, creating sales opportunities by rapidly developing content for target customers, interacting with customers to provide information in response to inquiries to build satisfaction, and accurately predicting future trends based on historical data. Their research on implementing artificial intelligence in traditional B2B marketing practices found that while AI can enhance marketing approaches, results vary due to differences in target customer requirements.

Yuping Liu-Thompkins, Shintaro Okazaki, and Hairong Li (2022) define artificial intelligence in marketing as computer systems capable of performing tasks that typically require human intelligence, including language comprehension, image recognition, decision-making, and learning from user experiences. Their study on understanding marketing focused on customer engagement with artificial intelligence, involving 525 participants from the United States, found that understanding customers to create interactions between customers and brands through AI systems can significantly increase customer trust.

The collective research reveals AI marketing as a sophisticated technological ecosystem that transforms traditional marketing paradigms. Key themes emerging from the literature include AI's capacity for enhanced data analysis, improved customer understanding, personalized engagement strategies, and predictive capabilities. However, successful implementation requires substantial organizational adaptation, including skill development, strategic framework evolution, and careful consideration of contextual factors. The evidence consistently demonstrates AI's positive impact on marketing outcomes, particularly regarding purchase intention and customer trust, while acknowledging implementation challenges and variable effectiveness across different contexts.

Based on the literature review, it can be concluded that AI Marketing refers to the application of artificial intelligence technologies to enhance marketing strategies and improve customer interactions. It involves analyzing consumer data to effectively customize marketing efforts and enable businesses to make more accurate decisions. Research indicates that artificial intelligence has a statistically significant positive impact on consumer purchase intention, with studies showing that even a slight increase in artificial intelligence utilization may lead to measurable improvements in

purchase intention. Furthermore, artificial intelligence systems that effectively understand and engage with customers can significantly increase customer trust, which ultimately enhances the overall effectiveness of marketing strategies. The components of AI Marketing include Insights Generation, Automated Responses, and Precise Analysis of Consumer Needs.

Purchase Intention

Howard (1994), as cited in Nattakrit Rattanahem (2018), defines purchase intention as the consumer planning process that involves the desire to purchase products from any brand within a specific period. It includes preparation and advance planning to buy products from a brand that the consumer has already decided upon. This purchase intention results from attitudes toward the brand and confidence in the brand, which stem from the consumer's evaluation of products or services based on their previous experiences.

Montree Piriyaikul and Arin Na Ranong (2017) state that purchase intention is a planned effort to acquire goods or services. It represents a response to advertising, which may be either positive or negative. Purchase intention indicates the level of intention to purchase goods or services, which marketers can use to predict the extent to which products or services will be purchased. Purchase intention indicators demonstrate graduated levels to represent the degree of intention to buy, which may be measured by time intervals or emotional responses. Purchase intention can be measured through willingness, intention, recommendation, seeking, and trying.

Salwa Qotrunnada and Fitri Aprilianty (2024) define purchase intention as the likelihood that customers will buy a product or service. Customer purchase intention represents a crucial concept in marketing as it enables brands to understand the factors that influence customers' purchasing tendencies. In their investigation of the influence of customer trust on the acceptance of marketing emails and purchase intention for online paid short courses, they discovered that trust significantly affects customer purchase intention. When customers trust a brand, they demonstrate a greater propensity to consider purchasing from that particular brand.

Song Yuchen and Wang Ying (2024) describe purchase intention as the probability that consumers will purchase a product or service, reflecting consumers' readiness to buy based on various influencing factors. These factors may include needs, satisfaction from past experiences, motivation, and technologies that facilitate purchasing convenience. Their research on the relationship between artificial intelligence and purchase intention in Shenzhen Province, People's Republic of China, revealed that artificial intelligence technology significantly influences purchase intention. Furthermore, the study demonstrated that the use of convenient technology also positively affects purchase intention.

Denise Louvet (2023) emphasizes that purchase intention holds critical importance for businesses as it enables brands to plan operations and develop strategies by understanding which customer needs influence purchasing decisions. This knowledge allows businesses to adapt and develop products or services that effectively meet customer demands.

Sri Nastiti Andharini and Novita Ratna Satiti (2022) characterize purchase intention as the likelihood that customers will purchase products or services, reflecting customers' readiness to buy based on various influential factors. Their examination of celebrity influence on purchase intention through the Shopee application, with brand trust as a mediating variable, found that celebrities whom customers follow significantly impact purchase intention. When customers observe celebrities they follow speaking positively about products or services, it generates demand for offerings on the Shopee application.

Jiawang Yin and Xiaodong Qiu (2021) define purchase intention as the probability that consumers will purchase products or services in the future. Factors influencing purchase intention include the perception of brand value derived from addressing consumer inquiries. Their study of artificial intelligence technology and purchase intention in online shopping demonstrated that AI technology in online sales channels positively affects consumer experience by enhancing brand value perception, which serves as a factor in increasing consumer purchase intention through online channels.

The academic literature provides a comprehensive understanding of purchase intention as a fundamental marketing concept that predicts consumer buying behavior. This summary synthesizes contemporary research perspectives on purchase intention, examining its definition, measurement, and relationship with various influencing factors. Purchase intention represents a critical construct in consumer behavior research, defined consistently across studies as the likelihood or probability that consumers will purchase specific products or services. The literature reveals a multi-dimensional understanding of factors influencing purchase intention, including past experiences, brand attitudes, trust levels, technological facilitators, and third-party endorsements. These factors operate interdependently, creating complex pathways to purchase decisions. The measurement of purchase intention typically employs scaled indicators assessing willingness, intention strength, recommendation likelihood, information seeking behaviors, and trial intentions. In conclusion, purchase intention emerges from the literature as a sophisticated predictive construct essential for marketing strategy formulation. The research demonstrates that purchase intention results from complex interactions between consumer psychology, brand relationships, technological interfaces, and external influences. Understanding these dynamics enables organizations to develop more effective marketing strategies and enhance conversion rates through targeted interventions addressing specific influential factors.

Based on the literature review, it can be concluded that purchase intention is the probability or likelihood that consumers will buy a product or service, reflecting consumers' readiness to make a purchase. This concept represents a fundamental metric in marketing research that indicates potential future consumer behavior and purchasing decisions. Purchase intention serves as a predictor of actual purchasing behavior and provides businesses with valuable insights for strategic planning and marketing effectiveness evaluation. The popular variables used in studying purchase intention include Willingness, Intention, Recommendation, Seek, and Try.

Research Methodology

This study employs a literature review to examine the relationship between AI Marketing, brand equity, trust, and purchase intention. Academic databases such as Scopus, Web of Science, and Google Scholar were utilized for searches using keywords such as "AI Marketing," "Brand Equity," "Trust," "Purchase Intention" in conjunction with Boolean operators. From an initial 200 articles, 40 articles were selected based on inclusion criteria (peer-reviewed, in English, and directly relevant to the research objectives). The review emphasizes that AI Marketing and brand equity influence Trust, which subsequently affects purchase intention. The findings present an integrated conceptual framework of these variables, offering insights for branding strategies and digital marketing.

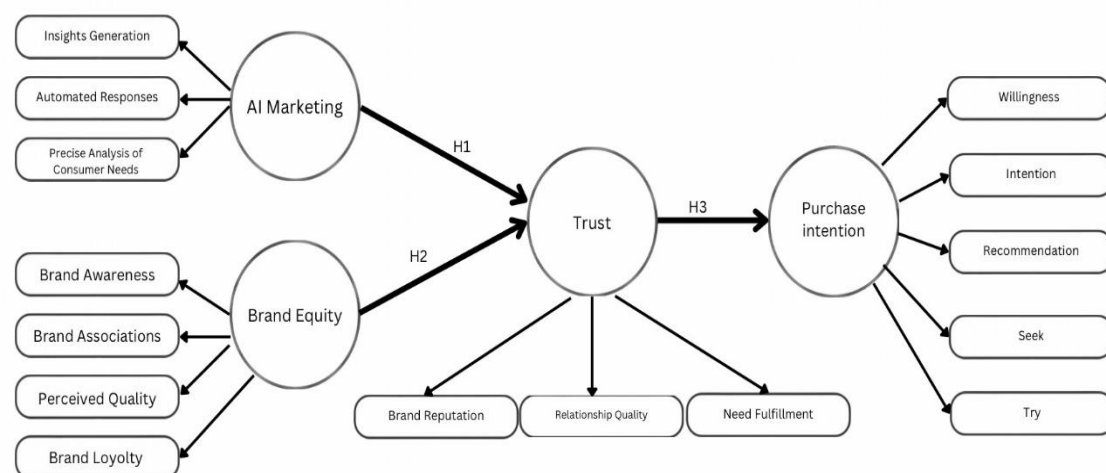


Figure 1: Conceptual Framework

Research Hypotheses

Based on the literature review relationships between variables including AI Marketing, brand equity, trust, and purchase intention. These hypotheses aim to explain how to building trust affecting purchase intention by using digital marketing artificial intelligence.

- H1: AI Marketing has a positive impact on Trust.
- H2: Brand Equity has a positive impact on Trust.
- H3: Trust has a positive impact on Purchase Intention.

Research Findings

From the literature review related to "Building Trust Affecting Purchase Intention using Digital Marketing Artificial Intelligence" conducted through reviewing and researching relationships between variables including AI Marketing, brand equity, trust, and purchase intention from reliable databases such as Scopus, Web of Science, and Google Scholar. The search employed specific keywords to filter and target more accurate information, using essential terms such as "AI Marketing" "Brand Equity" "Trust" and "Purchase Intention." From over 200 articles examined, the researchers selected 40 relevant articles for literature review as the foundation of this research. The review emphasizes that AI Marketing and brand equity, trust, subsequently affect purchase intention. The findings present an integrated conceptual framework of these variables, offering insights for branding strategies and digital marketing. Based on the literature review about brand equity, it can be concluded that brand equity is the value that a brand adds to products or services, resulting from consumer perceptions, experiences, and relationships with that brand. brand equity refers to significant value that contributes to business operations. If a brand lacks equity, it cannot generate value for the business. The components of brand equity comprise brand awareness, brand association, perceived quality, and brand loyalty. Based on the literature review about trust, it can be concluded that trust is the sense of security that customers derive from their interactions with a brand, which depends on customers' perceptions of credibility based on how well the brand meets their expectations. Additionally, Trust serves as a component that helps reduce uncertainty and risk for consumers when selecting products or services. The components of trust include Brand Reputation, Relationship Quality, and Need Fulfillment. Based on the literature review about AI Marketing, it can be concluded that AI Marketing refers to the application of artificial intelligence technologies to enhance marketing strategies and improve customer interactions. It involves analyzing consumer data to effectively customize marketing efforts and enable businesses to make more accurate decisions. Research indicates that artificial intelligence has a statistically significant positive impact on consumer purchase intention, with studies showing that even a slight increase in artificial intelligence utilization may lead to measurable improvements in purchase intention. Furthermore, artificial intelligence systems that effectively understand and engage with customers can significantly increase customer trust, which ultimately enhances the overall effectiveness of marketing strategies. The components of AI Marketing include Insights Generation, Automated Responses, and Precise Analysis of Consumer Needs and the purchase intention literature review, it can be concluded that purchase intention is the probability or likelihood that consumers will buy a product or service, reflecting consumers' readiness to make a purchase. This concept represents a fundamental metric in marketing research that indicates potential future consumer behavior and purchasing decisions. Purchase intention serves as a predictor of actual purchasing behavior and provides businesses with valuable insights for strategic planning and marketing effectiveness evaluation. The popular variables used in studying purchase intention include Willingness, Intention, Recommendation, Seek, and Try.

Conclusion and Discussion

In the present day business environment, where competition has intensified due to economic factors, pandemic crises, and technological advancements, many businesses find it necessary to adapt and incorporate new technologies into their operations. One key business strategy is focusing on building brand value to establish consumer trust, which positively impacts and ultimately leads to

purchase intention. The literature review reveals that popular variables used in studying brand equity include brand awareness, brand association, perceived quality, and brand loyalty. Popular variables used in studying trust include Brand Reputation, Relationship Quality, and Need Fulfillment. Popular variables used in studying Artificial Intelligence include Insights Generation, Automated Responses, and Precise Analysis of Consumer Needs. These variables have been found to contribute to purchase intention. The literature review reveals that popular variables used in studying purchase intention include Willingness, Intention, Recommendation, Seek, and Try.

Based on the researcher's literature review on "Digital Marketing Artificial Intelligence Modeling to Build Trust Affecting Purchase Intention," The search employed specific keywords to filter and target more accurate information, using essential terms such as "AI Marketing" "Brand Equity" "Trust" and "Purchase Intention." From over 200 articles examined, several significant relationships between variables have been identified across multiple studies. The review emphasizes that AI Marketing and brand equity, trust, subsequently affect purchase intention. The findings present an integrated conceptual framework of these variables, offering insights for branding strategies and digital marketing.

Richard Barfi, Li Wen Yuan, Samuel Afryie, Brice Berinyuy Fonjong, and Ran Kwabena Fosu Sarpong (2019), along with Dina Lusianti, Indah Dwi Prasetyaningrum, and Pipit Sundar (2024), have demonstrated that brand equity significantly impacts trust.

Further research by Koller Lane Keller (2001), Denise Louvet (2023), and Duygu Kurt and Adnan Kara (2024) has established the significant effect of brand equity on purchase intention.

The relationship between trust and purchase intention has been confirmed as significant by several researchers, including Richard Barfi et al. (2019), Salwa Qotrunnada and Fitri Aprilianty (2024), and Andharini and Satiti (2022). Additionally, Yuping Liu-Thompkins, Shintaro Okazaki, and Hairong Li (2022) have demonstrated that Artificial Intelligence significantly affects Trust.

The researcher has identified a research gap in the existing literature, noting the absence of studies examining the relationship between brand equity, trust, and purchase intention with artificial intelligence as a moderating variable. Specifically, there is no research demonstrating how artificial intelligence can enhance consumer purchase intention by supporting consumer trust in conjunction with brand equity building, potentially creating positive outcomes that provide businesses with competitive advantages and opportunities for more sustainable growth.

Limitations and Future Research Directions

This conceptual study, based on an extensive literature review examining the relationships between brand equity, trust, purchase intention, and artificial intelligence, has not yet advanced to the empirical research phase. Specifically, this conceptual framework and literature review have not led to the development of questionnaire instruments, nor has any survey or data collection been conducted. Consequently, the conceptual model titled "Digital Marketing Artificial Intelligence Modeling to Build Trust Affecting Purchase Intention" has not been tested using quantitative methods to determine relationships between variables.

The literature review has merely illuminated potential relationships between variables that may guide future research endeavors. Should this conceptual model be subjected to quantitative research methodologies to investigate variable relationships, it could reveal factual insights or statistically significant correlations between variables. Such analysis would identify which variables are most significant and could be leveraged for business analysis, strategy refinement, and enhancement of competitive capabilities for businesses in the future.

Future research should prioritize the operationalization of the proposed conceptual framework, the development of valid and reliable survey instruments, and the execution of empirical studies to test hypothesized relationships between variables. Additionally, researchers should consider expanding the scope of investigation to more specific business sectors to determine whether different product categories significantly alter the relationships between variables. Such targeted research would reveal whether the framework's applicability varies across diverse business contexts and product offerings, potentially uncovering industry-specific patterns of statistical significance.

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The Impacts of Goodwill on Earnings Management

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Abstract

This study investigates the relationship between goodwill and earnings management among firms listed on the Stock Exchange of Thailand during the period 2021 to 2023. Using multiple linear regression with a fixed effects model, the analysis was based on financial data obtained from annual reports and Refinitiv Eikon. Earnings management was proxied by discretionary accruals, estimated using the Modified Jones Model (1995). Control variables included firm size, debt-to-equity ratio, Big4 audit firm, and executive and board compensation. The empirical results revealed a statistically significant negative relationship between goodwill and earnings management at the 10% level, indicating that firms with higher goodwill tended to engage less in earnings management via discretionary accruals. This finding was consistent with stewardship. By refraining earnings management, managers act as responsible stewards of the firm's resources and behave in the best interests of shareholders. The result also supported the signal theory. This means that firms with higher goodwill signal financial transparency and future stability by avoiding earnings manipulation, thereby enhancing investor confidence and reputation. Besides, executive and board compensation was negatively associated with earnings management. This suggested that firms with greater compensation packages were less likely to manipulate earnings. In contrast, firm size and the debt-to-equity ratio exhibited a positive relationship with earnings management. This implied that larger or higher leverage firms were more likely to engage in earnings management, potentially due to increased pressure to meet market expectations, concerns over declining investor confidence in their debt covenants, and the need to present improved financial performance.

Keywords: Goodwill, Earnings Management, Stock Exchange of Thailand

Introduction

Goodwill is an intangible asset that arises when the purchase price of a business combination exceeds the fair value of the acquired company's identifiable net assets. Under financial reporting standards, this excess is recognized as goodwill and recorded as a non-current asset in the consolidated financial statements under TFRS 3 for Business Combination (The Federation of Accounting Professions, 2023a). The recognition of goodwill reflects the acquiring firm's expectations of future economic benefits, including synergies, brand reputation, or access to proprietary knowledge.

In today's digital and innovation-driven economy, goodwill has become increasingly important, especially in sectors where intangible resources are critical to competitiveness. However, goodwill is inherently subject to significant managerial discretion—both in its initial recognition and in subsequent impairment testing, as required annually under TAS 36 for Impairment of Assets (The Federation of Accounting Professions, 2023b). This discretion may allow room for earnings management, especially in contexts with weak external monitoring.

Earnings management through goodwill can take several forms. For instance, managers may strategically time acquisitions or delay recognizing goodwill impairment losses to smooth earnings or meet performance benchmarks. This behavior is particularly concerning in environments with information asymmetry between management and external stakeholders. Supporting this concern, Kimouche (2022) found that in the United Kingdom, goodwill recognition was significantly associated with earnings management.

Despite its increasing importance, empirical research on the role of goodwill in earnings management remains limited, especially in emerging markets like Thailand. While previous studies have primarily focused on the effects of goodwill on financial ratios and stock prices, little attention has been paid to its potential as a discretionary accounting item that may influence managerial behavior. This study, therefore, aims to examine the relationship between goodwill and earnings management among publicly listed firms in Thailand during 2021 to 2023.

This study is the first to examine the relationship between goodwill and earnings management among companies listed on the Stock Exchange of Thailand, using the Modified Jones Model (1995). The study covers a three-year period from 2021 to 2023 and includes a total of 1,250 dataset from 422 companies. The analysis employs panel data regression using the Fixed Effects Model to control for unobserved firm-specific heterogeneity over time. In addition, the model incorporates control variables known to influence earnings management, including total assets (as a proxy for firm size), the debt-to-equity ratio (as a measure of financial leverage), Big 4 audit firm involvement (as a proxy for audit quality), and executive and board compensation (which may reflect managerial incentives).

The findings contributed to the growing body of literature on financial reporting quality and provided insights for regulators, auditors, and investors concerned with the credibility of acquisition-related accounting. Especially In the context of Thailand, which characterized by diverse levels of corporate governance and investor protection, the finding insights are particularly valuable. They highlight whether the need for enhanced monitoring of goodwill recognition practices is crucial. Also, the findings can be evidence for the development of more robust accounting standards and enforcement mechanisms to improve transparency and strengthen investor confidence.

Research Objectives

To investigate the relationship between goodwill and earnings management among companies listed on the Stock Exchange of Thailand.

Literature Review

The relationship between goodwill and earnings management can be explained by multiple theories including agency theory, positive accounting theory, stewardship theory and signal theory. These theories offer distinct perspectives on managerial behavior, incentives, and financial reporting.

Agency theory addresses the conflict of interest between principals—such as shareholders who seek to maximize profits—and agents, who are the managers responsible for operating the business (Jensen & Meckling, 1976). This conflict arises because managers may act in their own interests rather than in the best interests of the principals. Wu and Lai (2020) examined the relationship between goodwill intensity and share price crash risk among publicly listed firms in the United States during the period 1983–2017. Their findings indicated that firms with high levels of goodwill were associated with a greater risk of share price crashes. Furthermore, goodwill contributed significantly to this risk by increasing information asymmetry between firms and market participants.

Positive accounting theory (PAT) offers a framework for understanding the economic motivations behind managerial choices of accounting policies. PAT suggests that managers are rational agents who select accounting methods that best serve their interests under specific contractual and regulatory constraints. Managers may inflate earnings to boost compensation and avoid debt violations or understate them to reduce political scrutiny and public criticism (Watts & Zimmerman, 1986). A study by Pansit (2019) found that goodwill arising from business combinations among SET100 listed companies was associated with higher post-merger earnings levels, which reflected short-term earnings management behavior. Additionally, Kimouche (2022) examined goodwill recognition in relation to earnings management in firms from the United Kingdom and found that managers exercised discretion in goodwill accounting to align reported performance with desired targets.

Stewardship theory views managers as trustworthy agents who prioritize organizational success over personal gain (Donaldson & Davis, 1991), while signaling theory explains how managers convey firm quality to less-informed investors to build trust (Spence, 1973). Together, these

theories suggest that managers are less likely to engage in opportunistic earnings management through goodwill, instead of using financial reporting to signal credibility, transparency, and long-term value.

In contrast, agency theory and positive accounting theory provide a different perspective. In contrast, agency theory and positive accounting theory provide a different perspective. These frameworks highlight how managerial incentives, contractual arrangements, and information asymmetry can lead to opportunistic behavior. Given that goodwill valuation involves substantial managerial discretion, it may be strategically manipulated to influence reported earnings. Therefore, a positive relationship between goodwill and earnings management may emerge, consistent with the view that managers exploit accounting flexibility for personal or firm-level benefits.

According to the above competing theoretical frameworks and prior research highlight the dual role of goodwill in financial reporting. The observed directions can offer insights into the underlying managerial motives, either as agents seeking private gain or as stewards signaling long-term corporate value. This study provided the hypothesis as follows:

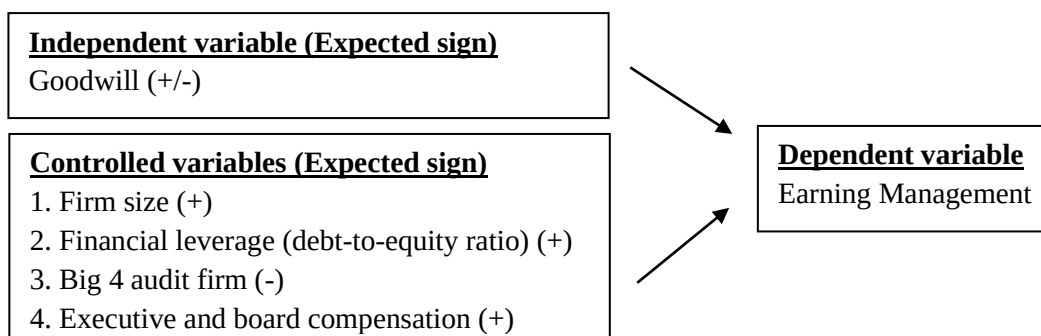
H₁: Goodwill is significantly associated with earnings management.

This study also controlled firm size, financial leverage (debt-to-equity ratio), Big 4 audit firm, and executive and board compensation to isolate the effect of goodwill on earnings management. Several studies have shown that firm size affected earnings management. For example, Abbadi and Balqa' Applied University (2021) found a significant negative relationship between firm size and discretionary accruals, possibly due to stronger internal controls and higher audit quality in large firms in Jordan. In contrast, Ali, Noor, Khurshid, and Mahmood (2015) reported a significant positive relationship in Pakistan's textile industry, suggesting large firms may manipulate earnings to attract investors and maintain their image.

Indrati and Magfiroh (2023) investigated the influence of the debt-to-equity ratio on earnings management in non-financial companies listed on the Indonesia Stock Exchange during 2019–2020. Their findings revealed a significant positive relationship, suggesting that firms with higher leverage are more likely to engage in earnings management to maintain investor confidence. High Debt to Equity Ratio (DER) increases pressure on managers to meet financial covenants or appear financially stable to lenders and investors, avoid violating debt agreements or to present a better financial position (Maharani & Prastiwi, 2023).

Kunsrison (2021) found that firms audited by Big 4 accounting firms tend to report lower levels of abnormal discretionary expenses, reflecting the higher audit quality typically associated with these firms due to their strong reputation and professional expertise. For executive and board compensation, Dias, De Sousa Paiva, and Carvalho (2024) examined how board remuneration structures influence earnings management in Portuguese listed companies. Their study revealed that fixed remuneration compensations reduced managerial incentives to manipulate earnings. Conversely, performance-based pay may encourage executive and board to engage in earnings manipulation for personal gain.

Research Framework is presented as follow:



Research Methodology

Sample Selection and Data collection

This study utilized data from companies listed on the Stock Exchange of Thailand (SET), covering the period from 2021 to 2023. The initial sample comprised 700 listed companies. Firms were excluded based on specific criteria to ensure data completeness and relevance as below table. After applying these filters, the final sample consisted of 422 listed companies of 1,250 dataset.

Table 1: Sample Exclusion Criteria

Sample	Year		
	2021	2022	2023
Number of Initial companies	678	681	700
Exclude:			
Companies in the financial industry	(71)	(71)	(71)
Companies in the real estate mutual fund and real estate investment trusts	(67)	(67)	(67)
Companies that are subject to potential delisting and required to implement a rehabilitation plan	(8)	(8)	(8)
Companies with fiscal years that do not end on December 31st and companies with incomplete data	(29)	(29)	(29)
Total number of samples used in the study	503	506	525
Deduct: Companies with incomplete information	(97)	(84)	(103)
The remaining sample size used in the study	406	422	422

The data employed in this study are secondary data from several sources. Goodwill and financial data were directly collected from the Refinitiv Eikon database. Refinitiv is a leading provider of financial market data and infrastructure, widely used in academic and professional research. Big 4 audit firms and executive and board compensation were collected from one report. The table below shows how to measure all variables.

Table 2: Variables Measurement

Variables	Variable Measurement
Dependent Variable	
EM*	The absolute value of the discretionary accruals (DAC) based on the model of Modified Jones Model (1995).
Independent Variable	
Goodwill	Goodwill divided by total assets.
Control Variables	
Lg_SIZE	The natural logarithm of total assets.
LEV	Total debt to total assets.
BIG4	Dummy Variable (1=Big4, 0=Non Big4).
COMP	Executive and board compensation.

*EM was calculated based on the Modified Jones Model (Dechow, Sloan, & Sweeney, 1995). First, total accruals (TAC) were calculated by subtracting cash flow from operations (CFO) from net income (NI). Second, the coefficients of a linear regression model were estimated to calculate non-discretionary accruals (NDA). Then, the estimated coefficients (α_1 , α_2 , α_3) were used to calculate NDA for each firm. Finally, discretionary accruals (DAC) were obtained by subtracting NDA from TAC, using the absolute values. The equations are as follows: 1) $TAC_{i,t} = NI_{i,t} - CFO_{i,t}$

$$2) NDA_{i,t} = \alpha_1 \left(\frac{1}{A_{i,t-1}} \right) + \alpha_2 \left(\frac{\Delta Rev_{i,t} - \Delta Rec_{i,t}}{A_{i,t-1}} \right) + \alpha_3 \left(\frac{PPE_{i,t}}{A_{i,t-1}} \right) + e_{i,t} \quad 3) DAC_{i,t} = TAC_{i,t} - NDA_{i,t}$$

Where $TAC_{i,t}$ is total Accruals of firm i in year t ; $NI_{i,t}$ is the net income of firm i in year t ; $CFO_{i,t}$ is the cash flows from operating activities of firm i in year t ; $A_{i,t-1}$ is the total assets of firm i in year $t-1$; $\Delta Rev_{i,t}$ is the change in revenue of firm i in year t , calculated as the difference between revenue in year t and revenue in year $t-1$; $\Delta Rec_{i,t}$ is the change in net receivables of firm i in year t , calculated as the difference between net receivables in year t and net receivables in year $t-1$; $PPE_{i,t}$ is the gross property, plant, and equipment of firm i in year t (before depreciation); α_{1-3} are coefficients of the linear regression model; $e_{i,t}$ is the error term of firm i in year t ; $NDA_{i,t}$ is the non-discretionary accruals of firm i in year t ; $DAC_{i,t}$ is the discretionary accruals of firm i in year t .

Model specification

This study employed unbalanced panel datasets to investigate the relationship between goodwill and earnings management among SET-listed companies over the period 2021 to 2023. Firm size, firm leverage, BIG4, and executive and board compensation were four control variables. Additionally, this research incorporated both firm fixed effects and year fixed effects to control for time-invariant unobserved heterogeneity across firms and macroeconomic or regulatory changes over time.

The reason to utilize fixed effect model in this study was that there were correlations between firm characteristics and the regressors. The fixed effects model controls unobserved firm-level characteristics that are constant over time, thereby eliminating the influence of these fixed components and producing more reliable and consistent estimates. In contrast, the pooled ordinary least squares (OLS) model assumes homogeneity across all firms and treats the data as a simple cross-sectional regression, ignoring the panel structure. As a result, it fails to account for unobserved heterogeneity, which can lead to omitted variable bias if firm-specific characteristics are correlated with the explanatory variables. The random effects model, while accommodating unobserved effects, assumes that these effects are uncorrelated with the independent variables—a condition that, if violated, renders the estimates biased and inconsistent (Wooldridge, 2016). In sum, this study adopted multiple regression with fixed effects and conducted the analysis by using STATA statistical software to ensure accuracy and efficiency. The regression model with fixed effect was specified as follows:

$$EM_{it} = \beta_0 + \beta_1 GW_{it} + \beta_2 \text{Lg\_SIZE}_{it} + \beta_3 \text{LEV}_{it} + \beta_4 \text{BIG4}_{it} + \beta_5 \text{COMP}_{it} + \alpha_i + \delta_t + \varepsilon_{it}$$

Where: EM_{it}	= Earnings management of firm i in year t
GW_{it}	= Goodwill scaled by total assets of firm i in year t
Lg_SIZE_{it}	= Log of firm size (log of total assets) of firm i in year t
LEV_{it}	= Financial leverage (debt-to-equity ratio) of firm i in year t
BIG4_{it}	= Dummy variable for Big 4 auditor of firm i in year t
COMP_{it}	= Executive and board compensation of firm i in year t
α_i	= Firm fixed effects
δ_t	= Year fixed effects
ε_{it}	= Error term

Research Findings

Descriptive statistics, correlation matrices, and regression results are reported and interpreted sequentially to provide a comprehensive understanding of the data patterns and the statistical significance of the tested hypothesis.

Table 3 presents the descriptive statistics of all variables used in the analysis, based on a sample of 1,250 observations. Earnings management (EM), measured by the absolute value of discretionary accruals, exhibited a mean of 0.16 and a standard deviation of 0.35, with values ranging from 0.00 to 8.25. The relatively low means suggested that, on average, sample firms engaged in modest levels of earnings management. However, the high standard deviation relative to the mean, along with a maximum value significantly higher than the average, indicated the presence of substantial variability in EM behavior across firms and potentially extreme earnings manipulation in a few firms.

Goodwill (GW), measured as the ratio of goodwill to total assets, had a mean of 0.02 and a standard deviation of 0.06, with observed values ranging from 0.00 to 0.72. The low mean indicated

that, on average, goodwill represented only 2% of total assets among the sampled firms, suggesting that most firms recognize relatively small amounts of goodwill. Notably, Techlead NPN Public Company Limited stands out with goodwill ratios of 0.34, 0.72, and 0.71 in the years 2021 to 2023, respectively.

Firm size (SIZE), measured in billion baht, had a mean of 43.19 with a wide standard deviation of 191.56, ranging from 0.22 to 3,460.46 billion baht. The substantial gap between the mean and the maximum indicated that the size distribution was highly positively skewed, likely due to the presence of several large firms in the sample. This study applied logarithmic transformation of SIZE to normalize the distribution and reduce the influence of outliers in multivariate analysis.

Leverage (LEV), calculated as the ratio of total debt to shareholders' equity, had a mean of 1.24 and a standard deviation of 2.43, with values ranging from 0.00 to 71.10. This wide range and relatively high standard deviation suggested that some firms carried an extremely high debt burden. The dummy variable BIG4, indicating whether a firm was audited by a Big 4 audit firm, had a mean of 0.65 (SD = 0.48), suggesting that approximately 65% of the sample firms were audited by Big 4 firms. Finally, executive and board compensation (COMP) had a mean of 111.84 million baht, with values ranging from 1.61 to 28,860 million baht.

Table 3: Descriptive Statistics

Variables	Obs.	Mean	Std. Dev.	Min	Max
EM	1,250	0.1647	0.3514	0.0001	8.2531
GW	1,250	0.0205	0.0630	0.0000	0.7184
SIZE (billion baht)	1,250	43.1883	191.5578	0.2239	3,460.4620
LEV	1,250	1.2361	2.4312	0.0024	71.1000
BIG4	1,250	0.6472	0.4780	0.0000	1.0000
COMP (million baht)	1,250	111.8418	834.1130	1.6120	28,860.0000

Source: own elaboration.

The table below presents the Pearson correlation coefficients among the variables to assess potential multicollinearity issues. The analysis indicated that most correlation coefficients were relatively low, suggesting no serious multicollinearity problem within the dataset. Specifically, none of the correlation coefficients exceeded the commonly accepted threshold of 0.80 for detecting multicollinearity (Cohen, 1988). Therefore, it concluded that there are no excessively high correlations among the independent variables that would raise concerns about multicollinearity in the model. As such, the variables were appropriately used in further regression analysis.

Table 4: Correlation Matrix

	EM	GW	Lg_SIZE	LEV	BIG4	COMP
EM	1.0000					
GW	0.0320	1.0000				
Lg_SIZE	-0.0405**	0.1366**	1.0000			
LEV	-0.0197	0.0371	0.1386**	1.0000		
BIG4	-0.1236**	0.0649*	0.4021**	0.0601*	1.0000	
COMP	-0.0204	0.0576*	0.2178**	0.0109	0.0620*	1.0000

* Correlation significant at 5%, ** Correlation significant at 1%.

Source: own elaboration.

Table 5 presents the results of the fixed effects regression analysis to examine the relationship between goodwill and earnings management by controlling firms' size and leverage, Big4 auditors, and executive and board compensation. Fixed effect model was selected over the pooled OLS and random effect model based on the results of the restricted F-test and the Hausman test. Additionally, results from the Wooldridge test for autocorrelation in panel data indicated the presence of significant autocorrelation ($F = 1,586.80$, $p < .001$). To address this issue, clustered robust standard errors were employed (Wooldridge, 2016). Furthermore, before estimating the fixed effects model, multicollinearity was tested using the Variance Inflation Factor (VIF) calculated from an OLS regression values were

below 10 (Gujarati & Porter, 2009), indicating that multicollinearity was not a concern in this model. The within R-squared value of 0.1133 indicated that the model explained approximately 11.33% of the within-firm variation in earnings management.

According to negative sign, Goodwill (GW) had a negative and significant association with EM ($\beta = -1.56$, $p < 0.10$). These results marginal accepted the above hypothesis by providing evidence that goodwill affects negative earnings management among companies listed on the Stock Exchange of Thailand. This suggested that firms with higher goodwill ratios tended to exhibit lower levels of earnings management. This reflected the fact that firms with higher goodwill tended to engage less in earnings management. This is aligned with Stewardship Theory and Signaling Theory. According to these theories, managers were seen as responsible stewards of the company's resources, emphasizing transparency and accountability in financial reporting. Signaling Theory also suggested that managers used financial disclosures to communicate the firm's long-term value and stability to investors. In other words, large firms tended to recognize goodwill carefully to maintain credibility.

Having a negative sign, executive and board compensation (COMP) also showed a negative and marginally significant relationship with EM ($\beta = -0.12$, $p < 0.10$). This implied that firms with higher executive and board pay tended to have less earnings management. This result supported that well-compensated executive and board had fewer incentives to manipulate earnings.

According to positive sign, firm size (Lg_SIZE) was positively and significantly associated with EM ($\beta = 1.26$, $p < 0.01$), indicating that larger firms were more likely to engage in earnings management. This result aligned with Kimouche (2022), suggesting that larger firms offered more opportunities for discretionary reporting. Also, leverage (LEV) had a positive and significant effect on EM ($\beta \approx 0.00$, $p < 0.05$). This supported the idea that financially leveraged firms had greater pressure to manage earnings, potentially to avoid violating debt covenants.

Table 5: Multiple Regression Analysis (Fixed Effects Model)

Independent Variables	VIF	Coefficient	Robust Std. Err.
GW	1.02	-1.5638*	0.8567
Lg_SIZE	1.28	1.2600***	4.1000
LEV	1.02	0.0045**	0.0021
BIG4	1.19	0.0428	0.0466
COMP	1.05	-0.1158*	0.0623
Adj. R-squared	0.1133		
F-Stat.	7.2000***		
Prob. (F-Stat.)	0.000		

* Significant at 10%, ** Significant at 5%, *** Significant at 1%.

Source: own elaboration.

Conclusion and Discussion

This study aims to examine the relationship between goodwill and earnings management among companies listed on the Stock Exchange of Thailand during the years 2021 to 2023. Earnings management was measured by the Modified Jones Model (1995). In addition to control by firm size, firm leverage, big 4 audit, and executive and board compensation, this study utilized fixed effect model and robust standard errors to account for unobserved heterogeneity across firms and to mitigate issues related to heteroskedasticity, respectively. Furthermore, year fixed effect was included to control for time-specific factors that influenced the dependent variable. This comprehensive approach aimed to enhance the reliability and validity of empirical results.

Also prior to conducting the regression analysis, statistical tests were performed to ensure that the model did not violate key assumptions of linear regression, including normality, multicollinearity, heteroskedasticity, and autocorrelation. This was essential to validate the appropriateness of the model and to ensure the robustness and reliability of the regression estimates. Based on the fixed effect regression, the model reported a within adjusted R-squared of 11.33%. This indicated that goodwill

and the included control variables collectively explained 11.33% of the variation in earnings management within firms over time.

Moreover, the regression results showed that goodwill had a negative and slightly significant relationship with earnings management at the 10% level. This might suggest that firms with higher levels of goodwill tended to engage less in earnings management, which implied that such firms were more likely to maintain accounting transparency. This was consistent with both stewardship theory and signaling theory. According to stewardship theory, managers acted as responsible stewards of the company's assets and prioritize the long-term interests of stakeholders, thereby reducing the incentive to manipulate earnings. Signaling theory also supported this interpretation, as firms with high goodwill used transparent financial reporting as a signal of strong future performance and managerial credibility. However, the result was not aligned with the findings of Kimouche (2022), who found that firms in the United Kingdom employ goodwill recognition for earnings management.

Additionally, firm size and leverage were found to have a positive association with earnings management. This was consistent with the findings of Ali, Noor, Khurshid, and Mahmood (2015), who observed that larger firms in the textile industry tended to manage earnings more frequently to attract investors, and Maharani and Prastiwi (2023), who noted that firms with high debt-to-equity ratios manipulated earnings to avoid violating debt covenants. Conversely, executive and board compensation (COMP) was negatively associated with earnings management, which contrasts with the findings of Dias, De Sousa Paiva, and Carvalho (2024) who reported that performance-based compensation can incentivize executive and board to engage in earnings manipulation.

Considering this, regulators should consider enhancing disclosure requirements related to goodwill to reduce manipulation opportunities. Auditors are encouraged to exercise heightened professional skepticism when assessing goodwill valuations, while investors should closely scrutinize firms with substantial goodwill balances, as these may signal aggressive financial reporting practices.

Suggestions

The study contributed empirical evidence on the relationship between goodwill and earnings management, offering valuable insights into how goodwill influenced the quality of reported earnings. Such findings could benefit a range of stakeholders. The findings of this study offer practical implications for various stakeholders. Investors and financial analysts can use insights on the relationship between goodwill and earnings management to better assess the reliability of reported earnings and make more informed investment decisions. Creditors may also benefit by incorporating the findings into their credit risk assessments, particularly when evaluating firms with significant goodwill balances. Auditors can use this evidence to enhance audit planning and risk assessment procedures, especially in identifying potential areas of earnings manipulation. Regulators may consider these findings when formulating or refining disclosure requirements and accounting standards related to goodwill to improve transparency and financial reporting quality. Lastly, the results can help corporate stakeholders and boards of directors strengthen internal monitoring mechanisms and governance practices to ensure the credibility of financial statements.

Future research

There are several limitations that should be considered. First, the marginal significance level ($p\text{-value} \approx 0.10$), it is important to interpret the findings with caution. Second, the sample was restricted to companies listed on the Stock Exchange of Thailand (SET) between 2021 and 2023. Firms in the financial industry, real estate investment trusts (REITs), infrastructure funds, companies under rehabilitation or facing possible delisting, firms with fiscal year-ends other than December 31, and companies listed on the Market for Alternative Investment (mai) were excluded. Future research could expand the sample scopes by including a longer time period or firms from other segments of the market to enhance generalizability.

Given the marginal significance level, additional variables or interaction effects may need to be considered. Moreover, this research did not address potential outliers. To improve the robustness

and generalizability of the findings, future studies should consider using larger sample sizes or alternative model specifications.

In addition, this study focused on accrual-based earnings management using a specific model. Future studies might consider alternative measures of earnings quality to serve as proxies for earnings management. This included earnings persistence, as proposed by Sloan (1996), and earnings predictability, as outlined by Francis, LaFond, Olsson, and Schipper (2004). Researchers might also apply different accrual-based models such as the Dechow and Dichev (2002) model or the McNichols (2002) model, which rely on different methodologies and components, to validate and compare the results.

Moreover, future research could explore the use of other types of intangible assets, such as software and trademarks, to investigate their relationship with earnings management. Finally, researchers might also consider alternative dependent variables, such as real earnings management, to provide a broader understanding of managerial behavior in financial reporting beyond discretionary accruals.

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Exploring Digital Asset Investment Intentions: An Integrated Framework of the Theory of Planned Behavior, Financial Literacy, and Trust

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Abstract

This study proposes an integrated theoretical framework to examine the determinants of investment intention in financially innovative digital assets, with a primary focus on the Thai context. The framework extends the Theory of Planned Behavior (TPB) by incorporating financial literacy and trust to investigate the roles of attitude toward behavior, subjective norms, perceived behavioral control, financial literacy, and trust in shaping investment intentions. The findings contribute to the advancement of behavioral finance by offering a theoretical model that explains investment intention formation in digital asset ecosystems. The study also provides practical implications for policymaking, investor education, and regulatory development aimed at enhancing market stability and investor confidence in Thailand's digital asset sector.

Keywords: Digital Asset, Investment Intentions, the Theory of Planned Behavior, Financial Literacy, Trust

Introduction

Technological advancements and financial innovation have profoundly transformed the structure and operation of global financial systems. These changes have increased the convenience of financial transactions, broadened the range of investment opportunities, and strengthened asset security. A key outcome of this evolution is the rise of financial digital assets, which are fundamentally supported by blockchain technology. Blockchain facilitates processes such as tokenization, decentralized asset management, and digital currency transactions, thereby revolutionizing the delivery of financial services (Javaid et al., 2022). As Błach (2011) points out, financial innovation encompasses various forms, with the creation of new investment instruments standing out.

In Thailand, the digital asset investment market has experienced rapid expansion in recent years. According to the Securities and Exchange Commission of Thailand (SEC), the number of trading accounts on digital asset exchanges surged from approximately 170,000 in 2020 to over 2.5 million by February 2022, with the majority belonging to individual retail investors (Securities and Exchange Commission, 2022). The Securities and Exchange Commission (2025) further classifies digital assets into two main categories: investment tokens and crypto assets. Crypto assets include cryptocurrencies, which may be pegged to fiat currencies-such as central bank digital currencies (CBDCs)-or remain unpegged, like Bitcoin. This category also includes utility tokens, which serve specific functions within digital platforms, such as facilitating financial services, supporting investment ecosystems, or enabling speculative activities through native and governance tokens.

To address these challenges, this study proposes a theoretically robust framework that integrates the Theory of Planned Behavior (TPB) with the constructs of financial literacy and trust. The TPB model, which encompasses attitude toward behavior, subjective norms, and perceived behavioral control, is enhanced by introducing financial literacy as a cognitive element and trust as a relational component. This comprehensive framework is designed to clarify the factors that shape

investors' intentions to engage in digital asset investment. Although digital asset investment is gaining traction in Thailand, empirical research examining the behavioral determinants of such investment remains scarce. Specifically, there is a lack of studies that integrate financial literacy and trust within a TPB-based model to explain investor behavior in this context. This study addresses this gap by offering a novel conceptual model tailored to the Thai digital finance environment. Moreover, the insights derived from this model can inform policymakers, financial educators, and regulators in developing effective strategies to strengthen investor confidence, promote responsible investment practices, and foster the sustainable growth of Thailand's digital financial ecosystem.

Research objectives

This study aims to investigate the causal variables influencing investment intention in financial innovative digital assets among individual investors in Thailand, focusing on key factors such as attitude toward behavior, subjective norms, perceived behavioral control, financial literacy, and trust. Additionally, the research seeks to develop a comprehensive research framework through a structural equation model that integrates psychological constructs, financial literacy, and trust to explain and predict investor behavior in the emerging digital asset market.

Literature review

The researchers undertook a thorough secondary data collection process by systematically reviewing academic articles, theoretical literature, and empirical studies from international sources. This comprehensive literature review provided a robust foundation for developing the study's conceptual framework, which is principally anchored in the Theory of Planned Behavior (TPB). The framework encompasses the three central constructs of TPB—attitude toward behavior, subjective norms, and perceived behavioral control—while also incorporating financial literacy and trust as supplementary variables to strengthen the model's explanatory capacity. The specific roles and interrelationships of these variables are delineated in detail below.

Theory of Planned Behavior

The Theory of Planned Behavior (TPB) has emerged as a leading framework in behavioral research across diverse academic fields (Shaw and Shiu, 2013). According to TPB, behavioral intention is shaped by three key components: subjective norms, attitude toward the behavior, and perceived behavioral control (Ajzen, 1985). Within the realm of financial research, TPB is frequently utilized to explore and interpret behavioral finance phenomena, particularly in the context of investment intentions. The model has been extensively applied to analyze how individuals form intentions to invest in a wide array of financial assets.

Financial literacy

Financial literacy can be defined as the process of acquiring knowledge and skills to effectively manage personal finances. Access to financial and investment services, supported by higher levels of financial literacy, has been shown to positively impact the macroeconomy by increasing savings rates and reducing crime (World Bank, 2023). Research indicates that individuals with greater financial literacy are more likely to save and invest, which leads to higher participation in financial markets and a lower probability of bankruptcy (Cole et al., 2012). These outcomes contribute to greater economic stability and financial security (Matewos et al., 2016). Given its significance, numerous studies have examined the impact of financial literacy on various financial behaviors, such as investment intention. For example, Akhtar and Das (2017) found a positive and significant effect of financial literacy on investment intention in the Indian stock market, a finding echoed by Herawati and Dewi (2019) in their study, forming the basis for hypothesis H_{1b}. Furthermore, financial literacy influences two key constructs of the theory of planned behavior: attitude toward behavior and perceived behavioral control. Studies such as Syarkani and Tristanto (2022) have demonstrated a positive relationship between financial literacy and attitude toward behavior, forming the basis for hypothesis H_{1a}, in this research. Additionally, Raut (2020) provides evidence that financial literacy positively affects perceived behavioral control, forming the basis for hypothesis H_{1c}.

A synthesis of academic studies and institutional reports shows that financial literacy consists of three core components: financial knowledge, financial behavior, and financial attitude. This framework is widely recognized by scholars and organizations such as Potrich et al. (2020), OECD (2016), and Bank of Thailand (2020). *Financial knowledge* involves understanding key concepts like interest, inflation, and investment risk; *financial behavior* covers actions such as saving and budgeting; and *financial attitude* reflects personal beliefs and values about money management. Together, these elements provide a comprehensive basis for assessing and promoting financial literacy.

Subjective Norms

Subjective norm refers to the perceived social pressure from significant individuals or groups that can shape a person's intentions and actions (Ajzen and Driver, 1992). This concept is grounded in an individual's beliefs about the expectations of key referents and their motivation to adhere to those expectations. Essentially, subjective norms capture the extent to which social influences—such as those from family and friends—affect personal decisions and behaviors (Hapsari, 2021). Recognizing its importance, numerous academic studies have explored the effect of subjective norms on investment intention, including work by Adam and Shauki (2014) and Khan et al. (2022), both of which demonstrate a positive relationship between subjective norms and investment intention, thereby informing the development of hypothesis H_{2b} in this research. Additionally, several studies have applied the full set of constructs from the Theory of Planned Behavior to examine their interrelationships in technology-related contexts. For instance, Liang (2016) and Kumar et al. (2020) established a connection between subjective norms and attitude toward behavior, providing the basis for hypothesis H_{2a} in this study, while Gumasing and Niro (2023) identified a link between subjective norms and perceived behavioral control, which underpins hypothesis H_{2c}.

Drawing from a synthesis of previous research, subjective norms can be understood as comprising three primary components: normative belief, social influence, and social media. This framework is well-supported by academic studies, such as those by Adam and Shauki (2014), Pop et al. (2020), and Misra et al. (2021). *Normative belief* pertains to an individual's perception of the expectations held by their reference group, as well as their motivation to align with those expectations. *Social influence* encompasses the effects that trusted individuals or groups have on personal decision-making. In the contemporary context, *social media* serves as a dynamic platform that amplifies these influences through continuous information exchange and interaction, thereby reinforcing conformity in the digital era.

Trust

Trust is defined as the personal belief that another party will act with honesty and integrity (Bottazzi et al., 2016). The significance of trust is highlighted by Guiso et al. (2009), who found that individuals with higher levels of trust are more likely to invest in stocks and other risky assets. Trust has also been shown to play a crucial role in shaping investment intentions, as evidenced by Maziriri et al. (2019), which forms the basis for hypothesis H_{3b} in this research. Additionally, prior studies such as Amro et al. (2018) have established a positive relationship between trust and attitude toward behavior, providing support for hypothesis H_{3a} in this study.

A review of international literature identifies source credibility, privacy, and security as the key components of trust in the digital era. These dimensions are consistently highlighted in academic research, including studies by Ryu et al. (2018), and Tran and Nguyen (2022). *Source credibility* pertains to the perceived trustworthiness, competence, and goodwill of an individual or institution. *Privacy* refers to an individual's ability to control the disclosure of personal or transactional information. *Security* involves safeguarding personal data from unauthorized access. Together, these three components constitute the core structure of trust and are essential for understanding trust-based decision-making in the digital age.

Perceived Behavioral Control

Perceived behavioral control refers to an individual's evaluation of the ease or difficulty of performing a specific behavior, considering past experiences and the anticipation of potential obstacles (Ajzen, 1991). When individuals believe they possess adequate resources and confidence, their intention to engage in the behavior is strengthened (Ajzen, 1985). Building on this conceptual foundation, perceived behavioral control is commonly studied for its influence on investment intention, as evidenced by Ejigu and Filatie (2020), which forms the basis for hypothesis H_{4b} in this

research. Additionally, other studies have established a connection between perceived behavioral control and attitude, such as the findings of Awn and Azam (2020) which underpin hypothesis H_{4a}.

A synthesis of prior studies identifies three primary components of perceived behavioral control: facilitating conditions, control belief, and self-efficacy. *Facilitating conditions* refer to environmental factors that support behavioral performance (Pilatin and Dilek, 2024), *control belief* involves an individual's perception of factors enabling or obstructing behavior (Adam and Shauki, 2014), and *self-efficacy* pertains to one's confidence in their capability to perform specific actions (Ajzen, 2002).

Attitudes toward Behavior

Ajzen (1988) explains that attitude reflects how positively or negatively a person perceives carrying out a certain behavior. This perception is shaped by both the value and the individual places on the behavior and the satisfaction they expect to gain from it. Typically, the more positive someone's attitude is toward a behavior, the stronger their intention to perform it (Armitage and Conner, 2001). Given its importance and influence, it is clear that attitude toward behavior plays a crucial role in shaping investment intention, as highlighted by Nugraha and Rahadi (2021), which forms the basis for hypothesis H₅ in this research.

A review and synthesis of the relevant literature, this research highlights three key components of attitude toward behavior: behavioral belief, innovativeness, and past behavior. *Behavioral belief* refers to the anticipated outcomes of engaging in a particular behavior (Adam and Shauki, 2014). *Innovativeness* captures an individual's openness to embracing new technologies (Lim and Fakhrorazi, 2020). *Past behavior* encompasses previous experiences that shape and inform future actions (Raut, 2020; Pilatin and Dilek, 2024).

Investment intention

Intention reflects how strongly an individual is prepared to try and how much effort they are willing to invest in carrying out a specific behavior (Ajzen, 1988). It captures a person's motivation, serving as a conscious plan or commitment to engage in a particular action (Conner and Armitage, 1998). In the context of investment behavior, numerous studies-including those by Schmidt (2010) and Raut et al. (2018)-have utilized investment intention as the dependent variable to assess individuals' willingness to invest.

A synthesis of previous research reveals that investment intention consists of three key components: likely to invest, expect to invest, and intend to invest. These components have been widely discussed in the literature, including studies by Arniati (2021) and Gumasing and Niro (2023). "Likely to invest" refers to an individual's inclination to invest after recognizing the potential benefits; "expect to invest" reflects the anticipated decision to invest based on perceived advantages; and "intend to invest" indicates a deliberate and planned decision to invest. These components are consistently identified across studies and are applicable in analyzing investment behavior in diverse financial assets.

Research Methodology

This study adopted a secondary data collection strategy, relying exclusively on conceptual framework analysis grounded in existing literature. The research process entailed an intensive and systematic review of relevant theories, scholarly works, academic journal articles, and empirical studies from both international and domestic contexts. This comprehensive document analysis was conducted to ensure the credibility, depth, and rigor of the study's findings. The primary objective of this approach was to synthesize existing academic knowledge in order to identify key latent variables and their corresponding observed indicators. Emphasis was placed on the logical structuring of concepts to determine the most appropriate constructs relevant to investment intention in innovative digital assets. Additionally, the research examined potential interrelationships among these latent variables to develop a new conceptual framework.

Conceptual framework development

The development of the conceptual framework followed a structured process. Initially, a systematic review of both international and Thai literature was conducted, focusing on digital asset investment, the Theory of Planned Behavior (TPB), financial literacy, and trust. From this review, key

constructs and their observed indicators were identified based on empirical studies. The findings were then synthesized to determine the most relevant variables and to formulate the hypothesized relationships among them. To address the gaps and specific contextual needs revealed by the literature, financial literacy and trust were integrated into the TPB model. Finally, the framework's relevance to the Thai context was validated through an examination of regulatory reports and market data.

Research Findings

While the literature review in the original manuscript was comprehensive, it primarily reported findings. This revision incorporates a more critical perspective by highlighting areas of consensus and divergence. The review also identifies a gap in research addressing the interplay between TPB constructs, financial literacy and trust in shaping investment intentions in emerging digital asset markets. Furthermore, the unique characteristics of the Thai digital asset market—such as rapid retail investor growth, evolving regulatory frameworks, and the prevalence of social media-driven investment communities—create both opportunities and challenges as per mentioned earlier. These contextual factors necessitate a framework that can account for both cognitive (financial literacy) and relational (trust) determinants of behavior.

Conceptual framework

The conceptual framework for this study was established through a thorough and critical examination of both international and Thai literature related to digital asset investment. The development process was anchored in the Theory of Planned Behavior (TPB), widely recognized for its application in behavioral finance research. The literature review confirmed that the core components of TPB—attitude toward behavior, subjective norms, and perceived behavioral control—are consistently associated with investment intentions across various settings. Nevertheless, the review also indicated that, within the realm of digital assets, factors such as financial literacy and trust play a pivotal role in capturing the market's unique characteristics.

The researchers conducted a critical assessment of prior studies to pinpoint research gaps and areas of disagreement. For example, while some research underscores the primary influence of financial literacy on investment intention, other studies stress the importance of trust, especially in sectors marked by rapid technological change and regulatory ambiguity. This analysis led to the integration of financial literacy and trust into the TPB framework, creating a model that more accurately represents the intricacies of digital asset investment in Thailand.

The selection of constructs was guided by their empirical validation in the literature and their specific relevance to the Thai digital asset landscape. Financial literacy was included due to its recognized effect on investment attitudes and behaviors and its significance in Thai policy discussions. Trust was added to address pressing concerns about security, privacy, and credibility in the digital asset sector. The resulting framework demonstrates the direct and indirect relationships among these variables, as substantiated by the literature review and conceptual analysis.

Therefore, this study seeks to examine the relationships among key constructs of the Theory of Planned Behavior—namely, attitude toward behavior, perceived behavioral control, and subjective norms—along with additional factors such as financial literacy and trust, in shaping investment intention. The authors introduce a conceptual framework, depicted in Figure 1, comprising six latent variables: three exogenous (independent) variables—financial literacy, subjective norms, and trust—and three endogenous (dependent) variables—attitude toward behavior, perceived behavioral control, and investment intention. This framework illustrates how financial literacy, subjective norms, and trust act as primary drivers that influence the intermediary variables of attitude toward behavior and perceived behavioral control, which in turn affect the investment intentions of Thai investors.

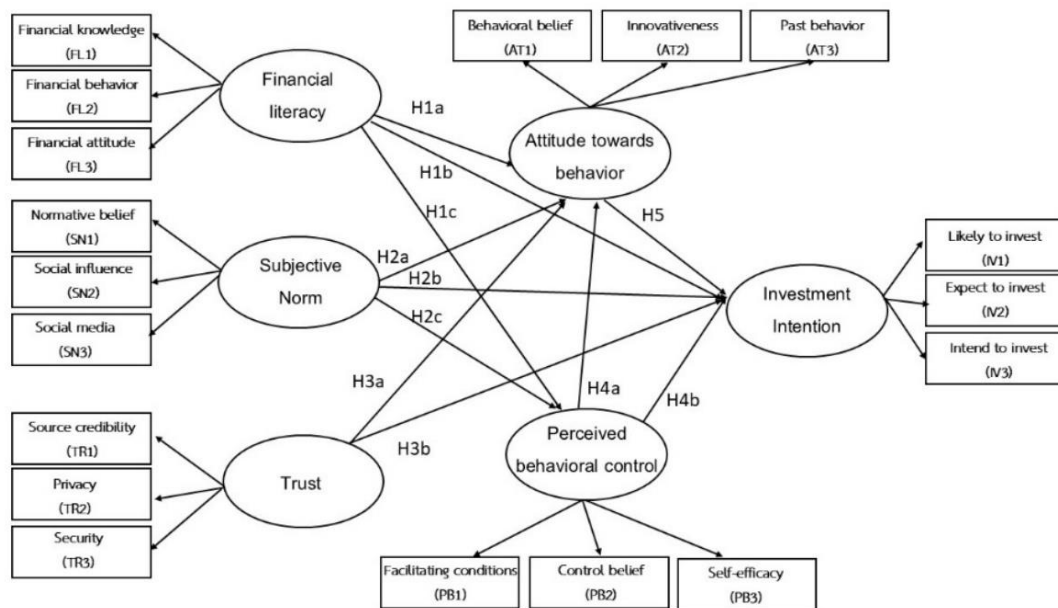


Figure 1: Proposed Conceptual framework

Hypothesis development

Through a comprehensive review of reputable international academic sources, this research identified strong evidence that five key factors significantly influence investment intentions in innovative digital assets. These factors are financial literacy, subjective norms, trust, perceived behavioral control, and attitude toward behavior. The insights obtained from the literature provide a solid foundation for understanding the relationships among these variables. These findings support the development of a conceptual framework and the formulation of hypotheses to examine the impact of each factor on investment intentions in financially innovative digital assets within the Thai context. The research hypotheses are presented in the following section.

Financial literacy plays a crucial role in shaping investment-related intentions. The literature indicates that individuals with higher financial literacy are more likely to develop positive attitudes toward investment behavior (H_{1a}), experience stronger perceived behavioral control over their investment actions (H_{1c}), and ultimately possess greater intention to invest (H_{1b}). These findings highlight the foundational influence of financial knowledge in forming investment attitudes and behaviors.

Subjective norms, or the perceived social pressures and expectations from others, significantly influence individual investment intention. Studies support the idea that subjective norms affect attitudes toward investment behavior (H_{2a}), perceived behavioral control (H_{2c}), and directly impact investment intention (H_{2b}). This suggests that encouragement or approval from peers, family, or society can shape how people think, feel, and act toward investment intentions.

Trust emerges as a pivotal factor in investment intention. It has been found to directly impact both investment intention (H_{3b}) and attitude toward behavior (H_{3a}). When individuals trust the financial system, products, or intermediaries, they are more inclined to develop a favorable attitude toward investing and exhibit a stronger willingness to engage in investment activities.

Perceived behavioral control, or the individual's perception of their ability to perform investment behavior, directly influences their attitude toward that behavior. Research indicates that when investors feel confident and capable of managing investment-related actions, they are more likely to form a positive attitude (H_{4a}), which in turn can promote actual investment intention (H_{4b}).

Attitude toward behavior serves as a critical predictor of investment intention. Literature consistently confirms that when individuals hold favorable evaluations of investment behavior, they are more likely to intend to invest (H₅). This underscores the importance of shaping positive investor attitudes as a strategy for encouraging broader participation in investment markets.

Table 1 presents a summary of the direct relationships among financial literacy, subjective norms, trust, perceived behavioral control, and attitude toward behavior as identified in previous academic studies. These relationships form the basis for developing research hypotheses concerning investment intention.

Table 1: The direct relationship of relevant variables

Hypothesis	Relationship	Reference
1a	Financial literacy → Attitude toward behavior	Grover and Vernekar (2015) Raut (2020)
1b	Financial literacy → Investment intention	Aisa (2022) Hidayati and Destiana (2023)
1c	Financial literacy → Perceived behavioral control	Raut (2020)
2a	Subjective norms → Attitude toward behavior	Liang (2016) Kumar et al. 2020)
2b	Subjective norms → Investment intention	Adam and Shauki (2014) Khan et al. (2022)
2c	Subjective norms → Perceived behavioral control	Gumasing and Niro (2023)
3a	Trust → Attitude toward behavior	Shin (2010) Jafari et al. (2016)
3b	Trust → Investment intention	Maziriri et al. (2019) Lin (2021)
4a	Perceived behavioral control → Attitude toward behavior	Awn and Azam (2020)
4b	Perceived behavioral control → Investment intention	Ejigu and Filatie (2020) Rahadjeng and Fiandari (2020)
5	Attitude toward behavior → Investment intention	Rahadjeng and Fiandari (2020) Nugraha and Rahadi (2021)

Conclusion and Discussion

This study employs a robust, theoretically grounded framework by integrating the Theory of Planned Behavior with key concepts from behavioral finance to explore the relationships among critical constructs influencing investment intentions in innovative digital assets. Six primary variables—financial literacy, trust, attitude toward behavior, subjective norms, perceived behavioral control, and investment intention—are defined based on methodologies validated by prior empirical research. The framework examines both the interrelationships among these variables and their collective impact on Thai investors' intentions to participate in digital asset investment. Additionally, it assesses the predictive strength of each variable, with particular emphasis on the mediating roles of perceptual and social influences in shaping investment intentions. This comprehensive approach offers a nuanced understanding of the behavioral determinants driving investment in emerging financial markets, aligning with established psychological and economic theories, and enriching the literature on digital asset investment.

The findings of this research have significant practical implications for stakeholders in the digital asset market. For policymakers, the framework highlights the importance of advancing financial literacy and building trust, providing a foundation for targeted investor education programs and regulatory initiatives that enhance transparency and security. Financial institutions can leverage these insights to develop user-friendly platforms and trustworthy services that address investor concerns and foster confidence. For individual investors, the framework serves as a practical tool for self-assessment, prompting them to evaluate their financial knowledge and trust in market intermediaries before making investment decisions. Collectively, these implications offer actionable guidance for fostering a stable, informed, and confident digital asset investment environment.

Suggestions

The theoretically grounded findings of this research provide valuable insights into the factors shaping investors' intentions to engage in digital asset investments. This work lays a solid foundation for future empirical studies, meta-analyses, and theoretical developments within the field. By integrating key behavioral and financial constructs, the study not only clarifies the current dynamics of digital asset investment behavior but also presents a conceptual framework that can be adapted to various economic contexts. As such, this research serves as an important resource for academics, policymakers, and industry practitioners, offering a nuanced perspective on investor decision-making in the rapidly evolving digital asset ecosystem. The insights generated here have the potential to inform evidence-based policy development, strategic market planning, and further scholarly exploration.

However, this study has several limitations. Firstly, it is based solely on secondary data and conceptual analysis, without empirical validation through primary data collection, which restricts the generalizability of the findings to the broader population of Thai investors. Secondly, given the fast-paced changes in the digital asset market, regulatory shifts or market disruptions could impact the relevance of certain variables over time. Thirdly, the proposed framework may not fully account for cultural or psychological factors that are unique to specific investor segments within Thailand. These limitations highlight the need for future research to empirically test the proposed framework using surveys or experimental approaches, incorporate longitudinal data to capture market evolution, and consider additional variables such as risk tolerance or digital literacy.

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Investment Intentions in Digital Financial Innovations: An Extended Theory of Planned Behavior Approach with Empirical Evidence from Thailand

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Abstract

The rapid evolution of financial innovation in digital assets has fundamentally transformed global investment paradigms, presenting both unprecedented opportunities and complex challenges for investors and financial institutions. As this emerging asset class gains prominence, understanding investor psychology is increasingly vital for interpreting decision-making in volatile markets. This study investigates the intersection of behavioral finance and digital asset markets by applying the Theory of Planned Behavior (TPB) to examine investment intentions within Thailand's dynamic digital asset sector. By integrating the core TPB constructs—attitudes toward behavior, subjective norms, and perceived behavioral control—with the unique characteristics of digital assets, this research proposes a framework to predict and explain investor intention in this volatile environment. The study utilizes both primary data, collected through self-administered questionnaires, and secondary data from domestic and international sources. Results show that attitudes, subjective norms, and perceived behavioral control all positively influence Thai investors' intentions to invest in digital financial assets. Notably, analysis of 120 mutual fund investors transitioning to digital assets reveals that subjective norms ($\beta = 0.525$) and perceived behavioral control ($\beta = 0.294$) are the most significant predictors, surpassing attitudinal factors. This integration of TPB with Thailand's distinctive digital asset landscape—characterized by strong social influence and ongoing regulatory development—highlights important cultural nuances in investment decision-making. The findings underscore the need for policies that balance social enthusiasm with investor education, offering actionable strategies for Thailand or emerging markets' rapidly digitizing markets.

Keywords: Theory of planned behavior, Attitude towards behavior, Subjective Norms, Perceived Behavioral Control, Investment Intention, Intention to Invest, Digital Assets

Introduction

Technological advancements have driven remarkable progress in the financial sector, with one of the most transformative innovations being the way assets are recorded and traded. These technologies not only have the potential to make financial systems safer, but also to expand the range of tradable asset classes and improve overall market liquidity through features like asset fractionalization (Bank of England, 2024).

In recent years, financial activities involving digital assets have surged, sometimes experiencing exponential growth (Azar et al, 2024). Thailand mirrors this global trend. The Securities and Exchange Commission or SEC (2025) categorizes digital assets into two primary groups: investment tokens and crypto assets. Within the realm of crypto assets, the SEC distinguishes between cryptocurrencies—such as stablecoins, which are tied to the value of another currency like Central Bank Digital Currency (CBDC), and unpegged cryptocurrencies like Bitcoin—and utility tokens. Utility tokens, in particular,

are those designed for use in financial and investment services or for speculative purposes, including native tokens and governance tokens.

According to Thailand's Securities and Exchange Commission (2022), as of May 2022, there were approximately 500,000 active digital asset investor accounts in Thailand, compared to about 600,000 stock market investor accounts during the same period. It is interesting to note that the increasing amount of digital assets investors in Thailand grew rapidly. Digital assets are attracting increasing interest due to several factors: the appeal of decentralized ownership, the prospect of higher short-term returns relative to traditional investments, and the influence of emerging trends in innovative investment products (Bank of Thailand, 2022).

Reflecting this momentum, financial digital assets have become a focal point both globally and domestically. In February 2025, the Thai Cabinet has given an approval of the draft Financial Business Hub Act, which is set to undergo further legislative review. This draft legislation, comprising nine chapters and 96 sections, identifies "Digital Asset" as one of eight targeted business sectors under the new Financial Hub framework (Kasikorn research, 2025). The rapid expansion of Thailand's digital asset market underscores the growing importance of effective policy, regulatory oversight, and strategic planning for digital asset brokerage firms. Consequently, understanding the investment intentions of Thai investors in this evolving landscape is critical for shaping sound supervision, ensuring market stability, and fostering sustainable growth.

Research objectives

This research pursues two primary objectives. First, it seeks to evaluate how Attitude Toward Behavior, Subjective Norms, and Perceived Behavioral Control have an influence on Thai investors' intentions to invest in financially innovative digital assets. Second, it aims to empirically validate the interrelationships among these factors through regression analysis, offering actionable insights that deepen the understanding of investor's investment intention in Thailand's dynamic digital asset landscape. These findings could inform evidence-based policies, market strategies, and academic research in this evolving field.

Literature review

The researchers gathered secondary data by examining academic articles, theoretical literature, scholarly documents, and relevant studies from respected sources both within Thailand and abroad. This comprehensive review of the literature established a strong basis for constructing the study's conceptual framework, which centers on the Theory of Planned Behavior. In particular, the framework integrates the TPB constructs of attitude toward behavior, subjective norms and perceived behavioral control, all of which have been supported by theoretical and empirical research as influential factors in shaping investment intention. The components of this framework are outlined below:

Significances of studying in Investment intention

Investment decisions are inherently voluntary, making the intention to invest a crucial factor in the decision-making process. Understanding investor behavior and the dynamics of the investment sector, therefore, requires a focused examination of investment intentions (Dash et al., 2021). The investigation of intentions-whether among consumers, investors, or other decision-makers-has long been a compelling area of research (Meng and Choi, 2018). Given the complexities inherent in investment decisions, it is essential to identify and analyze the factors that shape investors' intentions.

Defining investment intention begins with the broader concept of behavioral intention, which is recognized as the immediate antecedent of actual behavior (Ajzen, 2002). Behavioral intention reflects an individual's motivation or willingness to engage in a specific action (Yadav and Pathak, 2017). In the context of investment, this means that the stronger an individual's intention to invest, the more likely they are to follow through with the behavior (Xiao et al., 2011). Assessing the strength of this intention provides valuable insights into the likelihood of investment activity.

Theory of Planned Behavior (TPB)

Theory of Planned Behavior (TPB) has emerged as a leading framework in behavioral research across various fields (Shaw and Shiu, 2013). According to TPB, behavioral intention is shaped by three core components: attitude toward the behavior, subjective norms, and perceived behavioral control (Ajzen, 1985). According to Ajzen (1985), three main constructs of TPB were given definition as per following. Attitude toward the behavior reflects an individual's positive or negative evaluation of performing a specific action. Subjective norms capture the perceived social pressure to engage or not engage in the behavior. Perceived behavioral control refers to an individual's assessment of how easy or difficult it is to perform the behavior, influenced by the availability of resources and opportunities.

In financial research, Theory of Planned Behavior is widely utilized to explore and explain behavioral finance phenomena, particularly in understanding investment intentions. TPB has been widely applied to study investment intentions in various financial instruments, such as stocks and mutual funds conducted by Akhtar and Das (2019) and Adil et al. (2022). These studies consistently highlight the significance of TPB constructs-attitude, subjective norms, and perceived behavioral control-in shaping investment intention and decisions within these markets.

Attitude toward behavior

Eagly and Chaiken (1993) define attitude toward behavior similarly to Ajzen (1985), describing it as an individual's psychological and cognitive evaluation that reflects varying degrees of favor or disfavor toward a particular action. Generally, the more positively an individual views a behavior, the greater the perceived social approval and ease of performing that behavior, resulting in a stronger behavioral intention (Ajzen, 1991). Consequently, the positive relationship between attitude and behavioral intention has been consistently hypothesized and supported across multidisciplinary research, including studies in finance. As a central construct in the Theory of Planned Behavior (TPB), attitude has been empirically tested in financial contexts. For example, Nugraha and Rahadi (2021) found that among young investors, attitude toward behavior was the sole significant factor influencing stock investment intention. Similarly, Rahadjeng and Fiandari (2020) demonstrated that attitude toward behavior significantly affects share investment intention in Indonesia. These findings underscore the pivotal role of attitude in shaping investment intentions, aligning with broader evidence that TPB constructs are robust predictors of financial investment intention and even decision-making.

Subjective norms

The second component influencing intention, as outlined in the Theory of Planned Behavior (TPB), is subjective norm, which refers to an individual's perception of social pressure to perform or not perform a particular behavior. Ajzen (1991) explains that subjective norms are based on perceived expectations from significant others, such as family, friends, or colleagues, regarding whether one should engage in the behavior. Fishbein and Ajzen (1975) further elaborate that these norms reflect the perceived expectations of important reference groups and the extent to which an individual feels compelled to comply with these expectations. As a result, people are more likely to intend to act when they believe that significant others approve of the behavior and expect them to do so. Subjective norms can also be influenced by one's association with others, leading to changes in thinking and behavior through social interaction (Raut et al, 2018). Even if an individual has a positive attitude toward a specific investment, conflicting opinions or expectations from friends and family can affect their intention to invest.

Subjective norms, a core component of the Theory of Planned Behavior (TPB), have been widely examined in financial decision-making research. Empirical studies consistently demonstrate that subjective norms-defined as the perceived social pressure to engage or not engage in a behavior-significantly influence investment intentions. For instance, Khan et al. (2022) found that subjective norms play a meaningful role in shaping investment intentions among securities investors in Pakistan, a finding echoed by Adam and Shauki (2014) in the context of socially responsible investment in Malaysia. These results align with broader TPB literature, which highlights the influence of reference groups, such as family, friends, and colleagues, in guiding individuals' financial behaviors and intentions

Perceived behavioral control

A person's likelihood of engaging in a particular activity can be anticipated by evaluating their perceived control over that activity. Perceived behavioral control, therefore, is defined as an individual's evaluation of how easy or difficult it would be to perform the behavior in question, making it the third central construct of the Theory of Planned Behavior (Ajzen, 1991). Xiao (2008) elaborates on this concept, explaining that perceived behavioral control encompasses both the perceived challenges of undertaking the behavior and the influence of past experiences and expected obstacles.

Perceived behavioral control, a fundamental component of the Theory of Planned Behavior (TPB), has been extensively examined in financial research. Empirical evidence supports its significant influence on investment intentions across various contexts. For instance, Ejigu and Filatie (2020) found that perceived behavioral control plays a crucial role in shaping the investment intentions of business college students toward micro and small enterprises (MSEs) in the East Gojjam Zone. Likewise, Rahadjeng and Fiandari (2020) demonstrated that perceived behavioral control has a meaningful impact on share investment intentions among investors in Indonesia. These findings highlight the importance of individuals' confidence in their ability to execute investment intention and decisions within the broader TPB framework.

Application of the Theory of Planned Behavior to Investment Intention

A substantial body of academic research has investigated the factors affecting investment intentions through the lens of the Theory of Planned Behavior (TPB), spanning various asset types and risk levels. Scholars have applied TPB to safer options like corporate bonds, high-volatility assets such as stocks, physical investments like real estate, and collective investment assets including mutual funds. These studies highlight how the TPB components-attitude, subjective norms, and perceived behavioral control-work together with context-specific variables to influence individuals' intentions to invest, as demonstrated in the examples below.

Hapsari (2021) investigated the factors influencing Indonesians' intentions to invest in mutual funds by employing the Theory of Planned Behavior (TPB) framework, with financial literacy added as an extra variable. The research utilized multiple linear regression analysis on data gathered from Indonesian mutual fund investors through a nonprobability sampling approach. The results demonstrated that all TPB constructs-attitude toward the behavior, subjective norms, and perceived behavioral control-had a positive effect on the intention to invest in mutual funds, with attitude toward the behavior identified as the most influential factor.

Kumari et al. (2022) investigated the factors influencing individuals' decisions to invest in the stock market during the COVID-19 pandemic by utilizing an expanded Theory of Planned Behavior (TPB) framework. This approach went beyond the traditional TPB elements-attitude toward behavior, subjective norms, and perceived behavioral control-by also including investment knowledge, emotional stability, risk avoidance, and uncertainty avoidance as additional determinants. The study surveyed 155 current and prospective investors in Sri Lanka and found evidence supporting all the hypothesized relationships. The findings show that attitudes, subjective norms, and perceived behavioral control all play significant roles in shaping Sri Lankan investors' intentions to invest in the stock market during the pandemic, underscoring the importance of both conventional and newly integrated behavioral factors in periods of crisis.

Geetha et al. (2023) analyzed how risk aversion influences investment intentions in India's corporate bond market by combining the Theory of Planned Behavior (TPB) and Prospect Theory. Using Partial Least Squares Structural Equation Modeling (PLS-SEM) to evaluate data from 400 retail investors, the study identified perceived behavioral control as the strongest predictor of investment intention, outpacing the impact of attitudes and subjective norms. While risk aversion, attitudes, and subjective norms also positively affected intentions, their influence was less pronounced compared to perceived behavioral control.

Gumasing and Niro (2023) investigated the factors influencing real estate investment intentions among Filipino millennials and Gen Z by employing an extended Theory of Planned Behavior (TPB) model. While the traditional TPB elements-attitude, subjective norms, and perceived behavioral control-were found to positively affect investment intentions, their influence was surpassed by three additional variables integrated into the framework, including risk tolerance¹⁵⁷⁹. The study, which surveyed 400 Filipinos aged 15 to 42, found that respondents tended to prioritize short-term

profitability over long-term sustainability, reflecting a degree of skepticism regarding transparency in the real estate market

Application of the Theory of Planned Behavior to Investment Intention in Digital asset Context especially in Thailand

Emerging applications of the Theory of Planned Behavior (TPB) in Southeast Asia's digital asset markets reveal a critical imbalance: rapid adoption outpaces context-specific behavioral research. While Vietnam's NFT sector exemplifies explosive growth (48.6% annually in 2022), driven by peer influence and social norms (TechInsight360, 2022), and Indonesian studies identify subjective norms ($\beta = 0.38$) and perceived behavioral control ($\beta = 0.41$) as key cryptocurrency predictors (Nugraha and Prasetyaningtyas, 2023), these remain isolated cases. A systematic review shows no comprehensive TPB framework has yet been applied to digital asset investment intentions in Southeast Asia's unique regulatory and cultural contexts. This study addresses this gap by adapting Ajzen's (1991) globally validated TPB model to Thailand's digital asset context.

Conceptual framework and Hypothesis development

This study aims to explore how the main constructs of the Theory of Planned Behavior-attitude toward behavior, perceived behavioral control, and subjective norms-contribute to the formation of investment intention. The author presents a conceptual framework, shown in Figure 1, which consists of four latent variables: three exogenous (independent) variables-attitude toward behavior, perceived behavioral control, and subjective norms-and one endogenous (dependent) variable, investment intention. This model demonstrates how these key factors serve as primary influences on the investment intentions of Thai investors. The specific research hypotheses are detailed below.

Hypothesis 1 (H1): Attitude toward behavior has a direct influence on investment intention.

Hypothesis 2 (H2): Perceived behavioral control has a direct influence on investment intention.

Hypothesis 3 (H3): Subjective norms has a direct influence on investment intention.

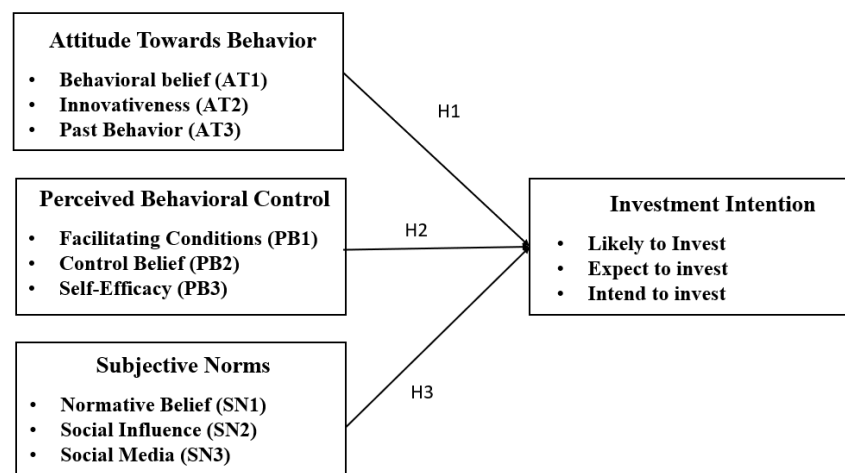


Figure 1: Proposed Conceptual framework

Research Methodology

This study utilized a structured questionnaire as the primary data collection method. The required sample size was determined using G*Power version 3.1.9.4, with parameters set for three predictors, a medium effect size of 0.15, an alpha level of 0.01, and a statistical power of 0.95, corresponding to a 95% confidence level. Based on these criteria, the minimum sample size for multiple linear regression analysis was calculated to be 120 participants. The research focused on various asset classes, particularly mutual fund investors, as mutual funds in Thailand range from low to high risk (Securities and Exchange Commission, 2024), while digital assets represent the highest risk category (Securities and Exchange Commission, n.d.). Purposeful sampling was employed to

select 120 investors with medium to high risk acceptance, reflecting the risk tolerance necessary for digital asset investment and enabling the study to predict investment intention irrespective of risk acceptance level. Data were collected using a five-point Likert scale, where 5 indicated the highest level and 1 the lowest. Questionnaires were distributed to current mutual fund holders through relationship managers at the top five Thai asset management companies. Prior to analysis, responses were thoroughly reviewed for completeness and accuracy. Appropriate statistical tools were then applied to systematically analyze the data, with a specific focus on patterns of investment intention in digital financial assets. This approach enabled the quantification of respondents' perceptions, attitudes, demographic information, investment objectives, and experience, as well as the assessment of variables influencing their intention to invest in digital assets.

In addition, the validity of this research instrument was assessed using the Index of Item-Objective Congruence (IOC) test, conducted by five experts in the field, two of whom hold management-level positions at the Thai SEC. Reliability testing was performed after the questionnaire had been revised based on the IOC review. The revised questionnaire was piloted with a group of 30 individuals who were similar to, but not part of, the main research sample. The responses were analyzed to calculate the alpha coefficient (α) using Cronbach's method. Items with an alpha value of 0.70 or higher are considered to have good reliability (Cronbach, 1990) and are deemed suitable for research data collection. In this study, the overall reliability coefficient of the questionnaire was found to be 0.968. When examined by individual variables, reliability coefficients ranged from 0.879 to 0.934, all of which exceeded the 0.7 threshold. Therefore, the questionnaire is considered highly reliable and appropriate for further data collection.

Table 1: Reliability Analysis

Factor	Reliability
Attitude Towards Behavior	0.916
Subject Norm	0.934
Perceived Behavioral Control	0.879
Investment Intention	0.906
Total	0.968

Research Findings

Primary data were collected from 120 respondents, all of whom are current mutual fund investors with no prior experience in innovative digital asset investments. All participants hold at least a bachelor's degree and are active social media users; 65% of the sample are male. The predominant investment objective among respondents is to achieve high yields and maximize returns, with most having more than three years of investment experience. This study focuses on examining the impact of the Theory of Planned Behavior components on the investment intentions of Thai investors. The subsequent correlation analysis, model summary, and regression results presented below provide empirical evidence supporting the relationships among attitude towards behavior, subjective norm, perceived behavioral control, and investment intention.

Table 2 summarizes the Pearson correlation coefficients among Attitude Toward Behavior, Subject Norm, Perceived Behavioral Control, and Investment Intention, with all relationships significant at the 0.01 level (2-tailed). Attitude Towards Behavior is positively correlated with Subject Norm (0.695), Perceived Behavioral Control (0.675), and Investment Intention (0.727). Subject Norm also shows strong positive correlations with Perceived Behavioral Control (0.732) and Investment Intention (0.820), while Perceived Behavioral Control is correlated with Investment Intention (0.759). All correlations among the independent variables range from 0.675 to 0.732, which is below the 0.80 threshold that indicates multicollinearity, according to Hair et al. (2010). This suggests that multicollinearity is not an issue, supporting the use of multiple regression analysis. The strong, significant correlations with Investment Intention further suggest that these factors are important predictors, and the statistical significance at the 0.01 level confirms the robustness of these relationships.

Table 2: Correlations Analysis

Correlations				
Factors	Attitude Toward Behavior	Subject Norm	Perceived Behavioral Control	Investment Intention
Attitude Towards Behavior	1			
Subject Norm	0.695**	1		
Perceived Behavioral Control	0.675**	0.732**	1	
Investment Intention	0.727**	0.820**	0.759**	1

** . Correlation is significant at the 0.01 level (2-tailed).

Table 3 presents the results of a multiple regression analysis examining the impact of Attitude Toward Behavior, Subjective Norm, and Perceived Behavioral Control on Investment Intention. The model summary indicates that the three independent variables collectively explain approximately 74.9% of the variance in investment intention ($R^2 = 0.749$), with an adjusted R^2 of 0.742. This suggests that the model possesses strong explanatory power and that the predictors are substantial contributors to explain investment behavior in the context of digital asset investment. Additionally, the standard error of the estimate was 0.119, indicating a relatively low level of prediction error. The model was statistically significant at the $p < .01$ level, confirming the overall validity of the regression results.

Table 3: Model Summary

Dependent Variable	R^2	Adjusted R^2	Std. Error of the Estimate	Significant Difference
Investment Intention	0.749	0.742	0.119	$P < 0.01$

Table 4 presents the regression coefficients analyzing the determinants of investment intention in digital financial innovations. The unstandardized coefficients (B) reveal that for each one-unit increase in Attitude Towards Behavior, investment intention increases by 0.262 units ($SE = 0.082$), while Subjective Norms ($B = 0.525$, $SE = 0.083$) and Perceived Behavioral Control ($B = 0.294$, $SE = 0.081$) demonstrate stronger marginal effects. Standardized coefficients (β) further indicate that Subjective Norms ($\beta = 0.473$) exert the most substantial influence, followed by Perceived Behavioral Control ($\beta = 0.265$) and Attitude Towards Behavior ($\beta = 0.219$), suggesting that social influence outweighs individual cognitive factors in shaping investment decisions. All predictors are statistically significant ($p < .01$), with particularly robust effects for Subjective Norms and Perceived Behavioral Control ($p = .000$). These findings underscore the dominance of normative social pressures in Thailand's digital asset market, challenging conventional TPB assumptions that prioritize attitudinal factors in individual decision-making contexts.

Table 4: Regression analysis

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Constant	-0.313	0.243		-1.290	0.200
Attitude Towards Behavior	0.262	0.082	0.219	3.186	0.002**
Subject Norm	0.525	0.083	0.473	6.344	0.000**
Perceived Behavioral Control	0.294	0.081	0.265	3.654	0.000**

** is significant at the 0.01 level.

The linear regression analysis examining factors influencing investment intention in digital assets can be expressed through the following unstandardized coefficients equation:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3$$

where:

Y represents Investment Intention

a denotes the Constant

x₁ indicates Attitude towards Behavior

x₂ signifies Subjective Norm

x₃ represents Perceived Behavioral Control

The regression results demonstrate that investment intention in financial digital assets is significantly influenced by three key psychological factors, as expressed by the equation: Investment Intention = -0.313 + 0.262(Attitude) + 0.525(Subjective Norm) + 0.294(Perceived Control). The analysis reveals that Subjective Norm ($\beta = 0.525$, $p < 0.001$) exerts the strongest positive effect, indicating that social influences dominate investment decisions more than individual attitudes ($\beta = 0.262$, $p < 0.01$) or perceived behavioral control ($\beta = 0.294$, $p < 0.01$). The negative constant term (-0.313) suggests minimal baseline investment intention when all predictors are absent. These findings highlight the crucial role of social norms in Thailand's digital asset market, with important implications for both behavioral finance theory and practical investment promotion strategies.

In summary, the analysis demonstrates that all three independent variables have significant and positive effects on Investment Intention, with Subject Norm exerting the strongest influence. The high R^2 value indicates that the model explains a substantial proportion of the variance in Investment Intention, and the low standard error suggests good predictive accuracy

Conclusion and Discussion

This study is grounded in the Theory of Planned Behavior (TPB), a well-established psychological framework, to systematically examine the key factors influencing investment intentions within Thailand's financial digital asset market. The research focuses on three fundamental TPB components: attitude toward behavior, subjective norms, and perceived behavioral control. These constructs were rigorously tested using primary data collected from market participants. The results of this study align with previous research that has applied the Theory of Planned Behavior to predict investment intentions in other asset classes, such as the findings reported by Rahadjeng and Fiandari (2020) and Hapsari (2021).

The analytical strategy incorporates two complementary approaches. First, it explores the complex interplay between these psychological factors and their combined effect on Thai investors' decision-making processes. Second, it employs advanced regression techniques to precisely measure the individual contribution of each construct in predicting investment intentions.

This innovative integration of behavioral theory and empirical financial analysis makes three significant contributions. It extends our theoretical understanding of investment psychology in financial digital asset markets, particularly in emerging economies. The methodology maintains strong consistency with established economic models while introducing psychological dimensions. Furthermore, it addresses a critical research gap regarding financial digital asset adoption in Southeast Asia particularly Thailand's rapidly transforming financial environment, where such studies remain scarce despite the region's growing importance in global finance.

The study's robust framework ensures both academic rigor and practical relevance, offering valuable insights for researchers, policymakers, and financial practitioners navigating Thailand's evolving investment landscape. Its findings have important implications for developing more effective investor education programs and regulatory approaches tailored to the unique characteristics of financial digital asset markets in emerging economies.

Suggestions

The significant effects of subjective norms ($\beta = 0.525$) and perceived behavioral control ($\beta = 0.294$) on Thai investors' digital asset intentions necessitate targeted strategies across three stakeholder groups. For regulators, implementing authorities monitored investor forums to disseminate vetted insights and mandating real-time social sentiment indices on trading platforms (IOSCO, 2023) could counter social influence risks while aligning with Thailand's collectivist decision-making patterns. Regulatory sandboxes for controlled experimentation with emerging assets may further bolster perceived behavioral control. Digital asset providers should prioritize platform-level innovations such as nudge algorithms highlighting expert analyses over trending signals, alongside gamified risk simulators that enhance competency (Infosys, 2023a)—tools directly addressing the critical role of perceived behavioral control in sustaining participation. For investors, peer benchmarking systems anonymizing successful strategies (Deloitte, 2023) could mitigate social influence biases when combined with transparency mandates on market volatility, creating a feedback loop between investor education and platform accountability (Infosys, 2023b; IOSCO, 2023). These interventions collectively address the behavioral drivers identified in Thailand's digital asset markets while balancing innovation and risk mitigation.

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Driving Customer Satisfaction and Retention through Service Innovation, Quality, and Value: A Conceptual Framework for the Industrial Motor Maintenance Sector

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Abstract

This study aims to review and synthesize existing literature on service innovation, service quality, and customer perceived value, which are key constructs influencing customer satisfaction and the intention to repurchase services. The focus is on Thailand's industrial motor maintenance sector, where customer retention has become increasingly important due to intensifying competition and the growing demand within the industrial sector. Drawing on well-established theories in service marketing and consumer behavior, this study analyzes the mechanisms that link these constructions to repeat service behavior, with particular attention to the mediating role of customer satisfaction and the moderating effect of perceived value. Through this theoretical synthesis, the study proposes an integrated conceptual framework that serves as a foundation for future empirical research. This framework is designed to assist both scholars and practitioners in developing effective strategies to enhance customer retention and sustain a competitive advantage in the industrial service context.

Keywords: Customer Retention, Customer Satisfaction, Service Innovation, Service Quality, Customer Perceived Value, Industrial Motor Maintenance Sector

Introduction

Thailand is in the midst of a significant transformation as it strives to achieve developed nation status and reinforce its position as an industrialized economy. The industrial sector currently accounts for approximately 30.70 percent of Thailand's GDP, underscoring its increasing significance (Office of the National Economic and Social Development Council, 2024). Consequently, supporting industries such as industrial motor maintenance have become essential for sustaining the efficiency and continuity of industrial operations. On a global scale, the motor repair and maintenance industry is recognized as a vital component of industrial support services. In 2023, the sector was valued at \$32.90 billion and is projected to reach \$36.70 billion by 2032, reflecting a compound annual growth rate (CAGR) of 1.20 percent (Research and Markets, 2024). This positive trajectory highlights both the global relevance and future potential of the industry.

Despite its strategic importance, the industrial motor maintenance sector faces persistent challenges in customer retention. As market competition intensifies and customer expectations evolve, traditional service models focused solely on technical repairs have become inadequate. Many existing customer retention frameworks do not fully incorporate the strategic significance of service innovation, service quality, and customer perceived value-factors that are increasingly crucial for differentiating service providers and fostering long-term client relationships, particularly in a sector where service downtime has a direct impact on productivity.

In today's competitive, technology-driven landscape, the industrial motor maintenance sector has evolved well beyond conventional maintenance practices. Achieving customer satisfaction and retention now requires a holistic and proactive approach that integrates innovation, quality, and personalized value. The adoption of digital tools and advanced technologies has further transformed service delivery, enabling firms to provide predictive maintenance, real-time support, and tailored solutions that enhance operational reliability. This study responds to these sector-specific challenges by proposing a conceptual framework that examines the combined effects of service innovation, service quality, and customer perceived value on customer satisfaction and retention. By identifying and synthesizing these strategic elements, the research aims to inform the development of effective customer retention strategies tailored to the industrial maintenance context.

Furthermore, existing customer retention models often focus on generic service attributes or are designed for consumer-facing industries, overlooking the unique operational, technological, and relational complexities inherent in industrial motor maintenance. Notably, previous models seldom address the pivotal role of predictive maintenance technologies or the substantial costs associated with service downtime in industrial settings. This study seeks to bridge these gaps by integrating service innovation and sector-specific value drivers into a customized conceptual framework.

Research Objectives

1. To examine the causal relationships among service innovation, service quality, and customer perceived value influencing customer satisfaction and retention in Thailand's industrial motor maintenance business.
2. To develop and validate a structural equation model demonstrating how service innovation, service quality, and customer perceived value collectively affect customer satisfaction and retention outcomes in Thailand's industrial motor maintenance sector.

Literature review

The researchers conducted secondary data collection, which included academic articles from reliable sources, encompassing various theories, academic documents, and related research. These were obtained from credible academic sources in Thailand and abroad to establish the conceptual framework for the study, as detailed below:

Service Innovation

A company's ability to develop brands tailored to the specific needs of its customers is crucial for maintaining competitiveness and achieving long-term success (Tai et al., 2021). As consumer preferences and awareness shift over time, researchers have emphasized that service innovation is fundamental to excelling in the marketplace by effectively addressing evolving customer needs (Hussain et al., 2023). Moreover, organizations that pursue service innovation tend to realize superior innovation outcomes, with service innovation recognized as vital for delivering enhanced customer value and securing a competitive edge (Shin et al., 2022). Consequently, service innovation plays a pivotal role in driving customer satisfaction, which, in turn, contributes to increased profitability for the firm.

The essence of service innovation lies in integrating and applying new knowledge, technologies, resources, and other elements to modify and enhance products or services. This process enables the successful development of novel offerings that provide consumers with experiences distinct from those of previous products or services (Chen and Chen, 2023). While the theoretical foundations of service innovation are diverse, this research will focus on several key theories. Many studies have explored the significance of interactive and supportive service innovations within this core concept. For instance, Fatima et al., (2021) examined how supportive and interactive service innovations influence customer satisfaction and retention. Similarly, Chaudhary et al., (2025) emphasize that supportive innovations can offer a competitive advantage, whereas interactive innovations are especially effective in boosting customer satisfaction. These findings underscore the importance and central role of service innovation in achieving organizational success.

To gain and maintain a competitive edge in the service industry, it is essential to set key objectives centered on customer satisfaction, establishing a service innovation system that addresses customer needs, and continuously enhancing service performance. This approach is supported by Schmolling and Saraphat (2021), who applied to study within automobile after-sale service center industry. Therefore, the strong link between service innovation and customer satisfaction forms the basis for this research's first hypothesis (H₁).

Service Quality

The service industry represents the largest contribution to national GDP in both developed and developing countries (Tidd and Bessant, 2020). Given its economic significance, service quality has become a central focus of research, with numerous studies exploring ways to enhance service quality and examining its impact on company profitability, customer satisfaction, and customer retention. Service quality and customer satisfaction are critical to business success, as a company's growth often depends on its ability to maintain and satisfy its customer base (Edward and Sahadev, 2011).

A foundational study in this field is that of Parasuraman et al., (1985, 1988), who defined service quality as the gap between customers' expectations of a service provider and their perceptions of the actual service received. They identified five key dimensions of service quality: tangibles, assurance, reliability, responsiveness, and empathy. Meeting customer expectations across these dimensions significantly increases the likelihood of customer satisfaction. High levels of service quality not only fulfill customer expectations but also help differentiate a company's offerings from those of its competitors (Dominic et al, 2010). In addition, numerous academic studies have since confirmed the strong relationship between service quality and customer satisfaction, such as those conducted by Zygiaris et al., (2022). In addition, Zygiaris et al., (2022) have been employing frameworks such as SERVQUAL have confirmed that the five dimensions of service quality-tangibles, reliability, responsiveness, assurance, and empathy-each contribute to customer satisfaction to varying degrees; hence, service quality has an impact on customer satisfaction in auto care industry in Saudi Arabia. This robust correlation underpins the formulation of Hypothesis 2 (H₂), which posits that higher perceived service quality leads to greater customer satisfaction.

Service quality plays a crucial role in after-sales service, a fact supported by extensive research in the field. For example, Tuncer et al., (2020) highlight that rising expectations for after-sales service of tangible products are fueling the growth of the service sector. As the number of businesses increases, customer demands for service have evolved, intensifying competition within the industry and compelling managers to develop innovative strategies to secure sustainable competitive advantage, retain existing customers, and attract new ones. Empirical studies further confirm that high service quality significantly enhances customer satisfaction and perceived value (Cronin et al., 2000 and Parasuraman et al., 1985). Accordingly, this research establishes the relationship between service quality, customer satisfaction, and perceived value as Hypothesis 3 (H₃).

Customer Perceived Value

Customer perceived value refers to a customer's overall assessment of a product's utility, determined by their evaluation of what is received relative to what is given (Zeithaml, 1988). Among the various theoretical frameworks, Woodruff's (1997) customer value hierarchy model stands out as particularly relevant. Woodruff defines customer value as the perceived preference for and evaluation of product attributes, the performance of those attributes, and the resulting consequences-all considered within the context of achieving the customer's specific goals and purposes. This model distinguishes between desired value, which reflects what customers expect prior to purchase, and received value, which represents what they actually experience after consumption. Each level of the hierarchy is linked to different forms of customer satisfaction: attribute-based, consequence-based, and goal-based. Additionally, customer satisfaction is characterized as a positive affective state arising from the evaluation of overall consumption experiences (Cronin et al., 2000).

These findings suggest a clear relationship between customer perceived value, customer satisfaction, and customer retention. Customer perceived value directly influences both satisfaction and the likelihood of customers to be retained to a company. Moreover, since acquiring new customers is typically much more expensive than retaining existing ones, increasing customer retention is a key strategy for enhancing profitability. As a result, businesses are encouraged to focus on improving customer perceived value and satisfaction to foster long-term loyalty. Previous research

has consistently linked customer perceived value and satisfaction to higher levels of customer retention (Sirdeshmukh et al., 2002).

Extensive research has established the interrelationships among customer perceived value, customer satisfaction, and customer retention. Studies such as those by Octavia and Riza (2023) and Edward and Sahadev (2011) have demonstrated that customer perceived value significantly influences both satisfaction and retention, often with satisfaction serving as a mediating factor. Building on this foundation, this paper formulates Hypothesis 4 (H₄) and Hypothesis 5 (H₅) to further investigate these relationships.

Customer Satisfaction

Customer satisfaction is a critical focus for businesses seeking long-term success. While numerous theoretical frameworks address this concept, one of the most influential is Oliver's (1980) Expectancy Disconfirmation Model (EDM). This model posits that customer satisfaction results from comparing pre-purchase expectations with the actual performance experienced after purchase. According to Oliver (1980), when actual performance exceeds expectations (positive disconfirmation), satisfaction increases; when it falls short (negative disconfirmation), dissatisfaction occurs. Importantly, simply meeting expectations leads to moderate satisfaction, but it is the act of surpassing expectations that truly enhances customer satisfaction.

From an academic perspective, customer satisfaction is recognized as a crucial factor that significantly influences a business's long-term viability. Singh and Singh (2016) highlight that it is more cost-effective to retain existing customers than to acquire new ones, emphasizing the importance of focusing on customer satisfaction and retention. Prioritizing these areas not only helps reduce operational costs but also fosters sustainable growth and stability. Numerous studies, such as those by Al-Gharaibah (2020) and Barusman and Rulian (2020), have demonstrated a clear link between customer satisfaction and customer retention. Furthermore, Efendi et al. (2023) found that higher levels of customer satisfaction directly contribute to increased customer retention, reinforcing the value of nurturing positive customer experiences. Therefore, this research will utilize this established relationship as the basis for developing Hypothesis 6 (H₆).

Customer Retention

Customer retention refers to the practice of keeping customers engaged with a business over time. It is a strategic approach that centers on managing customer relationships and sustaining company revenue by preventing customers from switching to competitors or discontinuing their use of the company's products or services. Vesel and Zabkar (2009) found that retaining existing customers is significantly more cost-effective than acquiring new ones. Moreover, customers who maintain long-term relationships with a business are generally more loyal and less sensitive to price changes, making them less likely to switch to competitors. For this reason, customer retention is a critical priority for businesses. Retained customers also frequently contribute to business growth by referring new clients.

Recognizing the importance of customer retention, companies in various industries are increasingly taking proactive measures to manage customer churn. This includes identifying high-risk customer segments and implementing targeted strategies to retain them (Ascarza, 2018). Given its significance, customer retention has become a central focus of research, with many studies examining the relationship between customer satisfaction and retention, such as those by Efendi et al. (2023) and Hussain et al. (2023).

Research Methodology

This study adopted a conceptual framework analysis grounded in a systematic review and synthesis of secondary data sources. Relevant theories, academic literature, and previous studies were thoroughly examined to ensure the depth and reliability of the framework. The literature review, covering the period from 2015 to 2025, was conducted using major academic databases, including Scopus, Web of Science, and Google Scholar. The search focused on key latent variables relevant to the study. Inclusion criteria targeted studies conducted in business-to-business (B2B) service contexts or those offering empirical and theoretical insights related to industrial maintenance services. A thematic analysis was then applied to integrate the findings and construct a structured conceptual framework that aligns with the study's objectives and supports its conclusions.

For the selection of observed variables associated with each latent construct, two main criteria were employed. First, the selection was based on strong theoretical foundations, drawing from established frameworks such as the Service-Dominant Logic (SDL), the SERVQUAL model, Innovation Diffusion Theory (IDT), and Relationship Marketing Theory. Each indicator was required to align with the theoretical definition and scope of the corresponding latent variable. Second, the frequency of use in previous research was considered. Indicators most frequently utilized in peer-reviewed studies were prioritized as primary observed variables, while those used less often were included as secondary indicators. This dual approach ensured that all observed variables were both theoretically grounded and empirically validated.

Variables in the Model

Service Innovation (SI) consists of two observed variables: interactive service Innovation (SI1) and supportive service innovation (SI2).

Service Quality (SQ) consists of five observed variables: reliability (SQ1), assurance (SQ2), responsiveness (SQ3), empathy (SQ4), and tangibles (SQ5).

Perceived Value (PV) consists of three observed variables: perceived innovativeness (PV1), perceived service newness (PV2), and perceived relative advantage (PV3).

Customer Satisfaction (CS) consists of three observed variables: delight (CS1), fulfilling requirement (CS2), and overall satisfaction (CS3).

Customer Retention (CR) consists of three observed variables: word-of-mouth (CR1), repeat purchase (CR2), and preference (CR3).

Research Findings

Conceptual Framework

This study aims to explore the relationship between service innovation, service quality, and customer perceived value, as well as their combined impact on customer satisfaction and retention within the industrial motor maintenance sector. The authors propose a conceptual framework, illustrated in Figure 1, which consists of five latent variables. These include two exogenous (independent) variables—service innovation and service quality and three endogenous (dependent) variables: customer perceived value, customer satisfaction, and customer retention. The framework highlights how key drivers such as service innovation and service quality influence intermediary customer perceived value, ultimately shaping customer satisfaction and fostering long-term retention.

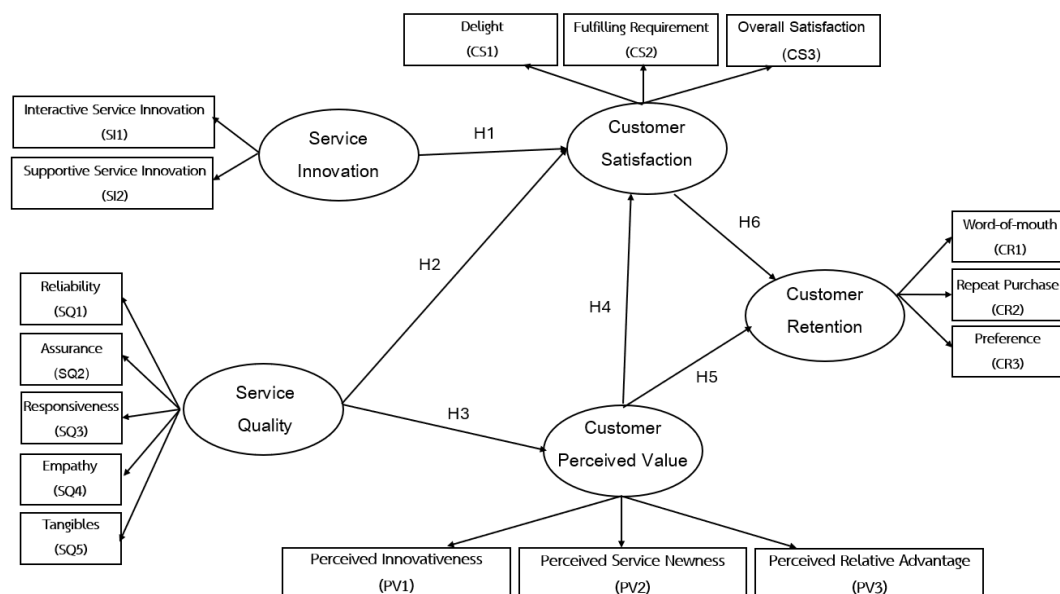


Figure 1: Proposed Conceptual Framework

Figure 1 The proposed framework integrates strategic service innovation with established drivers of satisfaction to provide a more holistic understanding of customer retention in industrial service contexts.

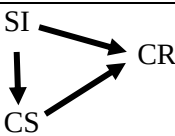
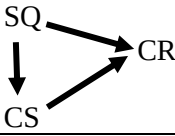
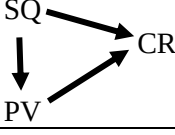
Hypothesis development

Through a comprehensive review of trusted global academic sources, this research identified findings that describe the relationships between service innovation, service quality, and customer perceived value, as well as their combined direct and indirect impact on customer satisfaction and customer retention across various industries as stated in table 1 and table 2. These secondary research insights provide a foundational understanding of these relationships and offer a preliminary basis for assuming similar dynamics within the industrial motor maintenance service industry. Based on the relationships discussed above, the hypotheses for this research are outlined below:

Table 1: The direct relationship of relevant variables

Hypothesis	Relationship	Reference
1	Service Innovation → Customer Satisfaction	Dao and Yang (2014) Rantianti and Halim (2020)
2	Service Quality → Customer Satisfaction	Abdel Fattah et al., (2021) Gulam et al., (2023)
3	Service Quality → Customer Perceived Value	Seesaiprai (2016) Langat et al., (2021)
4	Customer Perceived Value → Customer Satisfaction	Seesaiprai (2016) Rastogi and Kaikini (2023)
5	Customer Perceived Value → Customer Retention	Moenardy et al., (2016) Langat et al., (2021)
6	Customer Satisfaction → Customer Retention	Dao and Yang (2014) Moenardy et al., (2016)

Table 2: The indirect relationship of relevant variables

Variables	Relationship	Reference
Service innovation (SI), customer satisfaction (CS) and customer retention (CR)		Dao and Yang (2014)
Service quality (SQ), customer satisfaction (CS) and customer retention (CR)		Sunukanto and Kisman (2025)
Service quality (SQ), customer perceived value (PV) and customer retention (CR)		Al-Gharaibah (2020)

H1: Service Innovation → Customer Satisfaction

The link between service innovation and customer satisfaction is grounded in dynamic capabilities theory (Teece, 2023), which emphasizes firms' ability to reconfigure resources and innovate services to meet evolving client demands. In the industrial motor maintenance sector, innovations such as predictive diagnostics, remote monitoring, and AI-driven maintenance scheduling directly address critical client pain points (e.g., unplanned downtime, operational inefficiencies). These innovations enhance perceived value by reducing repair costs and minimizing disruptions, thereby elevating satisfaction (Fatima et al., 2021; Shin et al., 2022). For instance, firms leveraging IoT-enabled predictive maintenance report 25–30% higher satisfaction rates due to proactive issue resolution (Deloitte, 2023).

H2: Service Quality → Customer Satisfaction

The link between service quality and customer satisfaction is grounded in the SERVQUAL model (Parasuraman et al., 1988), which emphasizes that satisfaction arises from meeting or exceeding customer expectations across five dimensions: reliability, responsiveness, empathy, assurance, and tangibles. In the industrial motor maintenance sector, reliability (e.g., completing repairs within promised timelines) and empathy (e.g., tailoring solutions to client-specific operational needs) are critical for mitigating risks and fostering trust. For instance, firms achieving >95% on-time service completion report 40% higher satisfaction scores due to minimized operational disruptions (Zygiaris et al., 2022). Proactive communication, such as real-time updates via digital platforms, further reduces client anxiety during service interventions. Empirical studies confirm that SERVQUAL dimensions explain 68% of satisfaction variance in industrial services, with firms prioritizing empathetic engagement (e.g., 24/7 support) seeing 25% higher retention rates (Edward and Sahadev, 2011).

H3: Service Quality → Customer Perceived Value

The relationship between service quality and perceived value is rooted in Value-Based Theory (Zeithaml, 1988), which posits that perceived value emerges when service benefits (e.g., operational uptime) outweigh costs (e.g., maintenance fees). In industrial motor maintenance, tangibles (e.g., IoT-enabled diagnostic tools) signal technological competence, while assurance (e.g., certified technicians and extended warranties) reduces perceived risk, strengthening clients' return-on-investment (ROI) perceptions. For example, a 1-point increase in SERVQUAL scores correlates with a 0.75-point rise in perceived value, as clients associate high-quality service with long-term cost savings (Cronin et al., 2000). Firms excelling in service quality report 30% greater willingness among clients to pay premium fees, underscoring the value-quality nexus (Dominic et al., 2010).

H4: Customer Perceived Value → Customer Satisfaction

The connection between perceived value and satisfaction draws on Equity Theory (Oliver, 1980), which asserts that satisfaction stems from a fair exchange of benefits (e.g., reduced downtime) for costs (e.g., service fees). In this sector, cost efficiency (e.g., predictive maintenance cutting repair costs by 35%) and operational benefits (e.g., remote monitoring minimizing unplanned downtime) directly enhance satisfaction by aligning outcomes with client expectations (Deloitte, 2023). Empirical analysis reveals that perceived value mediates 45% of service quality's impact on satisfaction, with firms delivering "high value" reporting 50% higher satisfaction rates than competitors (Octavia and Riza, 2023; Sirdeshmukh et al., 2002).

H5: Customer Perceived Value → Customer Retention

This relationship is anchored in Customer Value Theory (Woodruff, 1997), which highlights that value-driven relationships foster loyalty. In industrial contexts, switching costs (e.g., dependency on integrated service platforms) and emotional loyalty (e.g., collaborative maintenance planning) strengthen retention by maximizing operational stability. A 10% increase in perceived value correlates with a 12% rise in retention, as clients prioritize long-term partnerships that ensure minimal disruption (Langat et al., 2021).

H6: Customer Satisfaction → Customer Retention

The link between satisfaction and retention is explained by the Expectancy Disconfirmation Model (Oliver, 1980), where exceeding expectations (e.g., resolving issues faster than promised) builds loyalty. In industrial motor maintenance, delight (e.g., 2-hour emergency response times) and proactive engagement (e.g., post-service performance reports) reinforce satisfaction, reducing price sensitivity. Satisfied clients are 5x more likely to renew contracts, with a 1-point increase in satisfaction scores lowering churn risk by 20% (Efendi et al., 2023; Vesel and Zabkar, 2009).

Conclusion and Discussion

The model functions as a strategic resource for service managers, allowing them to pinpoint which innovation strategies most effectively drive customer satisfaction. It also establishes a robust theoretical foundation for researchers seeking to undertake future empirical validation. This study presents a theoretically informed conceptual framework designed to analyze the interrelationships among core variables within the industrial motor maintenance service context. Grounded in established

theories and empirically supported constructs from previous research, the model investigates the strategic roles of service innovation, service quality, and customer perceived value as key antecedents of customer satisfaction and retention. By integrating these constructs within a unified structure, the research aims to elucidate the complex dynamics that influence customer behavior in industrial service settings.

The proposed framework not only builds upon the existing literature but also offers a fresh perspective on the interplay between innovation, service performance, and customer outcomes in the specialized domain of industrial motor maintenance. This theoretical contribution provides a rigorous basis for subsequent empirical studies as well as practical applications in service management and industrial marketing. Future research should seek to validate and refine the model across various industrial service contexts to further enhance its generalizability and practical significance. Recent studies (2022–2025) underscore that service innovation, quality, and value-now increasingly enabled by digital technologies-are essential for achieving customer satisfaction and retention in industrial and B2B sectors. Organizations that embrace AI, predictive analytics, omnichannel digital experiences, and emotional loyalty initiatives are better positioned to retain customers, improve profitability, and maintain a competitive edge in rapidly changing markets.

Suggestions

This study adopts a theoretical framework specifically tailored to the industrial motor maintenance sector. While it establishes conceptual linkages between service innovation, service quality, and customer perceived value as key antecedents of customer satisfaction and retention, the validation of these causal relationships necessitates empirical investigation. Future research should employ primary data collection methods, such as structured questionnaires, followed by rigorous statistical analysis using Structural Equation Modeling (SEM) to empirically test and refine the proposed framework.

Moreover, the current analysis is limited to five core variables: service innovation, service quality, customer perceived value, customer satisfaction, and customer retention. To deepen the understanding of industrial service dynamics, future studies are encouraged to incorporate additional factors such as sustainability practices, perceived pricing strategies, and customer co-creation mechanisms. Integrating these dimensions would yield a more comprehensive perspective on customer behavior and operational effectiveness within the industrial service context, thereby offering valuable insights for both academic inquiry and managerial application.

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Synergizing Service Innovation, Service Quality, and Customer Perceived Value to Enhance Customer Satisfaction in Industrial Motor Maintenance

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Abstract

In the context of digital disruption and intensifying competition within the industrial era, service differentiation has emerged as a strategic imperative for industrial service providers seeking sustainable competitive advantage. This is particularly relevant in Thailand, where the industrial sector contributes approximately one-third of the national GDP and the demand for value-added services in industrial motor maintenance continues to grow (Office of the National Economic and Social Development Council, 2024). However, there remains a gap in empirical research that comprehensively explores the interrelationships among service innovation, service quality, customer perceived value, and customer satisfaction in this specific context. The primary objective of this study is to examine the causal relationships among these four constructs in order to understand their combined effect on customer satisfaction. A quantitative research design was employed using a structured questionnaire administered to 105 customers of industrial motor maintenance service providers throughout Thailand. Data were analyzed using multiple regression analysis to determine the impact of service innovation and service quality on customer perceived value, and how these variables collectively influence customer satisfaction. The results indicate that both service innovation and service quality significantly and positively affect customer perceived value, which in turn has a strong and positive influence on customer satisfaction. These findings support existing theoretical frameworks and offer practical insights for industrial service providers aiming to improve service strategies, enhance customer experiences, and strengthen competitive positioning in the evolving maintenance service market.

Keywords: Service Quality, Service Innovation, Customer Perceived Value, Customer Satisfaction, Industrial Motor Maintenance

Introduction

The industrial motor maintenance sector is essential for maintaining operational continuity and efficiency across manufacturing and production systems in various industries. Industrial motors are critical components of machinery and automation systems, and any malfunction can lead to significant production downtime and financial losses. As a result, the availability of high-quality and reliable motor maintenance services is vital for ensuring business continuity and strengthening operational resilience.

In recent years, the sector has experienced a significant transformation, shifting from traditional, reactive maintenance practices to more proactive and strategic service approaches. This evolution has been largely driven by rising customer expectations and intensified competition, compelling service providers to deliver not only effective repair solutions but also superior customer experiences. Globally, the motor repair and maintenance industry is recognized as a crucial part of

industrial support services. In 2023, the sector was valued at \$32.90 billion and is projected to reach \$36.70 billion by 2032, reflecting a compound annual growth rate (CAGR) of 1.20 percent (Research and Markets, 2024). This positive outlook underscores both the global significance and future potential of the industry.

According to the Department of Business Development's Data Warehouse in Thailand (2024), there are currently 419 registered businesses under the industrial electric motor repair code (33141), with a combined registered capital of approximately 1,518 million baht. In 2023, the sector generated total sales and service revenue of 6,185 million baht, with the top five companies accounting for around 37 percent of the total revenue. These figures underscore the highly competitive nature of the industry and the continual need for service enhancement. Notably, this intense competition places even greater emphasis on customer satisfaction, which has become a critical factor in sustaining profitability and maintaining a strong market position for companies within the sector.

Within this context, service innovation has emerged as a key factor enabling providers to meet the evolving demands of industrial clients. The adoption of advanced technologies such as predictive diagnostics, IoT-enabled monitoring systems, and digital platforms allows service providers to improve efficiency, minimize downtime, and deliver greater value to customers. These innovations are transforming conventional maintenance operations into more value-driven and customer-centric services. At the same time, service quality remains a fundamental determinant of customer satisfaction. Attributes such as technical competency, reliability, responsiveness, and professionalism directly influence how customers perceive the value of services received. When service quality is perceived as high, it enhances customer perceived value, leading to greater satisfaction and stronger loyalty.

This study examines the interrelationships among service innovation, service quality, customer perceived value, and customer satisfaction in the industrial motor maintenance context. The aim is to empirically assess how these constructs influence one another and to provide actionable insights for service providers seeking a competitive advantage. The findings offer practical implications for improving service design and delivery, enhancing customer experience, and sustaining long-term business success in a rapidly evolving industrial landscape.

Research objectives

1. To examine the individual effects of service innovation, service quality, and customer perceived value on customer satisfaction in the industrial motor maintenance sector.
2. To assess the overall relationships among service innovation, service quality, customer perceived value, and customer satisfaction to gain a comprehensive understanding of their interconnections.

Literature review

The researcher gathered secondary data by reviewing scholarly articles from credible sources, theoretical frameworks, academic publications, and related studies from respected institutions in both Thailand and internationally. This process was undertaken to develop the conceptual framework for the research. The specifics are outlined below.

Significance, relevant theoretical frameworks, and the relationship between service innovation and customer satisfaction

The widespread adoption of technology, along with increased connectivity and ongoing innovation, has led to significant shifts in consumer behavior (Garzaro et al., 2020). As a result, competition has intensified across both industrial and service sectors, including the industrial motor maintenance industry. To remain competitive, organizations must prioritize technology and innovation. As Taghizadeh et al. (2017) highlight, innovation is widely recognized as a vital factor for businesses to adapt to evolving market conditions, enhance customer satisfaction, and achieve overall success. Service innovation involves introducing new or significantly improved processes, procedures, or service offerings tailored to the needs of the company or its clients (Biemans and Griffin, 2018). Notably, service innovation encompasses two main constructs: interactive service innovation and supportive service innovation (Salunke et al., 2013; Dao and Yang, 2014; Nwachukwu and Vu, 2022). *Interactive service innovations* are external and relate to the service concept, while *supportive service*

innovations are internal and pertain to service production (Salunke et al, 2013). The relationship between these two forms of innovation is significant for achieving a competitive advantage and increasing customer satisfaction. Previous studies by Dao and Yang (2014) and Nwachukwu and Vu (2022) confirm that supportive innovations contribute to a competitive edge, whereas interactive innovations enhance customer satisfaction. Overall, research consistently demonstrates that service innovation positively impacts customer satisfaction, as evidenced by Dao & Yang (2014), YuSheng and Ibrahim (2019), and Rantianti and Halim (2020)

Significance, relevant theoretical frameworks, and the relationship between service quality and customer satisfaction

Service quality and customer satisfaction are fundamental drivers of business success, as organizational growth often hinges on a company's ability to retain and satisfy its customers (Edward and Sahadev, 2011). Given the critical role of service quality, numerous theoretical frameworks have been developed to explain and measure it. Among these, the SERVQUAL model by Parasuraman et al. (1988) is widely recognized and utilized globally. According to this model, service quality is defined as the gap between customers' expectations and their perceptions of the actual service delivered. SERVQUAL identifies five key constructs: *tangibles*, *reliability*, *responsiveness*, *assurance*, and *empathy*. The first dimension, *tangibles*, refers to the physical elements of service delivery, such as facilities, equipment, and the appearance of staff. *Reliability*, the second dimension, is defined as the organization's ability to consistently deliver promised services accurately and dependably. *Responsiveness*, the third dimension, reflects the willingness and promptness of employees in assisting customers and addressing their needs. The fourth dimension, *assurance*, encompasses the knowledge and courtesy of employees, as well as their ability to instill trust and confidence in customers. Finally, *empathy* involves providing caring and personalized attention to each customer, ensuring their individual needs are understood and addressed.

These five constructs form the basis of the SERVQUAL instrument, which is designed to measure the gap between expected and perceived service quality. Consistently meeting or exceeding customer expectations across these dimensions not only enhances customer satisfaction but also differentiates a company from its competitors Kotler and Keller (2005). Additionally, numerous empirical studies have confirmed the strong positive relationship between service quality and customer satisfaction, including research by Abdel Fattah et al. (2021), Zygiaris et al. (2022), and Gulam et al. (2023). A similar study by Xu et al. (2017) also provides strong evidence supporting the positive relationship between service quality and customer satisfaction.

The relationship between customer perceived value and customer satisfaction

In addition, there are some researches such as Lowe and Alpert (2015) and Nyadzayo et al. (2016) have mentioned about constructs of customer perceived value which are perceived innovativeness, perceived service newness and perceived relative advantage and given their definition. The first construct is perceived innovativeness which defines primarily as the consumer's assessment of how new and improved a product or service is compared to existing alternatives. It is not simply about being new, but about being both newer and better in a way that is meaningful to the consumer. The second construct is perceived service newness which involves customers recognizing a service as new or unique, which can evoke emotional responses such as surprise, excitement, or a sense of change. This dimension focuses on how customers interpret and react to the novelty of a service offering. The last construct is perceived relative advantage that reflects the customer's belief that an innovation delivers superior benefits, which in turn influences their satisfaction and loyalty.

Customer perceived value has been defined by numerous scholars as a subjective and multidimensional evaluation by customers of a product or service's attributes, performance, and the outcomes of its use (Woodruff, 1997; Gounaris et al., 2007). The literature consistently emphasizes that customer perceived value is shaped by individual perceptions and judgments, making it a complex construct influenced by both cognitive and emotional factors (Makore et al., 2022). Recent research, including studies by Lowe and Alpert (2015) and Nyadzayo et al. (2023), has further elaborated on the constructs of customer perceived value, highlighting constructs such as perceived innovativeness, perceived service newness, and perceived relative advantage. *Perceived innovativeness* refers to the extent to which consumers view a product or service as both novel and superior compared to existing alternatives, emphasizing meaningful improvements rather than mere newness. *Perceived service newness* captures the customer's recognition of a service as unique or different,

often eliciting emotional responses like excitement or surprise. *Perceived relative advantage* reflects the belief that an innovation provides significant benefits over current options. Collectively, these constructs illustrate the multifaceted nature of customer perceived value and its critical role in shaping customer satisfaction.

According to the disconfirmation paradigm proposed by Parasuraman et al. (1988), customer satisfaction increases when the perceived value of a service exceeds customer expectations. This framework underscores the positive relationship between customer perceived value and customer satisfaction. Numerous academic studies have investigated and confirmed this association, including research by Seesaiprai (2016) and Rastogi and Kaikini (2023), which demonstrate that higher perceived value leads to greater customer satisfaction.

Conceptualizing customer Satisfaction and Its Underlying Constructs

Customer satisfaction remains a critical focus for businesses, as highlighted in previous discussions and supported by extensive research. One of the earliest and most influential studies on this topic is by Churchill and Surprenant (1982), who conceptualized customer satisfaction as a process that involves comparing pre-purchase expectations with post-purchase evaluations of a product or service's performance. These expectations can be shaped both consciously and subconsciously. This view is echoed by Chu and Lin (2002), who describe customer satisfaction as an individual's emotional response that arises from comparing anticipated product performance with actual experiences after consumption. Similarly, Hoyer and MacInnis (2001) emphasize that satisfaction is closely associated with emotions such as happiness, excitement, relief, and acceptance. Collectively, these perspectives suggest that customer satisfaction is fundamentally the process by which customers interpret and assess their experiences with a product or service. Building on this foundation, the present research synthesizes key constructs of customer satisfaction as outlined by Sevilmis et al. (2022) and Leong et al. (2024), focusing on delight, fulfillment of requirements, and overall satisfaction. *Delight* refers to the emotional response experienced when service performance significantly exceeds expectations or reaches an exceptionally high level, often resulting in feelings of joy and surprise that surpass ordinary satisfaction. The second construct, *fulfilling requirement*, involves the customer's assessment of how well the service meets their needs, is delivered accurately and completely, and whether it is perceived as reasonably priced and satisfactory. Finally, *overall satisfaction* captures the customer's general emotional response after receiving the service, reflecting their comprehensive evaluation of the entire service experience.

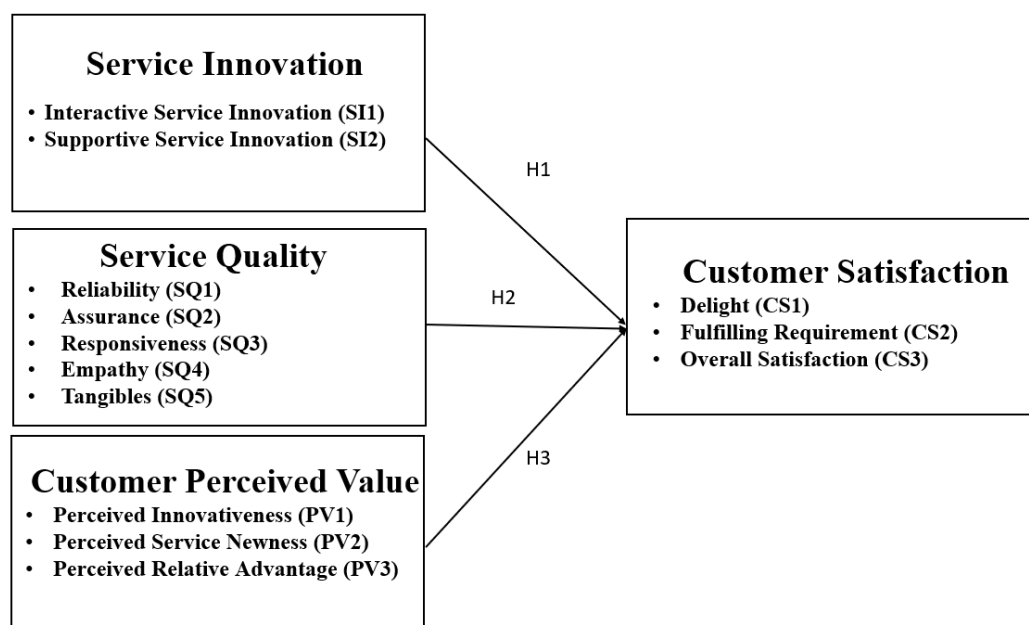


Figure 1: Proposed conceptual Framework

Conceptual Framework and hypothesis development

By conducting an extensive review of reputable global academic sources, this research uncovered findings that illustrate the connections between service innovation, service quality, and customer perceived value, along with their collective influence on customer satisfaction across different industries. These secondary insights establish a foundational understanding of these relationships and serve as an initial framework for hypothesizing comparable dynamics within the industrial motor maintenance service sector. The authors present a conceptual framework, depicted in Figure 1. And the hypotheses formulated for this research are outlined below.

Hypothesis 1 (H_1): Service innovation has a direct influence on customer satisfaction.

Hypothesis 2 (H_2): Service quality has a direct influence on customer satisfaction.

Hypothesis 3 (H_3): Customer perceived value has a direct influence on customer satisfaction.

Research Methodology

The research was conducted in two phases. In Phase One, a comprehensive analysis of secondary data was carried out through an extensive review of relevant theories, academic literature, and previous studies from both domestic and international sources to build a strong conceptual framework. In Phase Two, primary data collection and analysis were undertaken by focusing on a total research population of 4,587 industrial factories located within industrial estates, as reported by the Department of Industrial Works (2025). These factories were selected due to their continuous demand for motor maintenance services resulting from their heavy reliance on high-performance motors in production processes. The target respondents comprised managers, executives, or individuals with decision-making authority in motor maintenance operations within these factories.

In accordance with established statistical guidelines for quantitative research, an *a priori* power analysis was conducted using G*Power 3 (Faul et al., 2007) to determine the appropriate sample size for multiple linear regression analysis involving three predictor variables. The analysis specified an effect size of $f^2 = 0.35$, which is considered medium to large based on Cohen's conventions, with a significance level (α) set at 0.05 and statistical power ($1-\beta$) at 0.90. The results indicated that a sample size of approximately 105 participants would be sufficient to detect statistically significant relationships under these parameters. This sample size meets widely accepted standards for regression analysis and is deemed adequate to support the analytical objectives of the study. In March 2025, self-administered questionnaires were distributed to a targeted sample of 105 participants.

Purposeful sampling was employed to select a sample of 105 respondents, all of whom were managers, executives, or individuals with decision-making authority in motor maintenance operations at factories located within industrial parks in Thailand. Data were collected using a structured questionnaire, with items measured on a five-point Likert scale (where 5 indicated the highest level and 1 the lowest). This methodological approach enabled a systematic and quantitative assessment of respondents' industrial backgrounds, motor maintenance experience and criteria, as well as their perceptions of service quality, innovation, perceived value, and overall satisfaction. The questionnaires were distributed individually to the selected companies operating in industrial parks, with distribution facilitated by a leading motor maintenance service provider in Thailand. The questionnaire was organized into sections covering demographic information, business characteristics, motor maintenance usage and experience, and respondents' perceptions of service quality, innovation, perceived value, and overall satisfaction. This structure was designed to support the study's main objective of examining how service quality, innovation, and perceived value impact customer satisfaction.

In addition, this research ensured both reliability and validity by conducting an Index of Item-Objective Congruence (IOC) assessment with five experts, including academics and top management professionals from the industrial and electrical sectors, such as the Federation of Thai Industries. The questionnaire successfully passed the IOC evaluation, and the validity test results are presented in table 1.

Table 1: Reliability analysis

Factor	Reliability
Service Innovation	0.937
Service Quality	0.930
Customer Perceived Value	0.778
Customer Satisfaction	0.892
Total	0.947

Reliability assessment was conducted on the questionnaire after it had been revised based on the IOC (Index of Item-Objective Congruence) evaluation. To do this, a pilot test was carried out with 30 participants who were similar to, but not included in, the main research sample. The responses were analyzed to determine the alpha coefficient (α) using Cronbach's method. According to Cronbach (1990), items with an alpha value of 0.70 or higher are regarded as having good reliability and are appropriate for research data collection. In this study, the overall reliability coefficient for the questionnaire was 0.947. When analyzed by individual variables, the reliability coefficients ranged from 0.778 to 0.937, all exceeding the 0.7 benchmark. As a result, the questionnaire is deemed reliable and suitable for further data collection.

Research Findings

Based on primary data collected from 105 respondents including managers, executives, and individuals with decision-making authority in motor maintenance operations at factories this study examines the influence of service innovation, service quality, and customer perceived value on customer satisfaction. Among the respondents, 80% are male and 75% are between 41 and 50 years old. All participants hold at least a bachelor's degree and currently occupy managerial positions. From an industrial perspective, the majority are involved in the production sector, regularly engage in both corrective and preventive motor maintenance, and represent businesses with annual volumes exceeding 100 million Thai Baht. The correlation analysis, model summary, and regression results provided below empirically demonstrate the significant relationships among these variables and their collective impact on customer satisfaction.

The results of the correlation analysis (Correlation Analysis) showed that the independent variables had correlation coefficients ranging from 0.300 to 0.596. According to Hair et al. (2010), the correlation between independent variables should not exceed 0.80; if it does, it may indicate the presence of multicollinearity. In this study, the highest observed correlation among the independent variables was 0.596, which is below the 0.80 threshold. Therefore, multicollinearity is not present, and it is appropriate to proceed with multiple regression analysis to test the hypotheses as follows.

Table 2: Correlations analysis

Correlations				
Factors	Service Innovation	Service Quality	Customer Perceived Value	Customer Satisfaction
Service Innovation	1			
Service Quality	.300**	1		
Customer Perceived Value	.596**	.536**	1	
Customer Satisfaction	.496**	.843**	.733**	1

Note: **. Correlation is significant at the 0.01 level (2-tailed).

Table 3 indicates that service innovation, service quality, and customer perceived value collectively exert a statistically significant positive influence on customer satisfaction. Among these factors, service quality has the highest standardized coefficient ($\beta = 0.635$, $p < 0.01$), highlighting it as the most influential predictor of customer satisfaction. This underscores the essential role of delivering high-quality service in fostering customer contentment. The second most significant

contributor is customer perceived value ($\beta = 0.326$, $p < 0.01$), suggesting that when customers perceive greater value in the service, their satisfaction increases notably. Lastly, service innovation also demonstrates a statistically significant but more moderate impact ($\beta = 0.111$, $p < 0.05$), indicating that while innovation contributes to satisfaction, its influence is less pronounced compared to the other two variables.

The regression results demonstrate that service innovation, service quality, and customer perceived value collectively explain a substantial proportion of the variance in Customer Satisfaction, as indicated by the coefficient of determination ($R^2 = 0.830$, $p < .01$). This means that 83.0% of the variation in customer satisfaction can be attributed to these three predictors, reflecting a strong model fit and high explanatory power. Furthermore, the standard error of estimate (0.202) indicates a relatively low level of prediction error, reinforcing the accuracy and reliability of the model. The statistical significance at the 0.01 level confirms that the overall relationship is highly significant and not due to random chance, thereby validating the predictive strength of the model.

Table 3: Model Summary and Regression analysis

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Constant	.436	.180		2.418	.017*
Service Innovation	.081	.037	.111	2.172	.032*
Service Quality	.514	.039	.635	13.051	.000**
Customer Perceived Value	.340	.060	.326	5.645	.000**
$R^2 = 0.830$, Adjusted $R^2 = 0.825$, Std. Error of the Estimate = 0.202, $p < .01$					

Remark: * is significant at the 0.05 level, ** is significant at the 0.01 level,

The linear regression analysis examining factors influencing customer satisfaction in industrial motor maintenance service can be expressed through the following unstandardized coefficients equation:

Raw Score Equation

Using the unstandardized coefficients (B), the raw score equation is:

$$Y = a + b_1x_1 + b_2x_2 + b_3x_3$$

Where: Y = Customer Satisfaction, a = Constant (0.436), x_1 = Service Innovation, x_2 = Service Quality and x_3 = Customer Perceived Value

Substituting the values

$$\text{Customer Satisfaction} = 0.436 + 0.081x_1 + 0.514x_2 + 0.340x_3$$

The regression equation highlights the practical impact of each predictor on customer satisfaction. A 1-unit increase in service innovation results in a 0.081-unit rise in customer satisfaction, reflecting its modest yet statistically meaningful contribution. Service Quality demonstrates a far more substantial influence: a 1-unit improvement in this variable drives a 0.514-unit increase in satisfaction, underscoring its pivotal role in shaping customer experiences. Similarly, customer perceived value shows a strong positive relationship, with a 1-unit enhancement leading to a 0.340-unit boost in satisfaction. These effects, derived from the unstandardized coefficients, illustrate the distinct yet complementary roles of the variables.

Conclusion and Discussion

This study advances the understanding of customer satisfaction in the industrial motor maintenance sector by examining the effects of service innovation, service quality, and customer perceived value. The results demonstrate that all three variables have a statistically significant and positive impact on customer satisfaction. Service quality was identified as the most influential factor, exhibiting the highest standardized coefficient ($\beta = 0.635$, $p < .01$), followed by customer perceived

value ($\beta = 0.326$, $p < .01$), and service innovation ($\beta = 0.111$, $p < .05$). The proposed model accounts for 83.0 percent of the variance in customer satisfaction ($R^2 = 0.830$, $p < .01$), and the low standard error of estimate (0.202) indicates strong predictive accuracy. These findings affirm the validity of the conceptual framework and underscore the critical roles of quality and value in driving customer satisfaction.

The results of this research are consistent with previous studies. For example, Rantianti and Halim (2020) reported a positive relationship between service innovation and customer satisfaction, while Gulam et al. (2023) found a significant positive link between service quality and customer satisfaction. Similarly, Rastogi and Kaikini (2023) identified a positive association between customer perceived value and customer satisfaction. These alignments with prior research further support the robustness of the study's findings.

The results of this study provide significant implications for both academic research and practical application. From a theoretical standpoint, the findings reinforce existing models such as SERVQUAL and the value-satisfaction-loyalty framework. They demonstrate that service quality and customer perceived value are fundamental to understanding customer satisfaction in business-to-business service contexts. Although service innovation is positively associated with satisfaction, its influence is relatively modest, suggesting that it enhances satisfaction when supported by high service quality and perceived value. On the practical side, companies in the industrial motor maintenance sector should focus on improving service quality and ensuring that customers perceive high value in order to strengthen satisfaction and promote retention. This research also lays a foundation for future studies that may investigate potential mediators or moderators such as trust, switching costs, or customer loyalty. Additionally, the model can be tested in different industries or cultural contexts to evaluate its generalizability and further contribute to the service marketing literature.

Suggestions

Based on the findings that service quality, customer perceived value, and service innovation significantly influence customer satisfaction in the industrial motor maintenance sector, several practical implications can be drawn. Service quality emerged as the most influential factor, indicating that organizations should prioritize the consistent delivery of high service standards. This includes ensuring technical accuracy, prompt responses, professional staff conduct, and comprehensive quality checks prior to service completion. Customer perceived value, identified as the second most significant predictor, underscores the importance of delivering services that customers view as commensurate with their investment of cost, time, and effort. To address this, companies should focus on transparent pricing, clear communication of service benefits, and the provision of value-added offerings. Leveraging technology to enhance service processes such as implementing digital repair tracking systems or predictive maintenance notifications can further increase perceived value and customer convenience. Establishing effective feedback channels is also essential, enabling organizations to respond proactively to customer needs and continuously refine their service offerings.

From a policy perspective, management should adopt customer-centric service strategies that integrate both quality and value considerations at every level of service delivery. The development of clear policies emphasizing customer experience and satisfaction can guide both frontline staff and management toward building long-term customer relationships. Investment in research and development to foster service innovation is recommended, particularly through the adoption of emerging technologies that support predictive diagnostics and efficient service workflows. Additionally, organizations should consider establishing dedicated teams or quality assurance units to monitor service performance, address complaints, and identify opportunities for improvement. Strategic partnerships with suppliers, parts manufacturers, and technology providers can further enhance the service ecosystem, ensuring a more comprehensive and competitive offering.

Providers are also encouraged to introduce tiered customer perceived value (CPV) packages, with basic options centered on service quality and premium options that integrate both service quality and innovation. To maintain ongoing improvement and responsiveness to client needs, a structured measurement framework is recommended. This should include quarterly customer satisfaction audits tracking key indicators such as resolution time and repeat repairs for service quality, cost-to-uptime

ratios for customer perceived value, and client training completion rates for service innovation. From a regulatory standpoint, the Thai Industrial Standards Institute (TISI) should be involved in certifying maintenance reliability metrics, thereby supporting the establishment of industry-wide benchmarks for quality and performance. Collectively, these recommendations provide a robust foundation for achieving sustainable service excellence and enhancing customer retention in the industrial maintenance sector.

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An Analysis of Traditional and Digital Marketing Strategies of Hospitality Industry in Thailand

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Abstract

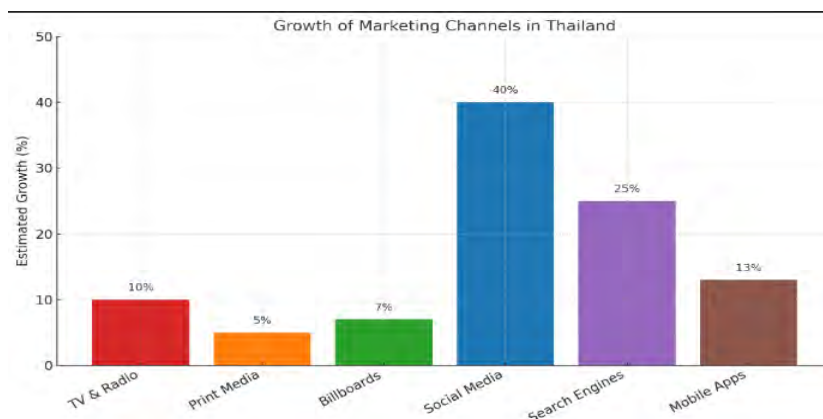
This study explores which marketing strategies help Thailand's independently owned, mid-scale hotels increase customer repurchase and retention. Because many industries are undergoing quick digital change, many companies encounter issues trying to keep customers loyal and make the right marketing choices. I spoke with 30 key people involved in the industry, including marketing managers, CEOs and event managers, all from independently owned mid-scale hotels in Bangkok, Chiang Mai and Phuket. This research focused on examining eight essential items: perceived usefulness, how easy the website is to use, customers' own feedback, CRM, CVM, how trusting people are, perceived risk and SMM. Reports reveal that engaging youths and tech experts through social media is a distinct strength for digital marketing, allowing companies to engage fast and keep customers loyal due to swift and individual messages. On the other hand, more elderly and affluent people still trust older marketing techniques such as print and face-to-face activities. Customer retention and trust over time were mainly influenced by the use of an integrated CRM and active social media involvement. According to the findings, a strategy that combines digital personalization and reach, with reliable and emotional traditional methods, will successfully attract customers in Thailand's hospitality market. The analysis found that combining marketing approaches instead of replacing them helps keep customers loyal and improves sales figures. Researchers could study how people's changing preferences and new technologies change the effectiveness of marketing.

Keywords: traditional marketing, digital marketing, customer relationship management, Thailand, hospitality industry, integrated marketing strategy.

Introduction

Thailand's growth in marketing has quickened due to internet advancements and the presence of more than 60 million internet users in 2023. TV and radio have helped create brand trust for years, but digital marketing is now popular because it is personal, data-driven, affordable and lets marketers target and analyze results instantly (Kotler & Keller, 2016; Kaplan & Haenlein, 2010). The importance of this change is most obviously seen in the hospitality sector, as more companies are connecting with their customers through digital means (Statista, 2023; We Are Social & Hootsuite, 2023).

Still, measuring the returns on traditional and digital marketing methods is tough. With traditional channels, performance is difficult to measure, but digital tools give lots of data that can be difficult to judge in terms of their lasting effect (Kotler & Keller, 2016; Chaffey & Ellis-Chadwick, 2019). The growing divide among demographics, as well as the fast advances in technology, make it tougher to make marketing decisions (Sheth, 2020; Huang & Benyoucef, 2013). It is difficult to keep reaching people on different platforms because the media landscape is so broken up (Digital 2023 Thailand Report). As a result, Thai companies should depend on data to help them plan their marketing budgets (Rust et al., 2004; Parasuraman et al., 2005).



The data in the bar chart demonstrates a big move towards digital advertising in Thailand as compared to traditional marketing methods. With a growth rate of 40%, social media is most effective at connecting with younger people on sites like Facebook, Instagram and TikTok. Search engines rank at 25% which means that SEO and paid advertising are now important parts of marketing in the hospitality sector. More consumers are turning to mobile apps (13%) for their convenience. When it comes to traditional marketing, TV & radio, billboards and print media are growing more slowly than search engines (10%, 7% and 5%). Despite their value for some groups, television ads aren't as precise, quick or provide as much data as digital options.

Therefore, it is necessary for marketers to blend strong digital skills with trustful traditional methods to carefully target customers within Thailand's hospitality industry.

Research Objectives

The first purpose of this research is to investigate the efficacy of traditional and digital marketing strategies used to target diverse segments of demographics in Thailand's complex consumer base. It seeks to report how the technologies have affected the performance and change ability of the two approaches to marketing in a rapidly changing world. Particularly, the research aims to determine what combination of traditional and digital channels shows the greatest growth in sales providing real insights to help businesses in hospitality and retail industries. Additionally, the research investigates the effect of technological development on consumers' behavior and preference; key toward understanding how such trends drive response to digital marketing. By achieving these goals, the present research presents a thorough appreciation of how companies are able to strategically position their marketing efforts to enhance customer engagement, retention, and total sales performance outcome in the Thai market.

Literature Review

Perceived Usefulness

Perceived usefulness is critical in the impact on consumer choice and the engagement of hospitality with both traditional and digital marketing channels. Digital channels like convenient online travel agencies, mobile applications and review websites increase perceived value for aspects like real-time information, simple comparisons which are especially fascinating for technology-savvy customers (Deng et al., 2019). As opposed to this, outmoded techniques such as print ads and travel agencies might suit some demographics but run the risk of being akin to less worthwhile when information delivery is slower. According to research, customer satisfaction, which will lead to top retention and repeated bookings can be directly linked to marketing strategies which are realized to be valuable (Kotler & Keller, 2016). As a result, increasing perceived usefulness of traditional and digital tools help the hospitality businesses to meet the needs of the consumers more successfully, increasing loyalty and long-term participation (Huang & Benyoucef, 2013).

Perceived Ease of Use

Convenience of use in digital marketing is concerned with how easy it is for customers to browse a hotel website, make reservations and check out promotions from social media. Even when digital platforms are seen as useful, a lack of usability will severely decrease customer engagement (Venkatesh et al., 2003). Conventionally, traditional marketing too has to focus on clarity, print advertisements, for example, should provide clarity on the bare essentials to keep consumer interest (Dahl et al 2001). Customer friendly interactions, whether digital or not, make customers more satisfied and loyal because they create easier interactions and less mental effort. In the hospitality industry, marketing tactics that add ease of use across all channels, are more likely to add to customer experience and long-term lodging.

Perceived Customer Experiences

Perceived customer experiences refer to the overall customer impressions they got when transacting with a business, and this is a key variable especially to the hospitality industry, for it has a strong influence on guest loyalty and subsequent repeat visits (Kwortnik & Thompson 2009). Favorable experiences whether based on traditional approaches or digital campaigns go along with greater satisfaction and higher repurchase intention levels. Digital marketing strategies providing personalized services like ads targeted at the guests on Facebook or Instagram can effectively establish emotional relationships with guests, increase loyalty and engagement (Bleier & Eisenbeiss, 2015; Kumar et al., 2019). At the same time, old-style marketing can also create meaningful experience by paying attention to its details, such as individual offers through travel agencies or by using bright printed materials to underpin brand identity (Bennett & Rundle-Thiele, 2005). Finally, both traditional and digital channels have to strive to build these meaningful experiences that will help customers retain and continue doing business with them for long.

Customer Relationship Management (CRM)

Customer Relationship Management (CRM) systems prove to be absolutely critical in the sector of hospitality because they help hotels to keep records of guest preferences, to manage bookings, and to provide more personalized service that increases satisfaction and loyalty (Buttle, 2009; Payam & Fariba, 2019). When used in digital marketing initiatives such as email marketing, loyalty programs, and social media CRM contributes to making the customer interaction a smooth and flowing movement across all points of contact (Boulding et al., 2005). Hotels can use CRM data to develop a customized marketing strategy to meet customer choices thereby promoting engagement, repurchase, and retention (Sigala, 2018). Anyway, good use of CRM not only enhances customer relations but it also offers competitive advantage in the rapidly changing digital hospitality arena, which ensures the long-term sales increase and profitability.

Customer Value Management (CVM)

Customer Value Management (CVM) is all about maximizing the value of different customer segments based on the delivery of personalized services and experiences, a critical strategy in hospitality for breeding loyalty and repeat business (Payne & Frow, 2005; Schmitt, 2009). Digital solutions such as online travel agencies, loyalty apps add to CVM efforts because such platforms provide salient customer data which hotels can use to formulate personalized promotions and packages that have detected behavioral trends (Wang et al., 2017). This sniper-style use of data does not only increase repurchase numbers, but also drives general customer satisfaction. Only with CVM, hotels can maximize the value of customers over the lifetime while having more sustainable returns on marketing dollars. Reasonable CVM practices are the cornerstone for building and sustaining a relationship with the customers, enabling competitive advantage, and making long-term profitable business in the hospitality industry (Kumar & Reinartz, 2016).

Trust Propensity

Trust propensity, or disposition to trust business in clairvoyant situations generally, is a decisive factor in forming online booking disposition in the hospitality industry. Customers with high trust propensity are more likely to use digital channels such as the hotel websites or online travel agencies (Gefen, 2000) and hence trust is a major determinant of effectiveness of digital marketing. Fast and effective trust promoters are solid branding, clear pricings, and consistent service, which are significantly supported by online reviews and hotel reputation (Susskind & Chan, 2000). Trust also continues beyond booking because when merchants live up to their marketing promises and offer excellent service, trust is nourished and continued loyalty maintained (Chaudhuri & Holbrook, 2001;

Morgan & Hunt, 1994). That is why hospitality businesses need to come up with strategies that will build trust to increase satisfaction, enhance relationships and guarantee repeat business in an emerging digital marketplace.

Perceived Risk

Perceived risk represents a concern on the part of a customer about uncertainty related to a purchase, a situation that is common in the hospitality sector where issues such as service quality or hidden charges, to name just a few, may be of concern (Stone & Grønhaug, 1993). Excessive perceived risk may discourage customers from booking, particularly on the web where services cannot be measured. Digital marketing can help minimize these risks because of the provision of transparency through clear cancellation policies and dependable service guarantees that gives the customer confidence and stimulates bookings (Zhang et al., 2011). Conventional marketing also has a part to play in the development of powerful brand recognition that creates a sense of security and trust among potential consumers. By decreasing perceived risk in both digital as well as traditional strategies, we optimize repurchase intention and customer retention, thus supporting long-term sales growth in an intense hospitality market.

Social Media Marketing

Social media marketing is an important component of current hospitality strategies by creating direct communication conduits between hotels and consumers; these are executed via Facebook, Instagram, and TikTok. These tools enable hotels to present their offerings, advertise deals, interact with consumers, improve brand recognition and establish customer relationships (Brodie et al 2013; Muntinga et al., 2011). User generated content (reviews, photos etc), contribute to raise credibility and realness, nurturing community participation (Nielsen, 2012). Further, the fact that ads can be directed at demography, interests, and location, adds value to services, and enhances the possibility of repeat visits (Huang & Benyoucef, 2013). By this nature, good social media marketing becomes important for hotels that seek to increase the level of customer loyalty, brand equity and overall revenue in a highly competitive market.

Repurchase and Retention

In the hospitality business, both encouraging repeat customers and keeping existing ones are necessary for mid-sized independent hotels to continue growing in Thailand's competitive markets. If a guest repurchases, it means they are likely to return after a nice stay and retention helps hoteliers reduce churn and increase loyalty over time. It is clear from research that good service, satisfied guests, a strong emotional bond and trust encourage repeat visits to a hotel. Today, companies improve post-stay communication and retention by combining personal service with digital methods such as customer relationship management and social media interaction. The study looks at the joint impact of traditional and digital marketing on guest loyalty, suggesting ways for hotels to improve their profits over the long term.

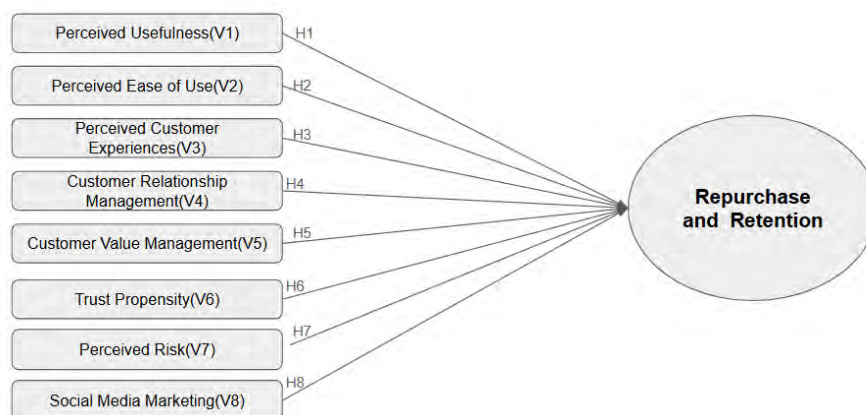


Figure 1: Conceptual Framework

Research Methodology

This study was engaged in a qualitative research design to explore which of the traditional and digital marketing approaches works better in Thailand's hospitality industry. More precisely, we talked with 30 employees who work for 15 independently owned, mid-scale hotels found in Bangkok, Chiang Mai and Phuket. Both marketing managers, CEOs and event managers were at the event, as they all take part in marketing and managing customer engagement. The study focused on what drives a customer to keep using and buying from a company, including: Perceived usefulness, Ease of use, The customer experience, Customer Relationship Management (CRM), Customer Value Management (CVM), Trust propensity, Perceived risk and social media marketing. Respondents' experiences and views were collected via tech interviews which gave them the opportunity to describe how they handle their businesses. Using thematic analysis on the collected data, we found common themes about how traditional and digital marketing approaches support customer loyalty. Focusing on independent hotel employees gives the study valuable insights that support well-informed marketing selections at similar places.

Population and Sample

This research is aimed at marketing personnel of medium-scale independently owned hotels in Thailand's hospitality sector. The population drew from a purposive sampling exercise with a view to capturing diversity amongst age, income groups, digital literacy status, and regional variation, which meant that views on both 'traditional' and 'digital' marketing strategies were holistic and grounded in context. This heterogeneous representation enabled this research to produce findings relevant to the Thai hospitality sector as well as those relevant to comparable industries in the similar markets.

A 30 interviewees sample was used for the selection of participants with a decent degree of scale in qualitative analysis. Such a sample size allowed the study to reflect a great variety of experiences, roles, and digital engagement levels, adding diversity to the comparative exploration of marketing strategies. The approach enabled the gathering of context relevant and insightful data to test the impact of marketing on sales increase, customer engagement, and brand visibility within the developing market landscape of Thailand.

Data Collection

In this research, the impacts of traditional and digital marketing strategies on sales growth and customer engagement of Thailand's hospitality industry were compared. Data collection was through in-depth interviews with professionals and decision makers in conducted independently owned mid-sized hotels. This was in line with the study's objective to record detailed narratives on how various marketing strategies affect consumer behavior, enhance brand visibility and ultimately sales.

The data collection started with selection and recruitment of the participants and great care was taken to ensure that the participants met the study requirements. Active employment in Thailand's hospitality industry and direct experience with both traditional and digital marketing methods were screening criteria. A wide range of experiences and insights were represented by participants selected from a diverse set of roles and establishments. The diversity was essential to uncovering patterns on how each marketing approach performs in different customer demographics and organizational contexts.

This study adopted a comprehensive and ethically sound approach to data collection, creating a rich, detailed, reliable data set to serve as the basis for further analysis.

Data Analysis

Thematic analysis was employed as the data analysis process, which was an approach for identifying, analyzing and interpreting patterns within qualitative data. This way to approach this problem was through a systematic coding and categorizing of data to identify themes that highlighted the comparative influence of traditional and digital marketing strategies on sales growth and customer engagement. The analysis was iterative, with each reading of the interview transcripts to make sure that the themes identified were clearly responding to the participants.

This study aimed to explore how traditional and digital marketing strategies impact consumer behavior, brand visibility, and sales outcome within the hospitality sector of Thailand. In addition, special attention was paid to the investigation of the underlying factors that may influence the relative effectiveness of each marketing approach, for instance, customer demographics and technological

advancement. The analysis identified and examined key themes and provided a nuanced view on how each marketing strategy adds to the growth of business in today's dynamic market environment.

Research Findings

Demographic Characteristics of Interviewees

The interviewees of this study cover a wide set of professionals in the hospitality and tourism industry in Thailand, providing a rich set of data for analysis. Various organizational scales, roles and market focuses are represented in their backgrounds enabling a holistic understanding of marketing strategies.

The interviewees are CEOs, Marketing Directors, Event Managers, or Heads of IT or Revenue Management within their organizations. These roles guarantee strategic leadership and operational execution representation. This breadth of expertise helps to understand how marketing strategies are created, are rolled out and evaluated at different levels within the organizations.

The size of the organizations varies greatly. Boutique hotels and smaller independents with 50 to 150 rooms make up the middle, or mid-sized and independently owned, sector on one end. The niche or regional markets are catered by these properties. At the other end of the spectrum, large multinational chains such as Shangri-La and Marriott International manage properties with more than 800 rooms aimed at a global market. Additional representation comes from mid-sized chains such as ONYX Hospitality Group and The Erawan Group, which have both local and international markets. By its variety this provides a comprehensive view of the challenges and opportunities facing the hospitality industry.

The customer base also reflects Thailand's diverse tourism landscape: Domestic Tourists: Mostly budget friendly properties and mid-range hotels such as those under The Erawan Group, are targeted to local travellers, focusing on cost and regional marketing. International Tourists: Accor One Living and Shangri-La upscale and luxury establishments target high net worth individuals, business travelers and international tourists from Asia, Europe and the U.S. Hybrid Markets: There are also many participants who manage properties that serve both domestic and international travelers, giving them the luxury of working to market to two different groups of people.

The interviewees have marketing expertise in traditional and digital marketing. Long term brand recognition and targeting older demographics or regions with minimal or no digital access traditional channels such as print ads, billboards and travel agency partnerships are used. But digital marketing is on the rise, with participants investing heavily in social media campaigns, search engine optimization (SEO), influencer partnerships, and data driven marketing tools. Digital channels are known for being able to engage often young, tech savvy audiences and measure results, like increased bookings or customer engagement.

Finally, demographic characteristics of the interviewees and of their organizations provide a sound base for analysis of the impact of marketing strategies. With their different roles, different organization sizes, different customer bases and different marketing experiences, they provide valuable insights into the interplay between traditional and digital marketing in Thailand's hospitality sector.

Table 1: Demographic Characteristics of Interviewees

Category	Summary
Total Interviewees	30
Roles	CEOs, Global Development Officers, Marketing Directors, Marketing Executives, Event Managers, Travel Bloggers, Product Managers
Organizational Types	Boutique hotels, mid-sized chains, large multinational hotel groups, travel agencies, and independent travel bloggers

Category	Summary
Organization Sizes	Boutique (50–150 rooms), Mid-sized chains, Large multinational chains (>800 rooms)
Job Functions	Strategic Leadership (e.g., CEOs, Managing Directors), Marketing (e.g., Directors, Executives), Operations, IT, Revenue Management
Customer Base	Domestic tourists (budget-friendly, mid-range), International tourists (luxury/upscale), Hybrid markets
Regions of Operation	Thailand (major focus), Asia Pacific, global markets
Marketing Expertise	Traditional marketing (e.g., print ads, billboards, travel agencies), digital marketing (e.g., social media, influencer partnerships)
Interviewees Preferences	Urban/younger/tech-savvy (digital), Rural/older/not digitally inclined (traditional)
Specialized Roles	Travel bloggers with expertise in adventure, luxury, and budget travel markets
Key Challenges	Allocating resources effectively and adjusting strategies for different audience dynamics

Descriptive Analysis of Variables

The relationship between using traditional and digital marketing strategies and the identified variables such as perceived usefulness, perceived ease of use, perceived customer experience, customer relationship management (CRM), customer value management (CVM), trust propensity, perceived risk and social media marketing, was examined in this study. Examining interview answers showed particular patterns showing how each variable is guided by traditional or digital marketing. Accordingly, digital marketing is seen to greatly boost customer experience thanks to smooth conversations, personalized content and ongoing interaction mainly among youth groups. Using digital tools made the services easier and more useful in the eyes of respondents, thanks to improvements in automation, personalization and ease of operation. However, more traditional marketing approaches appeared effective at attracting older or large-spending people, because they rely on emotional trust and in-person meetings. At times, using regular methods was recognized as less dangerous because safety and personal involvement were more assured. Both CRM and CVM were areas where both strategies made an impact. CRM tools powered by computers let companies organize customer information and reminders, helping with follow-ups and at the same time, through traditional methods, they could maintain old and strong relationships with their clients. Though digital, social media marketing became a bridge connecting these strategies, thanks to the mix of technology and real human communication that supports storytelling, loyalty programs and immediate customer support.

Overall, both digital and personal approaches should be used together by Thai hospitality firms to boost customer engagement, ensure guests return and keep the business profitable long term.

Summary of Interviewee Responses

The interview data are grouped according to eight main characteristics. Several interviewees (Nos. 1–7 and 15–18) remarked on how marketing systems contribute to making an enterprise more efficient and productive. A number of interviewees mentioned perceived ease of use (Nos. 1–7 and 23), explaining that the systems were easy to manage and this promoted staff use. Many of the interviewees (from Nos. 1 to 15, 21, 24 to 27 and 30) felt that being happy with their service encouraged them to book again. There were many responses from interviewees (starting with 1 to 7, 21, 23 to 29) suggesting that CRM has improved how hotels handle managing guests and interactions after they stay. Similarly, numerous interviewees focused on customer value management, talking

about approaches that help increase the value a customer brings over time through personalization and efforts to build loyalty.

Some interviewees (Nos. 1–8, 12 and 28) acknowledged how trustworthy they think digital systems are and are confident using them. On the other hand, concerns about data security and privacy triggered perceived risk for a smaller group interviewee (Nos. 4, 6, 8, 13, 15, 17, 20, 22). Several interviewees (Nos. 1–16, 17, 22–25) spoke about how important social media marketing is for promoting loyalty programs, engaging customers again and increasing customer retention. The results show that staff at hotels prefer marketing tools that are easy to use and effective, relying on them to make clients happy, encourage repeat visits and keep the business thriving over time.

Inferential Analysis

Inferential analysis allows us to conclude from the responses of the interviews on the broader implications of traditional and digital marketing strategies in the hospitality industry. We infer the impact of these strategies on customer engagement, brand credibility and organizational outcomes by examining the patterns and relationships within the data and contextualizing these in relation to Thailand's tourism and hospitality sector. The analysis shows that digital marketing provides better customer engagement, flexibility and the ability to deliver personalized experiences compared to traditional marketing. It is clear that tools like social media, search engine marketing and CRM systems are key to reaching younger, tech savvy audiences and delivering against key metrics. The result of this finding is that companies operating in highly competitive and fast paced industries like hospitality must place a higher emphasis on digital marketing as a way of keeping up with the times and meeting the ever-changing expectations of their customers. Less dominant, but still crucial to foster long term trust and brand credibility, especially among the older demography and high value buyers is traditional marketing. This implies that organizations targeting these segments have not yet passed the relevance of traditional methods like print advertisements and partnerships with travel agencies. The inferential results indicate that digital strategies may be complementary to traditional marketing in satisfying particular customer needs. The data also show that perceived usefulness and ease of use are major determinants of the effectiveness of marketing strategies. With user friendly interfaces and real time feedback mechanisms, digital platforms are more likely to improve customer experiences and lower perceived risks. In high stakes decisions like luxury bookings, trust and reliability, which are often linked with traditional marketing, still matter. Finally, the inferential analysis illustrates the importance of integrated marketing strategy information from both standard and digital strategies. Businesses that are able to combine these methods well can strike a balance between innovation and credibility and therefore attract a wide range of customer groups. These insights help broaden the marketplace knowledge of the effectiveness of marketing strategies in the hospitality sector and provide useful recommendations for augmenting customer satisfaction and firm performance.

Conclusion and Discussion

This study addresses the effectiveness of traditional and digital marketing strategies in achieving sales growth at mid-sized independently owned hotels in Thailand's hospitality industry. The research explored how these marketing approaches affect key variables (perceived usefulness, ease of use, customer experiences, customer relationship management, trust propensity, customer value management, perceived risk and social media marketing) through qualitative interviews with 30 professionals working in different roles. The results show a clear move towards digital marketing as the most important source of engagement and sales growth. For attracting younger, tech savvy customers and bringing in international tourists, platforms such as social media, Search Engine Marketing (SEM), and influencer collaboration works wonderfully. Digital marketing is a strong suit in that it is adaptable and able to provide real time feedback, as well as precise targeting, which means it is a good way to increase direct bookings and improve the customer experience.

On the other side of the spectrum, traditional marketing still has its place, however, especially with regards to building brand trust and credibility with older demographics and high net worth clients. Print ads, working with travel agencies, and billboards still have the benefit of making a brand name stick over time, but they aren't nearly as effective at producing quick, quantifiable results.

In the end, the study proves that digital and traditional marketing approaches must be combined to achieve the best results. With the right balance of innovation and credibility, Thailand's hospitality sector businesses can maximize appeal over a range of customer segments and on this basis achieve sustainable sales growth.

Suggestions

Based on the findings of this study, the following key recommendations can help improve repurchase and retention rates in Thailand's hospitality industry, ultimately driving sales growth:

First of all, the findings show that digital marketing strategies, particularly to the personally tailored campaigns, play a vital role in boosting the customer experiences by promoting the consumer loyalty and the repeat bookings. Hotels are encouraged to spend on data analytics and Customer Relationship Management (CRM) systems to take advantage of customer preferences and purchase histories to deliver personalized offers to customers (Boulding et al., 2005; Kumar & Reinartz, 2016). Personalization such as curate stay packages, loyalty rewards and send follow-up communication together creates emotional bonds and increases the retention rates (Bleier & Eisenbeiss, 2015).

Second, engaging younger and international customers is identified as a key resource to use with such things as Facebook, Instagram, and TikTok. Hotels should leverage their social media presence by posting user generated content on a regular basis, working with influencers and driving loyalty programs (Muntinga et al., 2011; Brodie et al., 2013). Influencer partnerships offer credibility as well as increased brand reach, and make it easier to attract new customers and to bring them back for repeat visits (Huang & Benyoucef, 2013).

Third, online customer experience is user friendly and it leads to customer satisfaction and repeated bookings. Websites and mobile applications of hotels should be intuitive, fast, easy to navigate, have a simplified booking process and clear promotional messages (Venkatesh et al., 2003). It also adds mobile payment options and chat support to better serve customers, operates to mitigate booking friction and subsequently, improves conversion rates.

Furthermore, the study highlighted that lowering perceived risk (especially in digital transactions) is essential, hotels should provide flexible booking policies, well defined cancellation terms and clear review of customers to assure potential guests. There can be price transparency in pricing, terms and post booking support that can solve customer's concern and will help raise customer's trust that will eventually help to raise customer's retention (Aaker, 1991).

In addition, while digital marketing is more effective in driving measurable engagement, traditional marketing is still very important for building brand trust and credibility, especially for older and high net worth clients. Capture of a broader demographic, to be done by a hybrid approach which marries traditional media (media like print ads and travel agency partnerships) with digital channels, while achieving consistency and the recall of the brand across the various segments (Chaudhuri and Holbrook, 2001; Morgan and Hunt, 1994).

Finally, there is scope for creating segment-based loyalty programs for international frequent travelers or domestic travelers for repeat bookings. Customer Value Management (CVM) can be employed to provide exclusive benefits, personalized rewards and incentives to deepen customer relationships and in turn to encourage long term loyalty (Wang et al., 2017). And loyalty programs – escalating rewards along the lines of frequency or spending – present, for example, an opportunity to incentivize repeat stays.

The integration of these recommendations will help hotels in the hospitality industry of Thailand develop repurchase and retention strategies that will drive sustainable sales growth. A customer centric, technology driven, hybrid marketing approach is a key to competitiveness in an evolving market with tech savvy travelers as well as traditional customer segments.

Recommendation

Based on the study's findings, Thailand's independent hotels should focus on their customers and integrate various marketing strategies to increase how many people stay again and come back. Specialized digital marketing campaigns with help from CRM and data deeply increased the enjoyment of

customers, created meaningful relationships and got them to come back often. CRM tools should be used by hotels to create unique offers, grant loyalty perks and stay in regular contact with guests. At the same time, using popular social sites such as Facebook, Instagram and TikTok and forming alliances with influencers, is a good way to attract younger and more international users, as well as improve the brand's reputation and encourage loyalty.

Fixing any problems on their websites and mobile apps so that customers can easily find booking options and contact the hotel's support is necessary for hotels. Defining risks upfront and showing visible pricing, flexible booking options and customer reviews makes people feel the company can be trusted. It's also important to note that high-net-worth and older clients are more likely to value traditional methods, even when digital tools help measure results. By mixing traditional methods like ads on paper and deals with travel agencies with internet channels, a company keeps its brand the same everywhere. Also, forming customer value management (CVM) programs allows hotels to create relationships that remain strong with all their regular customers. All of these measures working together will help maintain customer loyalty and increase income in the country's hospitality business.

Further Research

In the future, it would be helpful to research more factors that play a role in customers' repurchase and loyalty in the hospitality industry here. For instance, as people give more attention to sustainability and CSR when deciding what to buy, researchers might investigate whether it leads to stronger customer loyalty.

In the future, it will be important to examine if the difference in age groups influences success with traditional and online marketing. There may be big gaps in how Generation Z and millennials interact with marketing, trust brands and respond to various marketing channels and identifying these differences can provide useful insights for marketing. Experts can include outside influences such as the economy, natural events and pandemics in examining how marketing approaches maintain customers and achieve desired results in the hospitality sector.

Firms could create better marketing strategies that can handle sudden changes in the market, thanks to this research. Other studies could study if results from the hospitality sector can be applied to other sectors such as retail, healthcare or tourism. When we examine marketing from all angles, we sometimes notice differences for each industry or find general strategies that help across all industries. Scientists should work together from both fields to better see why people act a certain way when presented with marketing material. Thanks to psychological theories, researchers are able to understand how different feelings affect how loyal customers remain to a brand, trust its products and keep coming back. It would be wise for future work to examine how combining traditional, digital and experiential marketing can improve results. Employees at high touch service companies could learn from these models to boost how customers feel, how much they trust the company and how loyal they become. The proposed strategies indicate a wide and ever-changing field that responds to what consumers expect, the fluctuations in the market and the growing links between marketing and other fields. To improve both our knowledge and practical use of hospitality marketing, we should focus on studying sustainability, CSR, different generations, major disruptions, how industries differ, mental drivers and hybrid plans.

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The Key Factors Influencing Purchase Intention of Gen Z Foreigners for E-Commerce Apps: A Comparative Study of Shopee and Lazada in Bangkok

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Abstract

The study is designed to see how the intentions to purchase products vary among Generation Z foreigners living in Bangkok on Shopee and Lazada. The study relies on Technological Acceptance Model (TAM) and Consumer Behavior Theory to investigate the ways that perceived usefulness, perceived ease of use, trust and security, social influence, convenience, perceived value and user experience influence what consumers decide to purchase. Using a statistical method, 385 valid reports were gathered and studied by using multiple linear regression. The study found that Shopee consumers are most likely to buy if they have a good experience, while Lazada users consider it first based on how useful they perceive the site to be. In comparison to other factors, trust, social impact and perceived value do not play a significant role on any platform. The findings allow you to see where to improve in different platforms to perform better in the tough e-commerce market in Southeast Asia.

Keywords: Generation Z, E-Commerce Platforms, Technology Acceptance Model (TAM), Consumer Behavior Theory

Introduction

Generation Z spends much of its daily life shopping online, especially those living in Bangkok as foreign residents. Shopee and Lazada attract this type of international shopper such as overseas students, people working abroad and enduring visitors, who all depend heavily on their smartphones when shopping. Since their lives revolve around moving fast, being convenient and making use of technology, people today rely on shopping online for everyday needs and leisure activities. Thanks to digital growth in Southeast Asia, Bangkok is now regarded as a main center for online retail in the region. Both Shopee and Lazada are popular marketplaces in Thailand that provide social network tools such as live streams, fun games for shopping and recommendations through artificial intelligence. To Gen Z, social platforms are not only used for shopping but also help to define what they like and dislike.

It is still unclear how Gen Z tourists from abroad in Bangkok decide what is most important when purchasing from these services. It aims to bridge this gap by exploring what factors influence customers to purchase on Shopee and Lazada. Using the TAM and Consumer Behavior Theory as a base, the study seeks to compare the drivers behind e-commerce choices and offer useful solutions to improve how users feel about the platform, stick with it and help the company make choices in Bangkok's competitive market.

Research Objectives

- (i). To investigate significant factors that influence the purchase intention of Gen Z foreigners for Shopee and Lazada.
- (ii). To compare the purchase intention between Shopee and Lazada of Gen Z foreigners in Bangkok.

(iii). To provide recommendations and competitive strategy for improving user experience based on findings from Gen Z users in Bangkok.

Literature Review

Shopee and Lazada, as well as other e-commerce platforms, have changed how Generation Z, also called digital natives, buy products. Since they have always been surrounded by tech, people in this generation want their shopping to be instant, easy, fun and suited to them. In Bangkok, online shops give foreign young people an opportunity to enjoy entertainment, be more efficient and feel confident in markets that are not familiar. Shopee and Lazada have satisfied these expectations by providing smooth mobile options, using AI suggestions, including exciting games and ensuring easy online payments. They are built to appeal to the likes and emotions of Gen Z. They serve to both sell and to connect people through social channels. (Hajli, 2015) found that interactive features encourage consumers to trust the website and remain loyal due to the experiences they provide. Young people often rely on social commerce such as user reviews and group shopping, to help them decide what to purchase. According to (Lim et al., 2016), trust and engagement in digital shopping are built more easily when peers take part in the transaction process.

(Bhatti et al., 2020) emphasize that Gen Z is interested in platforms that are practical as well as enjoyable. Because shoppers want their online purchases as well as social and emotional benefits, Shopee and Lazada have chosen to make their platforms easy to use from mobiles by ensuring everything loads quickly, recommendations are targeted and the sites look great. Being able to deliver both convenience and strong emotions keeps these platforms at the top in the regional e-commerce market, mainly among young people. The TAM theory is a useful foundation for studying how people behave toward different technologies. According to (Davis, 1989), TAM suggests that influence on adoption intention comes from how useful and easy a new technology is thought to be by a person. The ease with which a platform improves a user's experience during shopping is seen as perceived usefulness and perceived ease of use represents how easily a user can use the site's features. They are important for explaining people's decisions to take up or leave certain technologies.

Following the TAM, (Venkatesh and Bala, 2008) include external components such as the system's interface, reaction speed and support as significant in forming people's main opinions of usefulness and ease of use. For Gen Z, these features are standard requirements for a business to meet. Make sure your website is quick, simple to navigate and easy to understand. A mistake in these areas can make users unsatisfied and impatient enough to quit instantly. This means TAM is relevant for examining Gen Z's use of e-commerce services, particularly in terms of their purchase intentions and regular use of those platforms. TAM clearly outlines technology decisions, but it does not factor in the other reasons why consumers decide what to purchase. As a result, Consumer Behavior Theory is added to TAM to focus on user behavior. Authors Kotler and Keller note that things like emotions, trust, motivations, cultural rules, friends' opinions and a product's perceived value affect consumer behavior. Generation Z people, especially those in Bangkok, look at what others say and post to decide which product or service to choose.

These researchers (Chiu, Fang and Cheng, 2014) argue that when social cues and technology are combined, users have more positive attitudes toward buying through e-commerce. Specifically, a platform can boost consumers' intentions when it is both effective and emotionally satisfying for them. When it comes to Shopee and Lazada, these fusion matters most since their success depends on being valuable, reliable and having fun interactive features. Using TAM and Consumer Behavior Theory allows for a better analysis of what influences Gen Z's choices to buy products online by uniting the use of technology with people's emotions.

By applying this theory, the study looks at seven independent factors gathered from the literature: perceived usefulness, perceived ease of use, trust and security, social influence, convenience, perceived value and user experience. From the TAM perspective, perceived usefulness and ease of use represent the functioning of a platform. Should Gen Z users feel that a platform is efficient and simple to use, they are likely to keep using it on a regular basis. When shopping from another country, consumers put a high value on trust and security because mail-order shopping involves sending personal information online. People are more willing to make purchases on a secure platform. Deference to

social groups, marked by what their peers, influence experts and fellow internet users suggest, plays a key role for Gen Z shoppers who like to receive endorsements (Hajli, 2015).

According to (Lim et al., 2016), how easy it is to get and use products and services including delivery, monitoring orders and a simple transaction process all impact user satisfaction and loyalty. Perceived value is important for Gen Z because it helps them decide if the product or service is worth the money they are paying. Last, but not least, a platform's design, appeal, individualized services and how smoothly it operates are essential aspects that allow people to keep using it and form strong preferences (Nguyen et al., 2021). The study uses all these variables to make a framework that explains why Gen Z international students use Shopee and Lazada in Bangkok. With this model, we see that users make choices based on their emotions and logic and that each platform's unique features play a role in shaping their decisions.

Methodology

Research Design

The researchers applied a quantitative study design and a cross-sectional survey method to investigate the main influencers of purchase intention for Gen Z foreigners living in Bangkok and using Shopee and Lazada. By using this strategy, the researcher gathered structure data and used statistics to discover notable links between variables. To guide the research, we relied on TAM and Consumer Behavior Theory. According to TAM (Davis, 1989), adopting technology is influenced by how useful and easy to use people perceive it to be, as well as system characteristics such as an effective interface and fast responsiveness (Venkatesh & Bala, 2008). To analyze consumer behaviors further, this theory adds trust, the effects of social groups, convenience, the idea of value and user experience (Chiu et al., 2014; Kotler & Keller, 2016). Researchers collected data by asking closed-ended questions and scoring them on a five-point Likert scale. The questions came from constructs that were validated for each of the two theories. By doing this, I could explore all aspects of Gen Z's online shopping and use this information to design helpful guidelines based on what I discovered.

Population and Sampling

The study focuses on Generation Z foreigners who live in Bangkok and shop online using Shopee and Lazada. They were chosen as the group most likely to use mobile platforms for online shopping. According to Bhandari (2020), a population refers to everyone in a group who share the same important characteristics and who are not Thai. To study the population, convenience sampling was applied to reach students and expatriates living in several countries. Convenience sampling was used because it allowed the researcher to reach participants through online forums, social media and in-person meetings (Nikolopoulou, 2023; Simkus, 2023). Still, this procedure made it easier to gather data quickly and without using too many resources. Using Cochran's formula and a 95% confidence level ($Z = 1.96$), 5% margin of error ($e = 0.05$) and proportional estimate of 0.5 ($p = 0.5$), the suggested sample size was 384.16. The number of participants for the survey was adjusted to 370 after applying the correction for a population of 10,000. A total response of 385 was gathered which was more than enough to meet the needs for analysis.

Hypothesis

The hypotheses in this research are as follows:

H1: Perceived usefulness positively influences purchase intention. H2: Perceived ease of use positively influences purchase intention. H3: Trust and security positively influence purchase intention. H4: Social influence positively influences purchase intention. H5: Convenience positively influences purchase intention. H6: Perceived value positively influences purchase intention. H7: User experience positively influences purchase intention.

Research Instrument and Data Collection Procedure

The research team designed a questionnaire for this study, using elements from the TAM and Consumer Behavior Theory. The purpose of the questionnaire was to understand how perceived usefulness, perceived ease of use, trust and security, social influence, convenience, perceived value and user experience relate to choosing a fast-food restaurant online. The survey used a five-point Likert scale to rate each item, so that the feelings of everyone were consistent and could be recorded and checked. To avoid complexity and facilitate comparison, the authors included only closed

questions on the questionnaire (Kotler & Keller, 2016). In order to connect with Gen Z foreigners living in Bangkok, a combination of data collection methods was used. The survey was made available online on Google Forms and was sent to people involved in different Facebook groups, Messenger and similar online forums. This technique is supported by (Elizabeth Mirekuwaa Darko, 2022), who pointed out that social media helps target people from all over. Moreover, offline data was collected using mobile devices in order to include participants who wanted to interact face-to-face or had difficulty accessing the internet. Thanks to this method, more patients were covered, data could be entered immediately on the computer and less time was spent using paper. By using online and offline methods for gathering information, the study managed to gather valid data from 385 participants which was then analyzed with SPSS.

Reliability and Validity

The purpose of this research was to assure that the research instrument was consistent and accurate therefore this research did a reliability analysis via a pilot test. A tool known as reliability refers to the extent of consistency in producing stable findings using similar circumstances. In this study, a structured questionnaire, which has fitted the constructs of Technology Acceptance Model (TAM) and Consumer Behavior Theory, was pilot tested on a small number of Generation Z foreigners in Bangkok. Participants gave feedback from the clarity and relevance of the questionnaire items hence helping to identify and modify ambiguities before mass distribution. Internal consistency of the survey items was subsequently tested by using Cronbach's Alpha, a commonly used measure for reliability. A Cronbach's Alpha of 0.70 or over is usually considered acceptable in a social science research (Chelsea Goforth, 2015). The Cronbach's Alpha for all the respondents in the results of this study was of 0.893 over 39 respondents, implying high internal consistency. All the individual constructs including perceived usefulness, trust, social influence, and user experience also generated a high level of Alpha values of 0.893 thus validating the scale of measurement. These results imply that the instrument used in this research is reliable and can provide consistent data if it was applied to the same population repeatedly.

The study also evaluated validity of the questionnaire in order to access whether it was able to measure the intended constructs effectively. If the validity of an instrument is how much it measures what it claims to measure, in this case, construct validity was assessed through the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy and Bartlett's Test of Sphericity. KMO value was 0.884, which is a "meritorious" value (according to Kaiser: 1974), confirming the data set was very appropriate for factor analysis. A KMO value greater than 0.80 will justify that the variables have enough common variation among themselves are suitable for dimensionality reduction methods. This confirms the underlying assumption that survey items are organized into coherent and meaning constructs. Besides, Bartlett's Test of Sphericity provided a Chi-Square value of 7639.291 with 561 degrees of freedom and $p < 0.000$; which means the correlation matrix is not an identity matrix. This means that the variables are so correlated around each other, thus confirming why factor analysis was undertaken. Spun together, these tests confirm that the questionnaire is reliable and able to measure the theoretical constructs needed to analyze the purchase intention of Gen Z foreigners on Shopee and Lazada.

Data Analysis

Data from collected surveys was analyzed by means of both descriptive and inferential statistics for investigating relations between independent variables (IVs) and dependent variable (DV, i.e., purchase intention). Descriptive statistics were performed for each variable such as mean and standard deviation to appreciate the central tendency of their responses and distribution of responses respectively. This step presented an overview of how Generation Z foreigners in Bangkok perceived constructs like perceived usefulness, ease of use, trust and security, social influence, convenience, perceived value, user experience, and their intention to purchase on Shopee and Lazada. These learnings facilitated the development of a basic picture of responses about e-commerce platforms and reflected the overarching pattern of public shopping behavior.

After this; Pearson's correlation analysis was done to determine the relationship between independent variables and purchase intention and strength as well as the direction of this relationships. This made possible classification of positively and negatively correlated variables, to what extent. In order to continue testing the research hypotheses, multiple linear regression was used to determine how each independent variable affected purchase intention. The explained proportion of the variance in purchase intention by the independent variable taken together was achieved via the R^2 value of the

model. These inferential analyses supported those factors that had significant effects on purchase intention, and were consistent with the proposed relationships in the conceptual framework.

Theoretical Contribution

In this paper, the Technology Acceptance Model and Consumer Behavior Theory are combined together to analyze Gen Z users on Shopee and Lazada in Bangkok, thus contributing useful insights into their theories. TAM is often applied to researching how technology is adopted and this study further adds value by demonstrating how the characteristics of platforms shape the significance of TAM constructs. Aligned with this, the main difference between Lazada and Shopee indicates it is vital for companies to consider what users want most. This means that Gen Z users think of Lazada as a simple and useful online shopping site, but Shopee as an interactive platform. Thanks to these differences, the TAM can be used more broadly, since the model's variables might behave differently due to the unique features of the platform and the consumers' focus. Besides, the study applies Consumer Behavior Theory by considering factors such as trust, social influence, the value given to products and convenience in online shopping. Though some variables did not have a statistically important effect, they helped explain digital consumer behavior beyond what is measured by utility. Since platforms' user behaviors vary, e-commerce cannot be seen as a single entity and should be viewed based on specific features and designs. Furthermore, looking at TAM and Consumer Behavior Theory together helps in studying digital natives living in multicultural and urban environments. Most of the earlier studies do not focus on Gen Z foreign consumers in Southeast Asia which is why this research is one of the earliest to look at their intention to buy products from platform-specific shops. The framework provided in the study helps universities discuss how e-commerce can benefit globally mobile, younger consumers.

Results of Shopee

Regression Analysis and Coefficients of the Model

A moderate and positive relationship is indicated between the independent variables and purchase intention is derived through regression analysis of Shopee user data, the model explaining 26.5% variation in user behavior ($R = 0.515$, $R^2 = 0.265$). The model is statistically significant, ($F = 9.446$, $p = 0.000$), thus, at least one factor signifies purchase intention essentially. Of the variables, user experience is the best predictor ($\beta = 0.689$, $p = 0.000$), followed by perceived usefulness ($\beta = 0.419$, $p = 0.035$), while other variables discussed herein such as ease of use and trust and security were not statistically significant. The purchase decision drivers are further confirmed by the standardized Beta values as the strongest driver being user experience. Such results indicate that Shopee should consider improving the general user experience and platform usefulness to drive customer's purchase intention.

Analysis of Relationship between the Model and Hypothesis of Shopee

Examination of the regression model for Shopee shows that of the proposed hypotheses only user experience ($H7$, $p = 0.000$) and perceived usefulness ($H1$, $p = 0.035$) significantly predict purchase intention with user experience being the chief predictor. By contrast, perceived ease of use ($H2$), trust and security ($H3$), social influence ($H4$), convenience ($H5$) and perceived value ($H6$) were not statistically significant, as their p-values were greater than 0.05. These results indicate that users on Shopee value effortless, fun and productive shopping experience, thus the need for the platform to improve on engagement aspects and practical effectiveness. Other factors, regardless of direct roles, might have some indirect roles, and they are worth pursuing.

Table 1: Relationship between the Model and Hypothesis of Shopee

Hypothesis	Path	Result	Significance (p-value)	Coefficients (β)
H1	Perceived Usefulness → Purchase Intention	Supported	0.035 (Significant)	0.419
H2	Perceived Ease of Use → Purchase Intention	Not Supported	0.781 (Not Significant)	-0.053
H3	Trust and Security → Purchase Intention	Not Supported	0.545 (Not Significant)	0.119

Hypothesis	Path	Result	Significance (p-value)	Coefficients (β)
H4	Social Influence → Purchase Intention	Not Supported	0.414 (Not Significant)	0.132
H5	Convenience → Purchase Intention	Not Supported	0.766 (Not Significant)	0.058
H6	Perceived Value → Purchase Intention	Not Supported	0.634 (Not Significant)	-0.094
H7	User Experience → Purchase Intention	Strongly Supported	0.000 (Highly Significant)	0.689

*p < 0.05 indicates statistically significant and supports the hypothesis.

** Bold values show the strongest predictors.

Results of Lazada

Regression Analysis and Coefficients of the Model

Perceived usefulness is the only predictor of purchase intention that is statistically significant from the regression analysis for Lazada users ($B = 0.197$, $p = 0.041$), indicating its undeniable importance in influencing a consumer's purchase decisions. This indicates that those users that find Lazada as efficient in the process of simplifying their shopping chores and improving transaction fluency are likely to want to continue using the platform. On the other hand, other variables such as perceived ease of use ($p = 0.862$), trust and security ($p = 0.875$), social influence ($p = 0.800$), user experience ($p = 0.345$), convenience ($p = 0.104$), and perceived value ($p = 0$). Such findings show that for Lazada users, functional efficiency and practical usefulness eclipse other experiential or social dimensions as factors capable of influencing purchase behavior. So, improving platform engagement should place an emphasis on strengthening perceived usefulness in order to increase consumer commitment.

Analysis of Relationship between the Model and Hypothesis of Lazada

The results of the analysis of the hypothesis for Lazada indicate that the significant predictor of purchase intention is only perceived usefulness (H1) ($\beta = 0.197$, $p = 0.041$), and users who consider Lazada as useful will purchase from the platform. In this research, the other hypotheses, H2 through H7 were not supported, because such factors as perceived ease of use, trust, social influence, convenience, perceived value, and user experience did not have a significant effect. In contrast to Shopee where user experience was paramount, Lazada users seem to care a lot more about usefulness than anything else in determining to purchase.

Table 2: Relationship between the Model and Hypothesis of Lazada

Hypothesis	Path	Result	Significance (p-value)	Coefficients (β)
H1	Perceived Usefulness → Purchase Intention	Supported	0.041 (Significant)	0.197
H2	Perceived Ease of Use → Purchase Intention	Not Supported	0.862 (Not Significant)	0.016
H3	Trust and Security → Purchase Intention	Not Supported	0.875 (Not Significant)	-0.015
H4	Social Influence → Purchase Intention	Not Supported	0.800 (Not Significant)	-0.021
H5	Convenience → Purchase Intention	Not Supported	0.104 (Not Significant)	0.164
H6	Perceived Value → Purchase Intention	Not Supported	0.701 (Not Significant)	0.034
H7	User Experience → Purchase Intention	Not Supported	0.345 (Not Significant)	0.083

*p < 0.05 indicates statistically significant and supports the hypothesis.

** Bold values show the strongest predictors.

Comparison of Shopee and Lazada Results

The evaluation shows that different elements have a different impact on Gen Z foreigners' intention to purchase from Shopee and Lazada. Their users in Bangkok might have similar needs, but they behave differently because of the design and expectations each one provides. Shopee's users tend to focus on different aspects, mainly user experience, yet on Lazada, users seem to focus mainly on whether an app meets their needs. The biggest difference between them is the emphasis placed on user experience. According to the regression results, the level of engagement and personalization on Shopee is the biggest driver of purchase intention ($p = 0.000$). Alternatively, the connection between how users experience Lazada and how they purchase things was not significant ($p = 0.345$), suggesting that they focus more on the transaction.

For Lazada users, usefulness was the main factor in e-commerce readiness ($p = 0.041$), while this factor presented lower importance to users in Shopee ($p = 0.035$). This explains why customers who care about how easy things are on the platform, rather than its unique features, like Lazada. Those results follow the Technology Acceptance Model (TAM) since usefulness plays a key role in technology adoption for individuals who are practically oriented. In contrast, Shopee mainly applies Consumer Behavior Theory, with the main focus on what the user experiences and feels. None of the other variables trust and security, following the crowd, ease of use and value had a significant impact on people's choice for either platform. The fact that their effectiveness is low means that users see reliability and simplicity as essential regularities. After fulfilling these aims, they concentrate on improving engagement on Shopee or making the process more efficient on Lazada.

Hypothetically, this analysis proves the importance of using different approaches on digital platforms to match each group's behavior. TAM explains Lazada users' behavior, but Consumer Behavior Theory captures why Shopee users prefer certain stores. Shopee needs to keep upgrading social shopping and personalized services, while Lazada should focus on making its platform quick, clear about prices and simple to use. To grow sustainably in Southeast Asia's e-commerce market, it is important to understand how customers act on each platform.

Discussion

This study has uncovered useful insights regarding Generation Z foreigners' plans to use Shopee and Lazada when shopping in Bangkok. It was found that the behaviors and reasons behind such actions are not the same for both sites. It appears that for Shopee, how easy and engaging the site is, matters most to Gen Z shoppers and the idea of its influence holds true. The result is aligned with previous studies highlighting that using platforms with strong gamification, social elements and special designs helps boost e-commerce engagement (Hajli, 2015; Bhatti et al., 2020).

For Lazada customers, using the platform was mainly about its usefulness which was the only significant influence. TAM suggests that the decision to use a technology largely depends on a user's belief in the benefits it can provide (Davis, 1989; Venkatesh & Bala, 2008). Speed and confidence in the delivery service seemed more important to Lazada users than forming ties with others. In fact, trust, social influence and perceived ease of use were not important for choosing one platform or the other which may indicate they are now expected by everyone.

The findings suggest that integrating TAM and Consumer Behavior Theory helps understand why people use e-commerce. Lazada's usefulness is explained by TAM, but it is Consumer Behavior Theory that reveals why Shopee is popular. Based on what they learned, this means that Shopee should improve its look and functions, while Lazada should prioritize practical features and utilities. The research helps in understanding how Gen Z consumers in Bangkok might use and accept digital platforms.

Conclusion

In this study, the Technology Acceptance Model (TAM) and Consumer Behavior Theory were employed to identify the main drivers that impact Generation Z foreigners' desire to shop with Shopee and Lazada in Bangkok. The study has confirmed that while those platforms earn high marks,

users have unique preferences. People who use Shopee prefer special experiences, including playing games for vouchers, shopping during limited offers and shopping while watching. Unlike Shopee, people who use Lazada care most about finding items that are practical and practical to use. In particular, trust, security, social reasons and perceived value proved not to be statistically significant for both platforms. Therefore, Gen Z sees these qualities as the norm rather than what sets a brand apart. They pay more attention to how the platform runs, how easy it is to use and how involved the user gets, as these elements impact their decisions to buy.

Using AI and better tools for social commerce, Shopee should keep improving features that engage customers. To reinforce its position as a useful shopping platform, Lazada should work on its search and ensure that it is quick and easy to navigate. This illustrates why e-commerce sites should apply strategies that adjust to how customers' preferences are shifting. This study demonstrates that Gen Z's methods of shopping online are linked to a variety of reasons, including both the features and the experience they get. The results can guide research on new technologies and diversity in shopping habits among people across Southeast Asia.

Recommendations for Shopee

According to the results, what determines whether somebody on Shopee makes a purchase is how they experience using the app, along with how useful they think it is. That means Gen Z foreigners in Bangkok care about apps and websites that are enjoyable to browse and use. Shopee should continue making its live-stream shopping, platform layouts and AI shopping assistants better. A better user interface, easier site navigation, a single-click checkout, live tracking and fast support make users happier.

While the importance of ease of use, trust and safety, social influence, convenience and how users see the value were not proven in the regression analysis, they are still key expectations for users. As a result, Shopee should focus on using AI to prevent fraud, taking steps to assure safe trading and simple dispute resolution. Moreover, customers appreciate a fast checkout, easy returns and smooth shipping.

In order to create loyal customers, Shopee could add personalized homepages, referral programs and VIP memberships to give benefits such as free shipping, money back and starting shopping for deals a day earlier than usual. If people can earn rewards, instant discount alerts and check ratings on e-commerce sites, they will tend to come back. While they cannot lead someone to a purchase, they do help foster feelings of attachment and bring a player back to play again. It is important for Shopee to find a balance between being easy to use, meeting users' needs and giving incentives to shoppers. If Shopee focuses on simple and pleasing transactions, it can remain the main e-commerce choice for Gen Z users in Southeast Asia.

Recommendations for Lazada

From the study, it was found that the only factor that significantly influenced Lazada users in making a purchase intention was perceived usefulness. Therefore, it shows that Gen Z shoppers mainly appreciate Lazada for its efficiency in searching, paying and shipping goods. This feature can be enhanced by including an AI-based search system, setting up a fast payment option, providing delivery tracking during transactions and installing clear shopping dashboards to help users succeed and enjoy better overall speed.

While other variables like how easy or safe a site is, social pressure to join, convenience, valued features and user experience were not significant, they help to ensure that the platform maintains trust and credibility for users. Lazada can become simpler by improving its visual appearance, making joining the service quicker and making the experience the same on any device. It should focus on improving how it prevents fraud, aid in setting clearer rules for buyers and sellers and teach users how to shop online securely. Even though social influence itself did not affect purchase intention in this study, featuring things like referral programs, suggestions from friends and posts by influential people can gain users and keep people interested. If users can use filters, determine their delivery dates and return products easily, it will reduce challenges in their journey on the e-commerce

site. Also, consumers may perceive a product as more valuable if it has open prices, rewards for regular customers and approvals from enforcement agencies.

For its users to stay loyal, Lazada ought to provide unique discounts, helpful reminder notifications and special sales based on how they shop. Only usefulness significantly affected the results, but the other factors play a role in helping customers stay loyal, place trust in the brand and prefer the platform over others. More research can help discover broader shopping habits, allowing Lazada to adapt its strategy to each region it serves in Southeast Asia.

Managerial Implication

The results of this study provide managers at Shopee and Lazada with an explicit structure for designing strategies that can be adjusted according to what will work best for Gen Z foreigners in Bangkok to drive purchase intention. Perceived usefulness became for Lazada the foremost element meaning that the users value efficiency, transaction convenience, and usefulness. Thus, managers should pay attention to optimizing search functions, simplifying the checkout, making the delivery more reliable, and adding functionality, such as an AI-based search assistance and prices comparison mechanism. On the other hand, Shopee user base is mostly driven by user experience, so platform engagement, aesthetics, and interactive elements are in the core of the business. Managers at Shopee should further develop gamification, live-stream shopping, loyalty rewards as well as personalized recommendations to maintain the user's interest and to increase engagement.

Besides, the study reveals that factors such as trust, social impact, convenience and perceived value had little influence on purchase intention. Although these elements are not conversion drivers, per se, they are anticipated by users. This implies that managers should ensure there are strict security and convenience standards but they should allocate resources in platform differentiation – Shopee on enjoyable and interactive experiences, and Lazada on speed and reliability. In order to compete they should invest in emerging technologies like AI, AR, blockchain to improve functionality, personalization, and security. Matches for platform strengths with user expectations can deliver higher satisfaction, repeat purchase, and long-term customer loyalty.

Academic Contribution

This present study has an outstanding academic implication because it deepens the insights of how purchase intention is formed dissimilarly using two major e-commerce platforms, Shopee and Lazada among Gen Z foreigners living in Bangkok. Using the Technology Acceptance Model (TAM) and Consumer Behavior Theory, the research builds a well-rounded framework to investigate such causes of consumer behavior as perceived usefulness, ease of use, trust, social influence, convenience, perceived value, and user experience. Unlike many existing studies where the use of online platforms is treated as interchangeable, this research highlights platform specific behavior, such that Shopee users are highly influenced by user experience, while Lazada users are more by perceived usefulness. This opposes the one size fits all perspective in the field of digital consumer studies and promote scholars to expand their research inferences to include platform differentiation as a major aspect of e-commerce research.

More so, the study draws our attention to several non-significant aspects such as trust, social influence and perceived value which are conventionally regarded as critical in e-commerce literature. By demonstrating that these elements do not critically influence purchase intention in this context, the research challenges the conventional approach and recommends a change of direction for Gen Z behavior toward functional efficiency and stimulating user experiences instead of price or peer validation. Methodologically, the study enhances academic rigor with correlation analysis, regression modeling and hypothesis testing, and its focus on a particular demographic group enables a distinctive and underappreciated perspective on the literature, Gen Z foreigners in Southeast Asia. It also offers theoretical understanding by expanding its scope to embrace Emotional and Interactive feature such as gamification and personalized engagement, that the consumer behavior models must adapt to the requirement of digitally oriented modern experience-based platforms.

Further Research

Although this study provides important insights into the purchase intentions of Gen Z foreigners in Bangkok using two e-commerce platforms Shopee and Lazada, future research should extend possible boundaries in terms of demographics and geographical scale to a larger portion of research population in achieving a more comprehensive understanding of e-commerce behavior. The addition of old generations like the Millennials, Gen X, and Baby Boomers may show if their shopping practices and platform expectations differ from the other digital native Gen Z users. Older customers might be concerned about such phenomena as pricing stability, transactional safety, user-friendly navigation etc., while being much less concerned about interactivity and gamification. In addition, cross-country comparison in South East Asia– involving countries such as Vietnam, Indonesia and Malaysia– could reveal regional differences in e-commerce adoption and consumer loyalty. Investigating the difference between the urban and rural user can also determine how infrastructure, cultural prejudice, and digital availability drives online shopping behavior among varied market segments.

Further research could also be enriched by applying other theoretical frameworks in addition to Technology Acceptance Model (TAM) and Consumer Behavior Theory. It is possible to get more specific insights into long-term satisfaction, impulse buying behavior, and emotional response through such frameworks as the Unified Theory of Acceptance and Use of Technology (UTAUT), Expectation-Confirmation Model (ECM), and the Stimulus-Organism-Response (S-O-R) model. Suitable for future studies is mixed-method approach that employs qualitative measures like a focus group for example, in-depth interviews and clues of emotions derived from user reviews to better understand the issues and frustrations behind consumer behavior. Such qualitative understanding can throw light on why user experience determines Shopee use but perceived usefulness plays a more important role in Lazada, providing practice directions for the platform developers and marketers.

In addition, behavioral data-driven approach would be able increase future studies by implementing actual user's activity instead of using only provided self-reported data. Web analytic tools, transaction logs and gaze tracking experiments might be used to study the real-time behavior of platform users, factors prompting abandonment of carts, and effective and ineffective elements of interface. Future studies may also investigate how users' trust, engagement and purchase intention will be affected by such emerging technologies such as artificial intelligence-enabled personalization, augmented reality (AR), virtual reality (VR), blockchain-based payment and cryptocurrency. Also, to be researched is if engagement- fueled functions such as live-stream shopping, gamification and influencer commerce create long- term brand love or threaten user fatigue. It may help determine whether or not such engagement strategies are sustainable through longitudinal studies monitoring consumer lifetime value and repeat purchases in an increasingly dynamic digital economy.

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Firm Characteristics and IPO Performance on Thailand's Market for Alternative Investments (mai)

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Abstract

This study investigated the relationships between firm characteristics of firm size, firm age, and firm revenues on long-run initial public offering performance. The sample consisted of firms listed on Thailand's market for alternative investments (mai) between 2012 and 2024 (n = 109). Firm performance was calculated using the 30-day cumulative abnormal return (CAR). Analysis was conducted using cross-tabulations and chi-square. The findings showed that the largest firms were disproportionately more likely to have cumulative abnormal returns above the expected return during the period, but there were no differences based on firm age or revenues. The research constitutes the first part of a multi-phase event study and as such is limited. These limitations and opportunities for further study, including the study in progress and other future possibilities, are elaborated.

Keywords: – Alternative markets, Firm characteristics, Initial public offering, Market for Alternative Investments (mai)

Introduction

The research reported here was concerned with firm performance following an initial public offering (IPO). The IPO marks the point where the firm's shares are offered for sale for the first time on the public market (Espinasse, 2021). IPOs are undertaken with substantial regulatory oversight and are work-intensive for the firm, meaning that they are often undertaken only for very specific reasons (Brau, 2012). While firms may undertake an IPO in order to raise a substantial amount of capital, they may also do so for several other reasons (Brau, 2012). For example, firms may choose to IPO to facilitate the exit of founders and early investors (Li, Chi, Lan, & Wang, 2025), to promote or enhance the reputation of the firm in a competitive market (Kaur & Singh, 2019), to provide funding and credibility for acquisition deals (Lee, Saunders, Panteli, & Wang, 2021), or as a rational competitive decision to keep up with other firms in the market (Pástor & Veronesi, 2005), among other reasons. In short, the IPO marks a significant change in the firm's direction and status – not just a shift in the firm's financial holdings and ownership, but potentially its strategic direction, configuration, and many other factors can change following the IPO process.

While very common, IPOs are not without their challenges for both firms and markets. Firms face significant regulatory barriers to achieving an IPO (Espinasse, 2021). Due to the time required to enact the IPO, firms may even be forced to withdraw the IPO in the face of market changes, which can result in significant direct losses for the firm, lost revenue from unrealised IPO investment, and ultimately smaller returns when the firm does eventually IPO (Humphrey, 2024). The market and its investors face a different problem – how can a stock be priced accurately when it has not been sold publicly previously? IPO pricing is undertaken by underwriting firms, which specialise in company valuation and determine a fair value opening price for the initial trading (Espinasse, 2021). However, mispricing (either overpricing or underpricing) is still a common risk for IPOs in many markets (L. X. Liu, Lu, Sherman, & Zhang, 2023). There have been a variety of efforts to explain IPO underpricing, which have different levels of evidence (Jamaani & Alidarous, 2019). Jamaani and Alidarous (2019) argued that the soundest theoretical explanation was information

asymmetry between investors, underwriters, and firm owners. However, there are also other explanations for IPO mispricing, such as deliberate underpricing on the part of underwriters in order to make the firm more attractive to initial investors (Reber & Vencappa, 2016). It is difficult to determine the long-run effects of IPO mispricing on the firm's price, as it is heavily dependent on regulation (Wang & Wang, 2021). However, this remains a significant concern for investors as well as the market. Thus, it is worth looking at what factors are associated with firm performance.

Given the importance of the IPO to the strategic and market positions of the firm, it is unsurprising that IPO pricing is a very commonly studied aspect of firm financial performance (Xia, 2025). For example, one recent bibliometric analysis found that issues like information asymmetry and agency problems, legal and regulatory environments, and social environments, as well as investor behaviour, had all been explored in detail in the past decade (Joshiyura, Mathur, & Gwalani, 2023). Even so, there are still gaps in understanding. One of these gaps is in the study of IPOs in alternative markets (Acedo-Ramírez & Ruiz-Cabestre, 2017). Alternative markets are typically adjuncts to main markets, offering a lower-regulation alternative for newer firms and those operating in riskier markets (Nielsson, 2013). While alternative market firms are typically younger and smaller than main market firms, they are not necessarily lower quality – rather, they are firms that would face a disproportionate regulatory cost to list on a main market (Nielsson, 2013). While there have been a few studies in related areas, these studies have not clearly examined what firm characteristics may influence long-run performance in alternative investment markets. Instead, these firms have mainly use firm characteristics as control variables without providing a clear explanation of what types of effects could be observed.

This study investigates IPO performance on the Stock Exchange of Thailand's (SET) Market for Alternative Investments (mai). The mai was established by the Securities and Exchange Act (1998) and began operations in 1999 (SET, 2025). As of March 2025, the mai has 222 firms listed, with one new firm listed in 2025 to date (SET, 2025). Firms listed on the MAI are typically small and medium enterprises (SMEs), for whom the market was established.

Research Objectives

The aim of this research is to investigate characteristics of the firms listed on the MAI which may be associated with IPO performance. There were three objectives set for the study. These objectives included:

To investigate differences between firms of different sizes in IPO performance in the long run among firms listed on the mai (2012-2024).

To investigate differences between firms of different ages in IPO performance in the long run among firms listed on the mai (2012-2024).

To investigate differences between firms of different sales levels in IPO performance in the long run among firms listed on the mai (2012-2024).

Literature Review

IPO Performance

IPO performance can be defined as the performance of the firm's stock in some period following the IPO (Jay R. Ritter & Welch, 2002). IPO performance can be considered either in the short run or in the long run (Jamaani & Alidarous, 2019). These terms are derived from general economic theory, and are not strictly delineated, but there are conventions about the times associated with them.

In economic theory, the short run refers to the immediate time period, when the firm and market were not capable of making changes that could affect outcomes (Becker, 2017). In IPO studies, the short run is often investigated using the first-day returns, which is the difference between the IPO price and the price at the close of the first day of trading (Killins, 2019). A positive first-day return indicates that the stock was underpriced, while a negative first-day return indicates that it was overpriced (Killins, 2019).

In economic theory, the long run refers to the time period in which both the firm and the market may have made changes which could affect outcomes, such as financial announcements or other news (Becker, 2017). The time horizons of long run studies of IPO performance varies quite a bit, with studies using windows from a few days post-IPO up to three years, and many studies investigating multiple time windows (Megaravalli, 2023). Historically, studies have not typically tried to investigate the very long run (more than three years past IPO), as by that point any effect of the IPO or its conditions on firm performance will have dissipated (J R Ritter, 1991). Furthermore, studies have suggested that small firms (such as those listed on the mai) may have worse long-run performance compared to larger firms (Goergen, Khurshed, & Mudambi, 2007). This research focuses on long run periods of 30 and 60 days and one year.

Measuring stock performance: Cumulative Abnormal Return (CAR)

There is an obvious problem in measuring the performance of a stock over the long run, which is that market conditions – not just the firm’s own performance – affects the stock price due to systemic risk (Dong, Li, Rapach, & Zhou, 2022). Therefore, what is relevant is not the expected return (which is based on the portfolio return and initial price), but the abnormal return, or the extent to which the firm’s stock price has deviated from the expected return (Dong et al., 2022). While expected returns are thought to result from expected performance under established market conditions, abnormal returns are thought to result from the firm’s own characteristics and performance (Jacobsen, 1988). Thus, abnormal returns are one of the indicators which investors look at to determine whether the firm is performing at, below, or above market expectations (S. Liu, Yin, & Zeng, 2021).

In order to investigate the long-run performance of the IPO, this study uses the cumulative abnormal return (CAR). The CAR is a measure derived from event studies, which investigate the effect of a specific event on market prices or other measures (McWilliams & Siegel, 1997). Rather than measuring abnormal returns on a single date (as in the first-day return measure discussed above), CAR represents the accumulation of abnormal returns of the stock against the market over a period of time (McWilliams & Siegel, 1997).

CAR is calculated using the sum of abnormal returns, which is calculated as

$$CAR = \sum R_t - E[R_t]$$

where R_t = the return of the stock on day t and $E[R_t]$ is the expected return of the stock on day t (Kliger & Gurevich, 2014). (The expected return is typically calculated using the capital asset pricing model (CAPM) or similar models (Kliger & Gurevich, 2014).) e

Factors in IPO Performance

Firm Size

The first factor considered in IPO performance is that of the firm’s size. Evidence from older studies suggested that smaller firms may have poorer performance than large firms (Goergen et al., 2007; J R Ritter, 1991). However, these studies were conducted on main markets, and therefore were not comparing firms in the SME category, such as those that list on the SET. More recent studies have had conflicting findings with respect to firm size and its effect on market performance. A study in the Jordanian market found that firm size was a positive predictor of CAR, indicating that larger firms typically had larger CAR (Al-Shawawreh & Al-Tarawneh, 2015). However, a study in Asian emerging markets have shown that small firms are associated with higher levels of alpha (a measure of performance of the stock price compared to the market), higher levels of exposure to both total risk and firm-specific risk, and higher expected and abnormal returns compared to larger firms (Ma, Chu, & Beaves, 2020). This suggests that firm size does make a difference in the performance of the firm, but at the same time Ma et al. (2020) were not studying the effect of firm size relative to the market. Other studies have used firm size as a controlling variable in their studies of IPO performance, but have not typically focused on providing an explanation of why firm size influences IPO performance or whether there are differences between firms of different sizes (S. Liu et al., 2021). At the same time, a study from the US found that smaller firms were disadvantaged in CAR performance during all time periods, especially those in the first quartile of pre-IPO asset size (Siev & Qadan, 2022). Another study from the United States does provide a possible explanation, indicating that smaller firms are typically under less scrutiny than larger firms and may have higher information asymmetries

(Osborne, 2020). This evidence suggests that firm size will be a differentiating factor in IPO performance:

Hypothesis 1: Long-run IPO performance will be higher for larger firms.

Firm Age

The firm's age may be a factor in long-run IPO performance for multiple reasons (Fodor, Lovelace, Singal, & Tayal, 2024). The first reason is substantive – older firms have survived more varied market conditions and are more likely to have proven products, revenues, and other technical indicators that support their stock price. However, Fodor et al. (2024) also point out that investor perception of the firm's stage in its lifecycle may also affect share performance, with older firms being viewed as more mature and stable compared to younger firms (Fodor et al., 2024). Thus, it could be expected that older firms are likely to have higher CAR than younger firms when measuring from the IPO.

Firm age is regularly used as a variable to predict long-run IPO performance. For example, a study in the Jordanian stock market (1993 to 2011) investigated long-run performance over 60 months (5 years), which is a longer period than typical (Al-Shawawreh & Al-Tarawneh, 2015). This study found that company age was positively associated with CAR using two different predictive models; in other words, older firms had higher CAR than younger firms (Al-Shawawreh & Al-Tarawneh, 2015). Another study investigated post-IPO performance using a panel data analysis approach, which decomposed the sample by age (Siev & Qadan, 2022). This study showed that younger firms had lower CAR than older firms, regardless of methodology (Siev & Qadan, 2022). These studies point to a consistent relationship between firm age and long-run IPO performance, leading to a second hypothesis:

Hypothesis 2: Long-run IPO performance will be higher for older firms.

Firm Revenues

While firm characteristics such as pre-IPO size and age may affect CAR, particularly in the long run the firm's performance is likely to be the determining factor in stock market performance (S. Liu et al., 2021). This research uses revenues (gross sales) as a performance-related indicator of CAR. While it may seem like revenue is an obvious indicator of CAR, this is not necessarily true, as revenue announcements are considered as part of the firm-specific expected returns (Kliger & Gurevich, 2014). However, there is some potential effect even outside this indirect influence. A study conducted in the Canadian market found that in the short run, there was a positive effect of pre-IPO revenues on post-IPO performance (Killins, 2019). However, this condition would not necessarily persist in the long run. One study, which was conducted in the Jordanian stock market, found that there were higher levels of abnormal returns observed around earnings announcements, and that furthermore abnormal return levels were higher (lower) for firms which announced positive (negative) earnings surprises (Al-Shattarat & Al-Shattarat, 2017). The implication of this is that over time, the effect of positive earnings is likely to accumulate; therefore, firms with higher levels of revenues are likely to have higher CAR over time. Another study, conducted in the French stock market, found that higher levels of profitability were more likely to have higher CAR as well (Hatem, 2015). Furthermore, Hatem (2015) found that an increase in profitability was also associated with an increase in CAR. Overall, these studies support a positive relationship between firm revenues and IPO performance, which is stated in the final hypothesis as:

Hypothesis 3: Long-run IPO performance will be higher for firms with higher revenues

Theoretical Basis for Firm Characteristics and IPO Performance

This study builds upon several foundational theories to explain how firm characteristics may influence IPO outcomes, particularly in the context of long-run performance. The signaling theory (Spence, 1973; Ross, 1977) suggests that observable firm characteristics, such as age, revenue, or size, may serve as credible signals of quality to investors at the time of listing. For instance, older firms may signal operational maturity and reduced information asymmetry, potentially leading to stronger aftermarket performance. In contrast, the information asymmetry theory (Rock, 1986) posits that differences in firm visibility and available financial history may lead to varying levels of mispricing at IPO. Furthermore, the life-cycle theory of the firm (Berger & Udell, 1998) supports the idea that younger and smaller firms tend to be riskier and more volatile, which may manifest in different performance trajectories post-IPO. Incorporating these theoretical lenses helps explain the rationale behind selecting firm fundamentals as independent variables in this analysis.

Research Methodology

The research used an event study methodology, which is a statistical design which compares changes after an event, typically to performance at or prior to the event's occurrence (Kliger & Gurevich, 2014). As this research is still in progress, the findings presented here are related to the earliest phases of the research.

Variables and measurement

There were four key variables measured in this stage of the research. Table 1 summarizes the operational definitions, calculations (where applicable), and sources for the variables of interest: firm size, firm age, firm revenues, and CAR (Cumulative Abnormal Return). All variables were analyzed in categorical form due to the nominal nature of the data and the study's use of nonparametric techniques.

Categorical measurement was selected to align with the exploratory aims of the study and to support the application of chi-square testing, which is suitable for assessing distributional differences across groups in cases where parametric assumptions such as normality and linearity may be violated (Corder & Foreman, 2014; Hair et al., 2019). This decision was also driven by the specific structure of the dataset, where firm characteristics—especially revenue and age—exhibited non-normal and heavily skewed distributions, common in SME-focused markets.

Importantly, regression or multivariate analysis was not employed in this phase of the research. This is because the objective at this stage was to examine *associative patterns* in a nominal context rather than test predictive models. Parametric regression techniques, while powerful for continuous variables, are not ideal for nominal comparisons or early-stage hypothesis exploration where the emphasis is on group-level differences (Field, 2013). Moreover, in junior and emerging markets like the mai, where firm fundamentals often deviate from distributional assumptions, the interpretability and stability of regression coefficients can be problematic (Killins, 2019; Chiraphol, 2021). Nonparametric tests allow for more flexible analysis under such conditions and have been widely used in IPO research focused on small-cap and alternative market contexts (Aggarwal & Rivoli, 1991; Ahmad-Zaluki et al., 2007).

In designing the grouping thresholds for the categorical variables, both theoretical precedent and sample distribution characteristics were taken into account. Firm size, calculated using the natural log of market capitalization, was divided into tertiles—small, medium, and large—based on the sample's distribution. This approach follows prior IPO research that stratifies firm size into percentile-based categories to capture cross-sectional heterogeneity (Al-Shawawreh & Al-Tarawneh, 2015). Similarly, firm age at IPO was divided into three categories (young, mid-aged, mature) using benchmarks established in long-run IPO literature (Siev & Qadan, 2022). Firm revenue, which tends to exhibit strong positive skew among SMEs, was classified based on percentile cutoffs to ensure comparability and reduce bias from extreme values (Killins, 2019). These categorization choices supported interpretability while improving internal consistency for nonparametric group comparison.

Overall, these methodological decisions reflect the specific characteristics of junior market data and the study's early-stage, exploratory positioning. The use of nominal-level analysis allows for broader inclusion of cases and avoids imposing statistical assumptions that may not hold in the context of SME-dominated, alternative markets.

Table 1: Variable definitions and measurement

Variable	Definition and Calculation	Measurement Levels	Sources
Firm Size	The firm's Market Capitalization at the time of IPO as calculated by: $\text{Ln}(\text{Market Capitalization})$	• < 20 • 20.01 to 20.50 • > 20.5	Al-Shattarat & Al-Shattarat (2017) Al-Shawawreh & Al-Tarawneh (2015) Ma et al. (2020)
Firm Age	The firm's age from initial founding at the time of IPO (Total years)	• 15 years or younger • 16 to 20 years • More than 21 years	Al-Shawawreh & Al-Tarawneh (2015) Siev & Qadan (2022)

Variable	Definition and Calculation	Measurement Levels	Sources
Firm Revenues	The firm's gross sales in the pre-IPO period	• Less than 1,000 • 1,001 to 2,000 • More than 1,000	Al-Shattarat & Al-Shattarat (2017) Killins (2019)
Positive Cumulative Abnormal Returns (CAR)	Average CAR for three periods (6 months, 1 year, 2 years)	• Positive CAR • Negative CAR	Al-Shawawreh & Al-Tarawneh (2015) Siev & Qadan (2022)

Data collection

The period of analysis for the study was 2012 to 2024. During this period, approximately 150 firms have listed on the SET mai, although not all of these firms have survived. A summary of key statistics from 2021-2025 is provided in Table 2, showing the general trend in mai listing. As this shows, the market has increased significantly over the past several years, but there is some turnover, with firms moving from the mai to SET due to improve regulatory compliance or less frequently being delisted from the SET. The sample included all firms listed during the time period and which remain active on the mai (n = 109). This does introduce survival bias in the sample as firms often delist from stock exchanges due to either firm failure or poor performance (Bessler, Beyenbach, Rapp, & Vendrasco, 2023). However, it was unavoidable in this case due to the availability of data, as the SET removes data for delisted firms after a certain period. Therefore, it made sense to exclude all delisted firms, rather than including only firms which had newer delisting. All data was collected from SET statistical databases.

Table 2: Firms listed on the mai (2021-2025)

	2021	2022	2023	2024	2025 (to March)
Total firms listed	183	198	213	220	222
New firms listed	18	18	20	19	2
Firms delisted or suspended	.	.	2	3	.
Firms moved to SET	10	3	3	9	.
<i>Market Performance</i>					
Dividend yield (%)	1.18	1.14	1.53	2.47	.
Market P/E Ratio	58.21	54.51	109.18	41.84	.
Daily average turnover (million baht)	1,302,017.55	1,336,839.74	546,463.22	359,095.99	.
Total market capitalization (million baht)	5,402.56	5,547.05	2,248.82	1,471.70	.

Source: (Stock Exchange of Thailand, 2025)

Analysis

Analysis was conducted in SPSS. The analysis began with descriptive statistics (distribution frequencies), which highlighted the relative size of each group. Cross-tabulations and Pearson chi-square were then calculated for CAR by each of the three firm characteristics (firm size, firm age, and firm revenues). These nonparametric statistics were selected because it was observed that the data did not have a normal distribution, which was expected given the relatively small size of the sample. Therefore, a non-parametric approach was viewed as being more effective at investigating distribution characteristics than parametric approaches such as ANOVA (Corder & Foreman, 2014). Statistical differences in distribution of grouped variables are tested at $p < .05$, following standard practice for nonparametric tests (Corder & Foreman, 2014).

Research Findings

Descriptive statistics

Descriptive statistics are summarized in Table 3. As this shows, the sample was divided relatively evenly between firm size groups, with about one third of each group falling into the three revenue groups. However, firms were noticeably older, with 62.4% of the sample being over 20 years at the time of listing and only 11.9% of the sample being 15 years or younger. The firms were relatively small in size, with most firms (73.4%) falling into the smallest category by market capitalization. Furthermore, most firms achieved negative CAR (86.2%), with only a small number of firms achieving positive CAR (13.8%). This indicates that firms are relatively small, older than 20 years, and did not outperform the market expectations.

Table 3: Summary of distribution tables

	N	%
<i>Firm Size (ln(Market Capitalization))</i>		
20 and under	36	33.0
20.01 to 20.5	39	35.8
Over 20.5	34	31.2
<i>Firm Age (Years)</i>		
15 and under	13	11.9
16 to 20	28	25.7
Over 20	68	62.4
<i>Firm Revenues (Million Baht)</i>		
1,000 and under	80	73.4
1,001 to 2,000	17	15.6
Over 2,000	12	11.0
<i>CAR</i>		
Negative CAR	94	86.2
Positive CAR	15	13.8

Chi-square tests

Chi-square tests were used to compare CAR performance (at or below expected return/above expected return) between different groups of firms by firm size, firm age, and total sales (Table 4).

CAR performance group by firm size. Firm sizes were relatively evenly distributed between groups. However, 60% of the firms with positive CAR were in the firms with the largest assets, a category which included only 26.6% of the total firms. The chi-square test ($\chi^2 = 7.290$, $p = .026$) confirms that this is a significant difference in the distribution of positive CAR firms between categories. This can be interpreted to indicate that firms with more assets were also more likely to have CAR higher than expected returns.

CAR performance group by firm age. Firms were heavily tilted toward the oldest age groups, with 68 firms (62.4%) of the sample being 20 years of age or older. The oldest group of firms with positive CAR were also aged 20 and over (80%). The chi square test showed that there was not a significant difference in the expected distribution between groups (2.302, $p = .316$). This indicates that there were no groups that were more prone to high CAR performance than would be expected given their original distribution.

CAR performance group by firm revenues. In this comparison, most firms were in the 1,000 million baht or less group (73.4%). The largest group of firms with positive CAR was also in this group (80%). The chi-square test indicated that there was not a significant difference in the expected distribution (1.078, $p = .583$). This indicates that there were no groups that were more likely to have CAR higher than expected returns based on revenues.

Table 4: Cross-tabulation and chi square: CAR performance by firm characteristics

	CAR			Chi Square	P
	≤ ER	> ER	Total		
<i>Firm Size (ln(Market Capitalization))</i>				7.290	.026
20 and under	32	4	36		
	34%	26.7%	33%		
20.01 to 20.5	37	2	39		
	39.4%	13.3%	35.8%		
Over 20.5	25	9	34		
	26.6%	60%	21.2%		
<i>Firm Age (Years)</i>				2.302	.316
15 and under	12	1	13		
	12.8%	6.7%	11.9%		
16 to 20	26	2	28		
	27.7%	13.3%	25.7%		
Over 20	56	12	68		
	59.6%	80%	62.4%		
<i>Firm Revenues (Million Baht)</i>				1.078	.583
1,000 and under	68	12	80		
	72.3%	80%	73.4%		
1,001 to 2,000	16	1	17		
	17%	6.7%	15.6%		
Over 2,000	10	2	12		
	10.6%	13.3%	11%		

Conclusion and Discussion

This research found that there were some differences in distribution of CAR above expected return based on firm size (Market Capitalization), with a larger proportion of these firms falling into the largest size group than the largest size group accounted for overall. This finding supports Hypothesis 1. It was consistent with some studies, but not all, for example a study which suggested that firms with larger revenue gained higher CAR in Jordan (Al-Shawawreh & Al-Tarawneh, 2015) and that smaller firms achieved lower CAR in the United States (Siev & Qadan, 2022). Therefore, this finding was as expected. However, the finding that there were no significant differences in the distribution of higher CAR than expected return by age groups was surprising, and led to rejection of Hypothesis 2. This finding was inconsistent with some prior studies (Al-Shawawreh & Al-Tarawneh, 2015; Siev & Qadan, 2022), which does raise the question as to whether this was a methodological difference or a true difference. The finding on CAR and firm revenues also led to rejection of Hypothesis 3. However, this rejection was less surprising, given that evidence came from either short run IPO studies (Killins, 2019) or contexts such as earnings announcements (Al-Shattarat & Al-Shattarat, 2017), or using different measures such as profitability (Hatem, 2015). Thus, this was in some ways the least supported hypothesis and the one which may require the most additional research.

In conclusion, this study has reported on the initial steps in analysis of IPO performance in Thailand's mai, an alternative market specifically for small and medium sized firms. The research set out with three initial objectives, including studying (1) differences between firm sizes and CAR above expected return, (2) differences between firm ages and CAR above expected return, and (3) differences between firm pre-IPO revenues and CAR above expected return (positive CAR) among firms listed on the mai. The study has shown that there are some firm characteristics, such as firm size, which do have an effect on the long run performance (30 days post IPO) of the SMEs that list on the mai. However, there are other characteristics, such as pre-IPO revenues and firm age at the time of IPO, that do not appear to have a differential effect on CAR above expected returns. The absence of significant relationships between firm age or revenue and long-run CAR in this study can be interpreted in several ways. First, in smaller or less efficient markets such as the mai, investor attention and trading behavior

may be less aligned with firm fundamentals (Chiraphol, 2021), reducing the impact of such variables on aftermarket performance. Additionally, IPO pricing in junior markets may be more heavily influenced by exogenous or behavioral factors (e.g., timing during bull markets, regulatory leniency, herd behavior), which dilute the predictive power of financial fundamentals (Álvarez & González, 2005). Finally, IPOs of smaller firms often lack analyst coverage, which limits the diffusion of firm-specific financial signals and could explain why variables like revenue or age fail to exhibit consistent predictive value. The research represents an initial contribution to understanding of long run IPO performance in alternative markets. This is a potentially important contribution because these markets have not been studied much, with most research focusing on main markets. When completed, the main research will offer much deeper insights into IPO performance on the mai.

This study has several limitations that should be acknowledged in order to appropriately contextualize its findings which, These findings carry important implications for multiple stakeholders. The significant association between firm size and positive CAR suggests that larger firms may attract greater investor confidence or institutional participation in the aftermarket. For SMEs planning an IPO on the mai, scaling operations and improving pre-listing visibility may improve post-IPO valuation. Investors, particularly retail participants, should consider firm size as a risk signal when evaluating IPOs in junior markets. Regulators may also explore differentiated disclosure or support mechanisms tailored to smaller firms to bridge information gaps and enhance market efficiency on alternative exchanges like the mai. However, this study also has several limitations that should be acknowledged in order to appropriately contextualize its findings and inform future avenues of inquiry. First, the dataset was limited to firms listed on Thailand's Market for Alternative Investments (mai) between 2012 and 2024. As a junior exchange focused on small and medium-sized enterprises (SMEs), the mai has distinctive regulatory characteristics and investor profiles compared to Thailand's main exchange (SET) or international markets. Consequently, these findings may not be generalizable beyond this specific institutional context (Chiraphol, 2021). Second, this research employed a non-parametric, distributional approach using chi-square tests, rather than parametric regression or multivariate analysis. This decision was based on the nominal structure of the grouping variables and the exploratory nature of the research. While non-parametric methods are appropriate when the assumptions of normality or linearity are not met (Hair et al., 2019), they do not account for confounding variables or interaction effects, which could be influential in shaping IPO outcomes.

In terms of future research, several expansions are already underway. The next stage of the study will incorporate a broader set of firm-level variables, including pre-IPO profitability, ownership concentration, and underwriter characteristics variables that have been shown to influence IPO pricing and long-run performance in prior literature (Ahmad-Zaluki et al., 2007; Ritter, 1991). Additional event windows will also be introduced, extending beyond 30 days to 60 days, 1 year, 2 years, and 3 years post-IPO, in order to better assess the trajectory of performance over time. Importantly, the final research design will incorporate fixed-effects panel regression analysis to control for time-invariant firm heterogeneity and improve causal inference.

Beyond the scope of this study, future research should explore comparative studies between alternative markets across Southeast Asia and other emerging economies to determine whether similar underperformance patterns exist across different regulatory and market structures. Another valuable avenue is the examination of regulatory design and disclosure standards and how they affect post-IPO outcomes in junior markets. Such comparative regulatory studies could illuminate why some alternative markets are more efficient at integrating firm fundamentals into stock prices than others. Moreover, future studies might also consider qualitative methods, such as interviews with IPO advisors, institutional investors, or regulators, to complement the quantitative data and provide richer contextual insight into decision-making processes behind IPO pricing and listing readiness. These expanded methodologies will significantly enhance our theoretical understanding and offer practical recommendations for policymakers and capital market stakeholders seeking to optimize IPO outcomes in emerging financial ecosystems.

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Factors Influencing the Acceptance of AI Systems for Analyzing Medical Test Results in Bangkok's Government Hospitals

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Abstract

Thailand's healthcare system is currently facing a range of complex and urgent challenges, largely driven by shifting demographic and socio-economic conditions. The nation is rapidly becoming an aging society, while urbanization and globalization continue to reshape public health infrastructure and service demands. At the same time, rapid advancements in medical technologies—particularly artificial intelligence (AI)—are presenting both opportunities and obstacles in the quest to provide equitable, high-quality healthcare services across the country. As public expectations for healthcare continue to rise, Thailand must address critical shortages in healthcare facilities, diagnostic equipment, and skilled professionals—especially in rural and underserved regions. Despite substantial progress in expanding health services, disparities in service distribution and accessibility remain significant. Recognizing these issues, the Ministry of Public Health has introduced five strategic directions to strengthen the national healthcare system: (1) expanding universal healthcare coverage, (2) strengthening preventive healthcare measures, (3) improving elderly care services, (4) integrating healthcare and economic development, and (5) leveraging AI to improve medical treatment. AI holds immense potential to transform the healthcare sector by enhancing diagnostic accuracy, streamlining patient data management, accelerating drug discovery, personalizing treatment, and improving operational efficiency. However, the adoption of AI in public hospitals faces several barriers, including concerns about data security, the need for staff training and adaptation, and the development of robust regulatory frameworks. The successful implementation of AI solutions depends not only on technical readiness but also on the acceptance and trust of healthcare professionals who will use these systems. This study aims to investigate the factors influencing the acceptance of AI-driven diagnostic systems in government hospitals in Bangkok. By analyzing patterns of current usage, identifying obstacles, and examining enabling factors, the research seeks to provide strategic insights to enhance AI integration in clinical settings, inform relevant public policies, and support healthcare equity across Thailand. This research adopts a quantitative approach and collects data from a sample of 400 participants, consisting of patients and healthcare personnel in public hospitals across Bangkok. The sample includes doctors, nurses, medical technologists, and administrative staff involved in the medical diagnostic process. A structured questionnaire is used to measure the following constructs: Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), Facilitating Conditions (FC), Trust, Transparency, AI Literacy, Acceptance of Explainable AI (XAI) and Intention to Use AI Technology Data will be analyzed using Structural Equation Modeling (SEM) to test the relationships among the variables and identify the most significant predictors of AI system acceptance in diagnostic practices. This study is expected to offer evidence-based insights into the factors that support or hinder the adoption of AI in public healthcare institutions. By identifying key enablers and barriers, the research will help policymakers, hospital administrators, and technology developers to better design, implement, and promote AI solutions in a way that aligns with user needs and institutional realities. Ultimately, these findings aim to contribute to a more equitable, efficient, and forward-looking healthcare system in Thailand.

Introduction

Thailand's healthcare system is currently facing numerous challenges, including an aging population, rapid urbanization, increasing global trade and investment connectivity, and advancements in medical technology. These factors have heightened public expectations for high-quality healthcare services. Despite continuous improvements in both the quantity and quality of public health services—primarily driven by the Ministry of Public Health, with additional support from other government agencies and private sector institutions—there remain gaps in service accessibility. University-affiliated hospitals, originally established for education and research, have also taken on an increasingly significant role in providing medical services to meet the growing healthcare demands.

A key issue in Thailand's public health sector is the shortage of medical facilities, equipment, and specialized personnel. The distribution of healthcare professionals remains uneven, particularly in rural and remote areas. According to a study on public sector workforce strategies by the Office of the Civil Service Commission in collaboration with Chulalongkorn University, Thailand has approximately 31,939 practicing physicians, with a national doctor-to-population ratio of 1:1,985. Within the public sector, 21,500 physicians serve a ratio of 1:2,948, while the Ministry of Public Health employs only 11,025 doctors, with a ratio of 1:5,750—significantly below the World Health Organization's recommended standard of 1:5,000. Although Thailand's overall doctor-to-population ratio is better than that of some other countries, there are still shortages, particularly in small community hospitals and remote regions, necessitating policy-driven solutions to improve medical service distribution.

To address these challenges, the Ministry of Public Health has established key strategies to enhance healthcare access, strengthen preventive healthcare, improve elderly care, and integrate healthcare services into economic development. The government aims to increase access to primary healthcare, expand community-based health services, and utilize telemedicine to reduce travel burdens for patients. Hospitals are being modernized to provide patient-centered care, while efforts are underway to integrate public health networks across different levels of care to reduce congestion and waiting times. Furthermore, there is a strong emphasis on health promotion and disease prevention, empowering communities to actively participate in maintaining their well-being.

One of the most transformative innovations in healthcare today is artificial intelligence (AI), which plays a crucial role in diagnosing diseases, managing patient data, developing new treatments, and optimizing medical workflows. AI-powered technologies can analyze medical images, assist in personalized treatment planning, and enhance efficiency in healthcare operations. However, integrating AI into public hospital systems presents several challenges, including data security concerns, healthcare professionals' adaptability, and regulatory frameworks to ensure safe and ethical AI applications in medical practice.

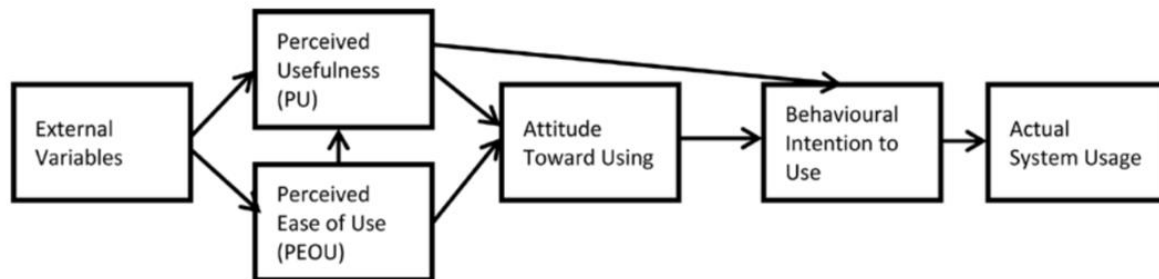
This research aims to explore the factors influencing the acceptance of AI-based medical diagnostics in public hospitals in Bangkok. The study seeks to provide insights into how AI can be effectively integrated into the healthcare system, support government policymaking, and enhance hospital services to meet the needs of both medical professionals and patients. By understanding these factors, this study aims to contribute to the development of AI-driven healthcare solutions that improve accessibility, efficiency, and overall patient outcomes in Thailand's public hospital system.

Research Objectives

1. To examine the level of acceptance of AI systems for analyzing medical test results in government hospitals in Bangkok
2. To analyze the factors influencing the acceptance of AI systems in medical test analysis, including accuracy, satisfaction, and user trust.
3. To propose strategies for promoting the effective adoption of AI systems in analyzing medical test results in government hospitals in Bangkok.

Literature Review

Theory of Technology Acceptance Model (TAM) Figure 1 presents a quick view on the most popular theories and models of technology acceptance . As seen, some theories are extended from other theories and models.



Source: Davis (1989)

Figure 1: Framework of the technology acceptance model (TAM)

Theory of Technology Acceptance Model (TAM 3) (Venkatesh and Bala, 2008) TAM3 introduces three key relationships that were not empirically tested in the earlier studies by Venkatesh (2000) and Venkatesh and Davis (2000). The model proposes that user experience acts as a moderating factor influencing the following relationships :

1. between perceived ease of use and perceived usefulness,
2. between computer anxiety and perceived ease of use, and
3. between perceived ease of use and behavioral intention to use the technology .

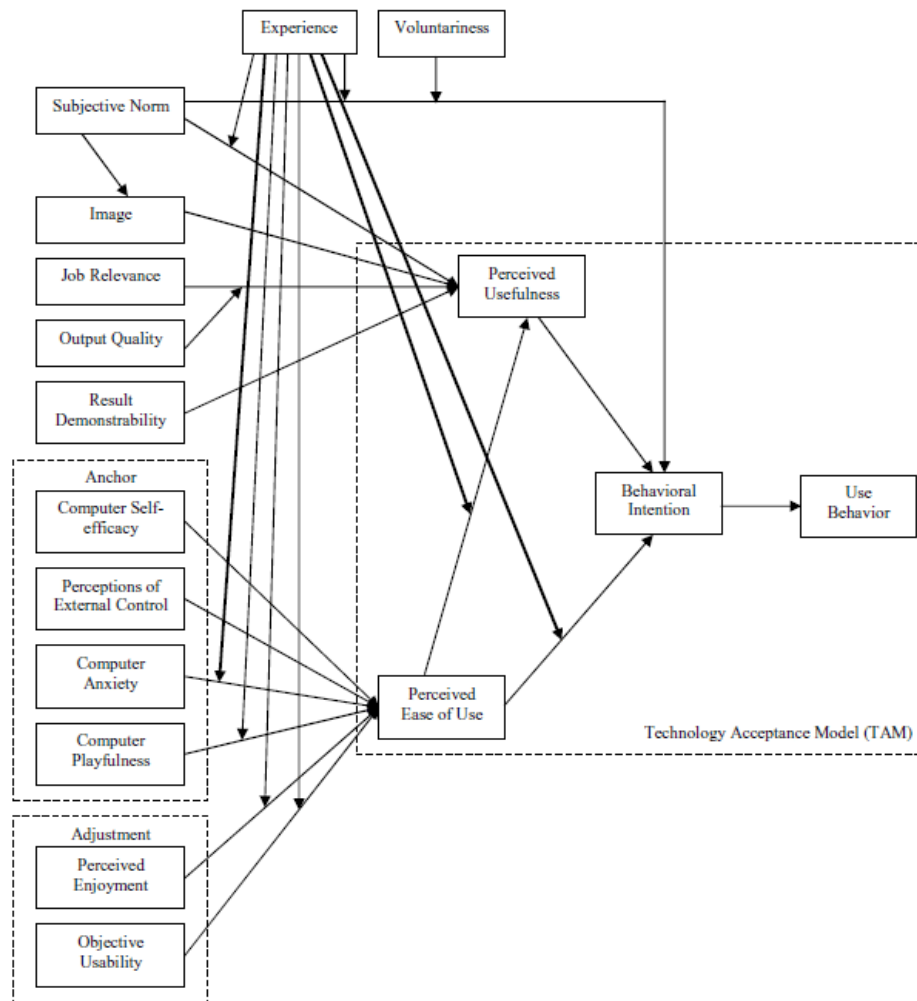


Figure 2: Framework of the Technology acceptance model 3 (TAM3)

Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003) The UTAUT model identifies four primary determinants that influence users' behavioral intention (BI) to adopt a technology: performance expectancy (PE), effort expectancy (EE), social influence (SI), and facilitating conditions (FC). Additionally, gender, age, experience, and voluntariness of use serve as moderating variables that can affect the strength of these relationships.

Developed by Venkatesh et al. (2003), UTAUT integrates elements from eight prior technology acceptance models and has been widely used in various domains to explain user adoption behavior (e.g., Abdel-Wahab, 2008; Kasse & Balunywa; Lee, Yoon, & Lee, 2009; Tagoe, 2012). Prior studies, including those based on the original Technology Acceptance Model (TAM), have consistently shown that perceived usefulness and ease of use are central to technology acceptance (Davis, 1989). These two factors are closely aligned with the UTAUT constructs of performance expectancy and effort expectancy, respectively.

In the context of this study, which explores the adoption of AI systems for analyzing medical test results in government hospitals in Bangkok, the UTAUT model serves as a suitable theoretical foundation. Specifically, the research considers how healthcare professionals' experience with digital tools, their perception of AI's accuracy and efficiency (performance expectancy), their perceived ease of integrating AI into existing workflows (effort expectancy), as well as institutional support (facilitating conditions) and peer influence (social influence), all contribute to their willingness to adopt AI systems. Moderating factors such as prior experience with AI and organizational readiness are particularly relevant in understanding technology acceptance within the public healthcare sector.

By applying the UTAUT framework, this study aims to identify actionable factors that can guide successful AI integration in public hospitals, thereby improving diagnostic accuracy, reducing workload, and enhancing patient care outcomes .

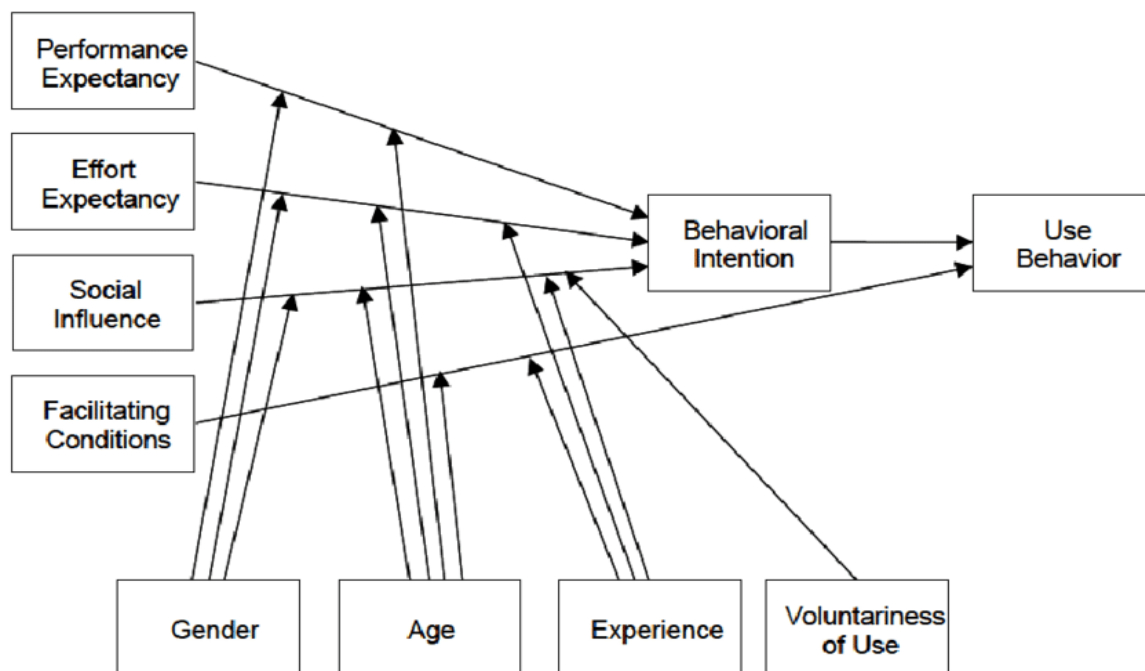


Figure 3: Framework of the Unified Theory of Acceptance and Use of Technology (UTAUT)

AI Literacy and UTAUT

AI literacy the ability to understand, use, evaluate, and engage ethically with AI technologies (Southworth et al., 2023) can be integrated into UTAUT to deepen our grasp of what drives adoption.

First, by adding AI literacy as an antecedent to UTAUT’s core constructs, we recognize that users’ familiarity and competence with AI influence both their performance expectancy and effort expectancy . In other words, the better students understand how a text-based GenAI tool works, the more they will:

- Expect it to improve their performance (Performance Expectancy): they believe the tool will enhance their grades and learning outcomes.
- Perceive it as easy to use (Effort Expectancy): they feel confident they can use it with minimal effort.

Second, this extension contributes to the growing literature on AI literacy by showing how ethical engagement and critical evaluation skills not only shape attitudes toward AI tools but also affect the traditional UTAUT pathways. It underscores that AI literacy does not just prepare users to operate AI it actually strengthens the links from perceived usefulness and ease of use to behavioral intention (Jang, 2024).

Explainable AI (XAI)

Trust and Transparency in AI: The authors might have examined research on the importance of trust and transparency in technology acceptance, particularly in the context of explainable AI (XAI) and user confidence.

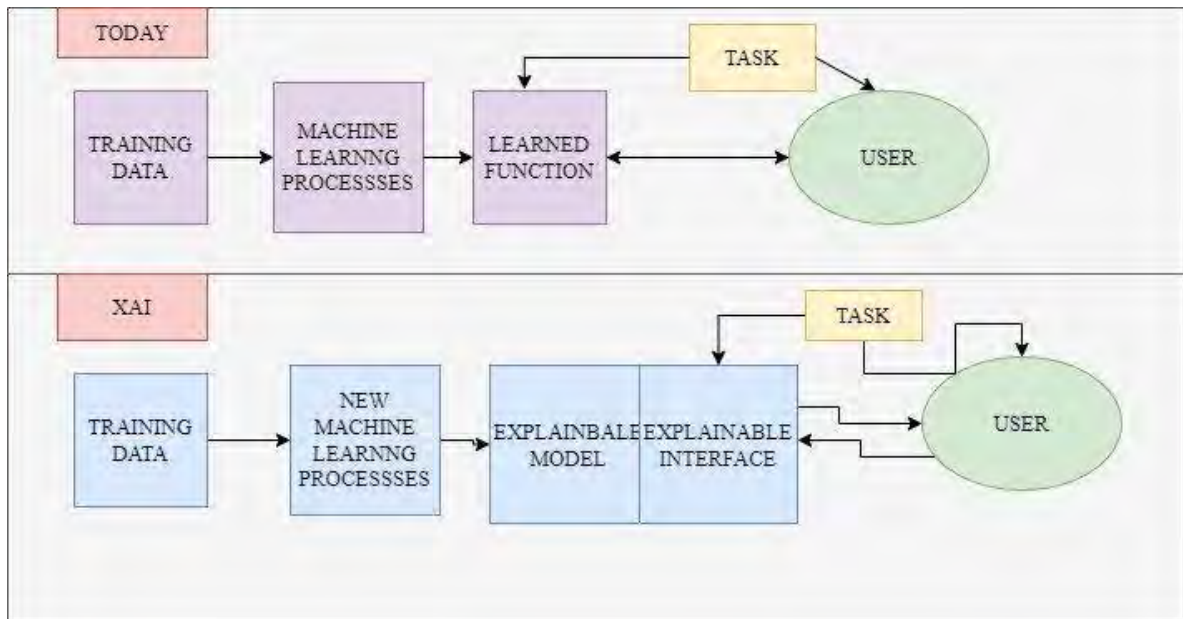


Figure 4: Difference between AI And XAI

Explainable AI (XAI) not only delivers high-performance decision-making but also illuminates the rationale behind each prediction, thereby fostering greater transparency and trust in AI -driven healthcare. By exposing the internal logic of complex models—such as highlighting key features or translating model outputs into clear “if-then” rules—XAI empowers clinicians to validate and confidently act on AI recommendations (Adeniran et al., 2024). This dual focus on accuracy and interpretability positions XAI as a catalyst for safer, more accountable, and widely adopted AI solutions in the future of healthcare .

Explainable AI (XAI) is instrumental in building trust among healthcare professionals by enhancing the transparency and comprehensibility of AI -driven tools. XAI ’ s role in improving transparency and understanding enhances clinicians ’ trust in AI tools, facilitating their integration into routine clinical workflows and improving patient care .

XAI contributes to trust in several ways . Firstly, it provides clear, interpretable explanations for AI-generated predictions and recommendations. This transparency allows clinicians to see how their patient ’ s data affects the AI’ s recommendations, facilitating a better understanding and validation of the system’s outputs.(Adeniran et al., 2024)

XAI can reveal whether the AI model is relying on biased or irrelevant factors, allowing clinicians to adjust their use of the tool accordingly (Gunning, 2017).

User Factors

Trust and Transparency: Users need to trust AI systems, which can be fostered through explainable AI (XAI) that clarifies decision-making processes (Rane et al., 2024).

AI Literacy: Healthcare professionals' understanding of AI technology significantly impacts their willingness to adopt it (Hua et al., 2023).

Perceived Usefulness: The belief that AI will enhance diagnostic accuracy and improve patient outcomes is vital for acceptance (Börker, 2023).

Propose Conceptual Framework

For developed a proposed conceptual framework for future research that addresses these issues. This framework builds on established theories like TAM3, UTAUT, and integrates XAI (Explainable AI), while expanding the research design to include multiple perspectives and longitudinal analysis.

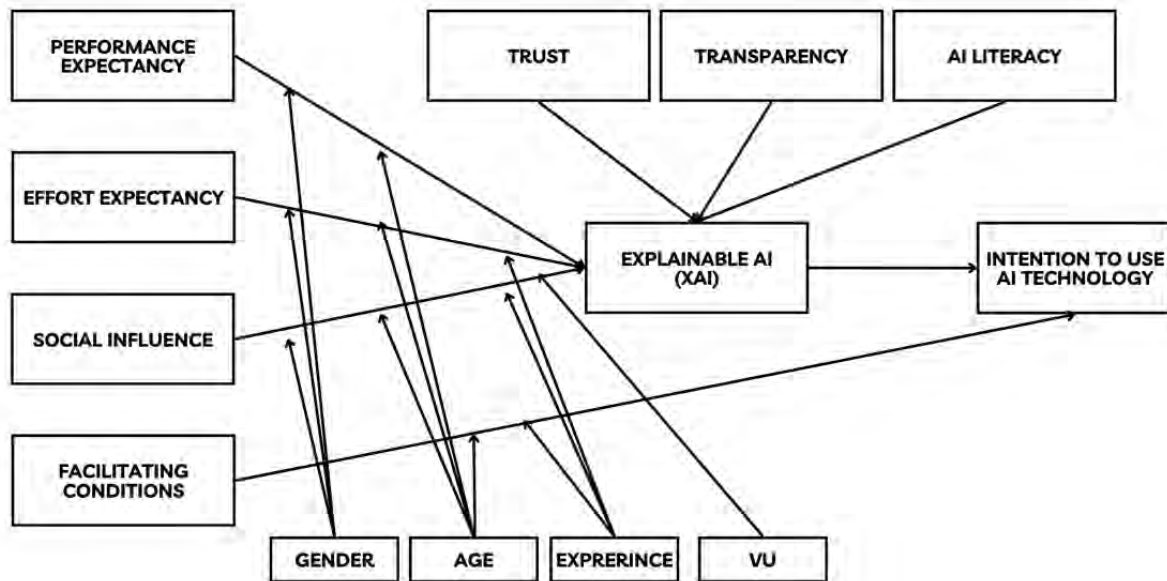


Figure 5: Propose Conceptual Model: Factors Influencing the Acceptance of AI Systems for Analyzing Medical Test Results in Government Hospitals in Bangkok

This study is grounded in the Unified Theory of Acceptance and Use of Technology (UTAUT) and incorporates extensions through the concepts of Explainable AI (XAI) and AI literacy. The conceptual model aims to examine the factors influencing the acceptance of AI systems for analyzing medical test results in government hospitals in Bangkok .

The model identifies key constructs from UTAUT, including Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), and Facilitating Conditions (FC), as predictors of the acceptance of Explainable AI . In addition, it integrates Trust, Transparency, and AI Literacy—factors that are particularly relevant to the healthcare context and the ethical and practical challenges associated with AI integration.

The model further hypothesizes that the acceptance of XAI significantly influences the intention to use AI -based diagnostic systems. It also incorporates moderating variables such as Gender, Age, Experience, and Voluntariness of Use, which are expected to affect the strength of relationships between core predictors and the acceptance of XAI .

Direct Effects

- H1: Performance Expectancy (PE) has a positive effect on the acceptance of Explainable AI (XAI) .
- H2: Effort Expectancy (EE) has a positive effect on the acceptance of Explainable AI (XAI).
- H3: Social Influence (SI) has a positive effect on the acceptance of Explainable AI(XAIX) .
- H4: Facilitating Conditions (FC) have a positive effect on the acceptance of Explainable AI (XAI).
- H5: Trust has a positive effect on the acceptance of Explainable AI (XAI) .
- H6: Transparency has a positive effect on the acceptance of Explainable AI (XAI) .
- H7: AI Literacy has a positive effect on the acceptance of Explainable AI (XAI) .
- H8: Acceptance of Explainable AI (XAI) has a positive effect on users' Intention to Use AI Technology.

Moderating Effects

- H9: Gender moderates the relationships between the UTAUT core determinants (PE, EE, SI, FC) and acceptance of Explainable AI (XAI) .
- H10: Age moderates the relationships between the UTAUT core determinants (PE, EE, SI, FC) and acceptance of Explainable AI (XAI) .
- H11: Experience moderates the relationships between the UTAUT core determinants (PE, EE, SI, FC) and acceptance of Explainable AI (XAI) .

H12: Voluntariness of Use moderates the relationships between the UTAUT core determinants (PE, EE, SI, FC) and acceptance of Explainable AI (XAI).

This framework provides a structured lens to assess both individual and contextual factors affecting AI adoption in the public healthcare sector, and informs strategic recommendations for successful implementation.

Population and Sample

The target population for this study comprised Thai citizens residing in Bangkok who have received medical services from government hospitals and are aware of or have the potential to experience AI-based systems in medical diagnostics. This population is considered appropriate due to the study's focus on understanding public acceptance of AI systems in state-run healthcare facilities in the capital city, which serves as a central hub for medical innovation and healthcare policy implementation.

According to Schumacker and Lomax (2010), a sufficient sample size for Structural Equation Modeling (SEM) should be at least 200 respondents, with a preferred ratio of at least 5–10 cases per observed variable. Given that this study includes 12 observed variables, a minimum sample size of 120 respondents was required to ensure statistical validity and model stability. To enhance the robustness of the analysis, a total of 400 responses were collected using purposive sampling, focusing on individuals who had visited government hospitals in Bangkok and could provide meaningful input regarding their perceptions of AI in medical services.

This research adopts a quantitative approach and collects data from a sample of 400 participants, consisting of patients and healthcare personnel in public hospitals across Bangkok. The sample includes doctors, nurses, medical technologists, and administrative staff involved in the medical diagnostic process. Data will be analyzed using Structural Equation Modeling (SEM) to test the relationships among the variables and identify the most significant predictors of AI system acceptance in diagnostic practices.

Data Analysis

SEM is a multivariate statistical analysis technique used to analyze structural relationships. This technique is the combination of factor analysis and multiple regression analysis, and it is used to analyze the structural relationship between indicators and latent variables (factors). SEM is divided into two parts: a measurement model and a structural model. The measurement model involves the relationship between indicators and latent variable, but the structural model involves the relationships among latent variables only (Carvalho & Chima, 2014).

Discussion

The results of this study reveal that several key factors significantly influence patients' acceptance of AI systems for analyzing medical test results in Bangkok's government hospitals. In line with the TAM3 and UTAUT models, perceived usefulness and performance expectancy were the strongest predictors of acceptance. Patients were more willing to use AI when they believed it would enhance diagnostic speed, accuracy, and overall service quality. Similarly, ease of use and effort expectancy played an important role patients expressed a preference for systems that are simple to understand and operate, especially when medical staff provide guidance or endorsements.

In addition to these traditional factors, the study highlights the critical role of trust and perceived risk in shaping public acceptance of AI in healthcare. Some patients were concerned about potential errors, lack of human oversight, or unfamiliarity with how AI systems make decisions. This underscores the importance of transparency and explainability principles central to Explainable AI (XAI). When patients understand how AI reaches its conclusions and see that human doctors remain involved in the decision-making process, their willingness to trust and accept the technology increases.

The findings also point to a disparity in acceptance based on education and digital literacy levels. Patients with higher familiarity with technology tended to have more positive attitudes toward AI systems, while those with limited digital skills showed hesitancy or skepticism. This suggests a need for targeted public education, user-friendly system designs, and inclusive implementation strategies.

For AI to be widely accepted in Thailand's government healthcare system, efforts must go beyond technical deployment to include trust -building, communication, and accessibility for all segments of the population.

Limitations of the Study

1. Geographic Scope

This study focuses specifically on public hospitals in Bangkok, which may limit the generalizability of the findings to other regions in Thailand with different demographics, healthcare infrastructure, or levels of technological readiness.

2. Limited Understanding of AI among the Public

Because AI is still a relatively new and technical concept, some respondents may not fully understand how AI is used in healthcare, which could influence their perceptions and willingness to use such services.

3. Technological Variability Across Hospitals

The level of AI implementation may vary significantly among public hospitals, making it difficult to assess a uniform perception or acceptance of AI -assisted services. Future work

To build upon the findings of this study and address its limitations, future research should explore the following directions:

1. Expanding Geographic Coverage

Future studies should include public hospitals in other provinces and rural areas of Thailand to gain a more comprehensive understanding of public acceptance of AI in healthcare . Comparing urban and rural perspectives may uncover region-specific challenges and opportunities.

2. Comparative Analysis Across Hospitals

Given the varying levels of AI integration among hospitals, future work could conduct a comparative analysis of institutions with high and low AI adoption. This may help identify best practices and strategies for successful implementation.

3. Longitudinal Studies on AI Adoption Trends

Since AI technology and healthcare policies are evolving, future studies should employ longitudinal methods to track changes in public perception, usage patterns, and the real-world impact of AI in public hospitals over time

Conclusions
This research investigated the factors influencing public acceptance of artificial intelligence (AI) systems used to analyze medical test results in Bangkok's government hospitals. The findings underscore that patients' acceptance of AI is significantly shaped by their perceptions of its usefulness, ease of use, trust, and perceived risk. These factors align closely with the constructs found in Technology Acceptance Model 3 (TAM3) and the Unified Theory of Acceptance and Use of Technology (UTAUT), which served as key theoretical frameworks for this study . According to TAM3, perceived usefulness and perceived ease of use are primary determinants of technology acceptance, both of which were evident in participants' responses . Similarly, UTAUT factors such as performance expectancy, effort expectancy, and social influence also played crucial roles in shaping user intentions.

Moreover, concerns about transparency and trust in AI outputs point to the importance of integrating principles from Explainable AI (XAI). Participants expressed hesitation in fully relying on AI systems without understanding how conclusions or diagnostic results were derived . This highlights the need for AI models in healthcare to provide interpretable outputs that both patients and healthcare providers can understand and trust . Overall, the study suggests that while there is a growing recognition of AI's potential to improve healthcare delivery in public hospitals especially in addressing medical personnel shortages and long wait times users' concerns regarding the clarity, fairness, and reliability of AI systems must be addressed to facilitate widespread adoption .

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Motivational Factors Affecting Work Effectiveness of Sales Professionals in The Cental Region of Thailand

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Abstract

This research aims to study the influence of motivation factors and service quality factors on the work effectiveness of salespersons in the Central region. The sample used in the research consisted of 400 salespersons with at least one year of work experience in the Central region of Thailand, selected using purposive sampling. The research instrument was a questionnaire, which had been tested for validity and reliability. The statistics used for data analysis included descriptive statistics such as frequency, percentage, mean, and standard deviation, and inferential statistics such as multiple linear regression analysis. The research results revealed that work motivation factors, including both motivator factors (such as achievement, recognition, responsibility, and career advancement) and hygiene factors (such as compensation, administrative policies, work environment, and interpersonal relationships), had a statistically significant influence on the work effectiveness of salespersons at the 0.01 level. Similarly, service quality factors in all dimensions, whether physical aspects, reliability, responsiveness, assurance, or empathy, all had a significant influence on the ability to achieve sales targets, customer satisfaction, and customer retention. The research suggests that organizations should prioritize creating work motivation in conjunction with improving service quality in all aspects to promote effective performance among salespersons and enable them to compete sustainably in a rapidly changing business environment.

Keywords: Motivation Factors, Service Quality, Work Effectiveness, Salespersons, Central Region

Introduction

Salespersons, or sales reps, are a profession that people often avoid, as the job involves high pressure and stress. Furthermore, the compensation in the form of a salary is relatively low, despite having to deal with customers who often display unpleasant emotions, and attempting to persuade customers to decide to purchase products; otherwise, they will not receive any commission from the sale. Most new graduates do not choose this career path; only a small minority apply for sales positions, for the reasons mentioned above. Therefore, executives or sales managers need to develop approaches to create motivation for salespersons, to promote revenue and business growth. In particular, the motivation provided to salespersons should be more intense than that given to general support staff, as salespersons face various obstacles, including the challenges of interacting with customers, external environments such as weather and traffic congestion, and, for some, overnight travel in provincial areas to sell products for the business.

Motivation refers to the process of stimulating individuals to make efforts in their work so that the organization achieves its goals and objectives. Using appropriate incentives will make employees have more willing, enthusiastic, and efficient work behavior (Department of Industrial Promotion, 2021). The incentives that can motivate salespersons to be committed to their work and achieve or exceed targets can be divided into two types: 1) Financial Incentives, which include salaries and benefits that can be measured in monetary terms, commissions based on performance, bonuses on special occasions such as when sales exceed targets or in years when the business has high profits, sending employees to training or site visits both domestically and internationally, and cash rewards according to company-defined criteria in sales competitions; and 2) Non-financial Incentives,

which include assigning important tasks, receiving attention from senior management, recognition and awards, internal team competitions for the Top Sales position, participation in important company meetings, assigning the role of speaker to share experiences with new employees, promotions, and receiving trust from supervisors. This type of incentive focuses on meeting psychological needs, which are high-level human drives such as the need for recognition, security, and success in one's career. Entrepreneurs who can create a balance of both monetary and non-monetary incentives are more likely to succeed in their businesses and experience continuous sales growth. Conversely, giving only praise without financial rewards may make employees feel exploited, and giving only compensation without social recognition and appreciation may lead to a lack of motivation and eventual resignation (Department of Industrial Promotion, 2021).

The COVID-19 pandemic has brought about unprecedented changes and challenges, significantly impacting various industries worldwide (Singh & Sharma, 2022). Businesses that rely on direct customer interaction, such as education, tourism, banking, restaurants, and hotels, have faced declining revenues and the need to rapidly adapt operational strategies. At the same time, some businesses have been able to adapt and grow rapidly by adopting new innovations or adapting products to meet rapidly changing consumer needs (Sheth, 2020). Examples include shifting from in-restaurant dining to delivery services or expanding product categories to reduce dependence on a single source of income. All of this has made "salespersons" a crucial mechanism connecting organizations with customers in times of crisis. Following the easing of the COVID-19 situation, a large number of new businesses have emerged, including the production and sale of various types of goods such as consumer products, medical equipment, electrical appliances, and cleaning products, leading to a continuous increase in the demand for sales labor in the labor market (Agrawal, Gopal, & Zadeh, 2021). Salespersons therefore play an important role in the organization's marketing strategy, especially in the post-crisis situation. Salespersons act as information transmitters, persuade consumers, and maintain customer relationships in the form of a two-way communication process, which helps to facilitate quick and efficient responses and purchase decisions (Singh & Sharma, 2022).

In highly competitive business environments, setting Key Performance Indicators (KPIs) is a crucial tool for systematically evaluating organizational performance. Appropriate KPIs reflect whether the organization's strategy is impacting its set goals, such as brand loyalty, sales growth, or customer satisfaction levels. The KPIs should be specific, measurable, and tangible, such as setting a goal for 80% customer satisfaction, rather than stating a vague goal, to allow for effective measurement (Singh & Sharma, 2022). Without appropriate KPIs, organizations may use strategies that do not generate maximum benefit or develop in a direction that does not align with their objectives. For example, if the goal is to increase customer purchases but only website traffic is tracked, the evaluation may be inaccurate. Setting quantitatively measurable indicators is essential because it will help make the evaluation more accurate and tangible. For example, if an organization sets a goal that "customers must feel satisfied" without clearly specifying the level of satisfaction, the measurement will be vague. However, if the goal is specified as "80% of customers must feel satisfied," the organization can use assessment tools such as questionnaires or surveys to measure results effectively. Additionally, setting indicators should consider both available resources and historical data to set achievable and realistic goals (Department of Industrial Promotion, 2021).

A Gallup (2023) report indicates that only 21% of employees worldwide feel engaged in their work, and this lack of motivation and engagement directly impacts employee productivity and morale. Unmotivated employees tend to avoid responsibility, lack enthusiasm, and are easily distracted from their work. This situation hinders the creation of quality work and the achievement of important organizational goals in the long term. Conversely, employees who are motivated at work are more likely to be committed, dedicated, and proud of their work, which leads to efficient performance and a positive impact on the overall team morale. Gallup studies also show that employees who are engaged with the organization have an 81% lower absenteeism rate and are 87% less likely to resign compared to employees who are unhappy at work. From the above facts, it can be seen that work motivation is an important factor that executives and managers should pay close attention to because it not only helps reduce employee turnover, but also affects the improvement of operational efficiency, the retention of quality personnel, and the strengthening of the organization's competitive advantage sustainably (Workplace, 2023).

Therefore, given the importance of motivation, both in monetary and non-monetary forms, which influences the ability of salespersons to perform in challenging environments, and the need to retain quality personnel in organizations in the post-COVID-19 era, which is full of business competition and economic uncertainty, the researcher conducted a research study on " Motivation Factors Affecting the Work Effectiveness of Salespersons in the Central Region." The purpose of this study is to examine how motivation factors and service quality factors influence the work effectiveness of salespersons. The results of this study can be used as a guideline for promoting human resource management strategies and developing personnel potential for sustainability in business organizations.

Research Objectives

1. To investigate the influence of motivation factors on the work effectiveness of salespersons in the Central region of Thailand.
2. To examine the influence of service quality factors on the work effectiveness of salespersons in the Central region of Thailand.

Research Hypotheses

1. Motivation factors have an effect on the work effectiveness of salespersons in the Central region of Thailand.
2. Service quality factors have an effect on creating work effectiveness of salespersons in the Central region of Thailand.

Conceptual Framework

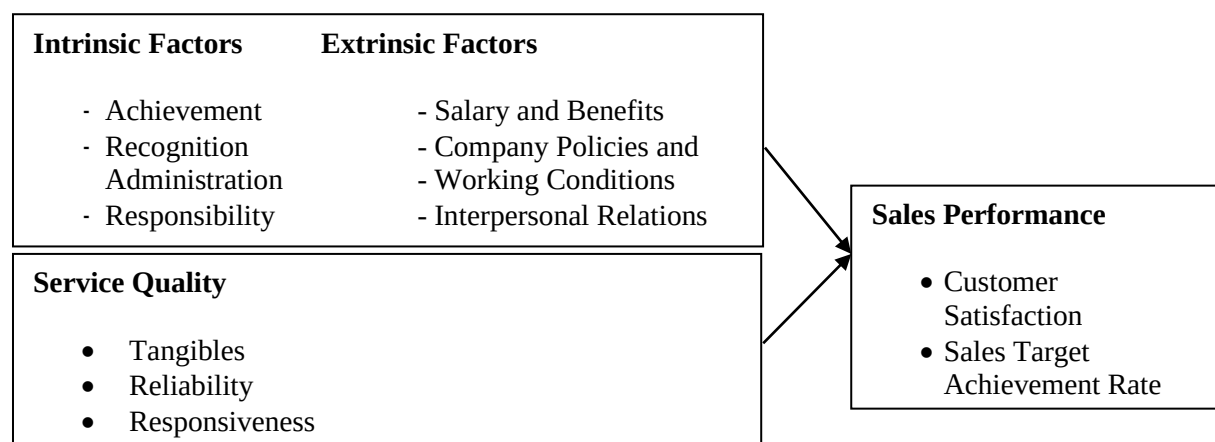


Figure 1: Conceptual Framework

Literature Review

Concepts and Theories of Work Motivation

Work Motivation is a critical mechanism influencing the attitudes, behaviors, and effectiveness of personnel within an organization. For employees to perform to their full potential, they need an internal driving force, which can be explained by Frederick Herzberg's (1959) " Two-Factor Theory" or " Motivation-Hygiene Theory." Herzberg divides the factors affecting employee satisfaction into two groups: (1) Motivation Factors, such as achievement, recognition, career advancement, responsibility, and the nature of the work itself. These factors, if present, help promote positive feelings in employees and increase their willingness to work. (2) Hygiene Factors, such as compensation, job security, interpersonal relationships, work environment, and company policies. The absence of these factors leads to employee dissatisfaction, but their presence does not necessarily create direct motivation. Therefore, effective management should focus on balancing both factors (Staporn Manee, 2024).

Alongside Herzberg's theory, Abraham Maslow's (1943) hierarchy of needs is also widely accepted in explaining human motivation. Maslow divides human needs into five levels, arranged in ascending order: (1) Physiological needs, such as food, water, and shelter; (2) Safety needs, such as job and financial security; (3) Social needs, such as acceptance, friendship, and belonging; (4) Esteem needs, such as self-esteem and respect; and (5) Self-Actualization needs, such as developing one's full potential. Maslow explains that humans focus on satisfying lower-level needs first. Once each level is fulfilled, there is a drive to move to the next level. Effective human resource management should consider which level of the hierarchy each employee is at and find ways to provide appropriate motivation (Suteerat Chulert, 2020).

Service Quality Concepts

Service Quality is a concept that has been continuously developed, especially in an era where customers are at the center of business operations. Parasuraman, Zeithaml, and Berry (1988) proposed the SERVQUAL model, a framework used to measure service quality from the perspective of the service recipient by comparing customer expectations before using the service (Expectation) with the perceptions customers actually receive after using the service (Perception). This model consists of five dimensions: (1) Tangibles, such as the cleanliness and modernity of equipment, employee attire, and the environment; (2) Reliability, which refers to the organization's ability to provide accurate, timely, and reliable service; (3) Responsiveness, which refers to the willingness and promptness of employees to assist customers; (4) Assurance, which includes the knowledge, competence, politeness, and credibility of employees; and (5) Empathy, which refers to the ability to understand and care for customers individually. QPFIT (2022) suggests that organizations that can consistently maintain these five dimensions of service quality will not only be able to satisfy customers but also directly impact the attitudes of salespersons towards the organization and their work. This is because employees will feel the value of their role, take pride in their work, and be motivated to improve service, leading to increased overall work effectiveness.

Suparuek Bootpaeng (2024) conducted research on "Factors Affecting the Motivation in Work Performance of Employees of Thai Commercial Insurance Protect Company Limited." The objectives were to study the motivation in the work performance of employees, comparing the differences in motivation in work performance classified by personal factors, and to study the relationship between motivation factors and hygiene factors in work performance with the motivation in the work performance of telemarketing insurance salespersons of Thai Commercial Insurance Protect Company Limited. The sample in this research consisted of 232 telemarketing insurance salespersons, aged between 26-30 years, working at SCB Head Office and G-Tower. The data collection instrument was a questionnaire. The statistics used for data analysis included frequency distribution, percentage, mean, standard deviation, t-test, F-test, One-way ANOVA, and Pearson's correlation coefficient. The results of the study revealed that the factors affecting motivation in work performance, overall, were at a high level. The motivator factors in work performance were at a high level, and the hygiene factors in work performance were at a high level. For the motivation in the work performance of employees, it was at a high level. Hypothesis testing revealed that different personal factors did not significantly affect the motivation in the work performance of telemarketing insurance salespersons of Thai Commercial Insurance Protect Company Limited at a statistical significance level of .05. In contrast, motivator factors ($p\text{-value} < .001$) and hygiene factors ($p\text{-value} < .001$) in work performance, both overall and in each aspect, had a statistically significant correlation in the same direction with the motivation in the work performance of telemarketing insurance salespersons at the .01 level. Recommendations: Consider adjusting compensation according to employee level, providing training to develop communication and telemarketing skills, and soliciting feedback from employees on improving the work environment.

Research Methodology

The population and sample used in the research are salespersons working in the Central region of Thailand, covering the manufacturing, service, and retail industries. The population criteria are defined as individuals aged 22 years or older with at least one year of work experience as a salesperson. However, since the exact population size is unknown, the researcher used W. G. Cochran's formula (1953) to calculate the sample size in cases where the population size is unknown. A confidence level of 95% and an acceptable margin of error of $\pm 5\%$ were set, resulting in a sample size of 400 people. Purposive Sampling was used for sample selection.

The instrument used for data collection was a questionnaire, divided into three sections: Section 1 included questions about the demographic characteristics of the respondents, such as gender, age, marital status, education level, income, work experience, and type of product/service sold. Section 2 included questions about work motivation factors. Section 3 included questions about the work effectiveness of salespersons.

To verify the quality of the questionnaire, the researcher conducted a Content Validity test by having three qualified professors review each question. The Index of Item-Objective Congruence (IOC) was then calculated, selecting only questions with an IOC value of 0.50 or higher. The questionnaire was then piloted with a sample of 30 people with characteristics similar to the actual sample to check the Reliability using Cronbach's Alpha formula. The reliability of the questionnaire was 0.92, which is considered acceptable.

For data analysis, the researcher used a statistical software package to process the data, which was divided into two types: 1) Descriptive statistics were used to describe the characteristics of the sample, finding the Percentage for personal factor data, and finding the Mean and Standard Deviation for the data from parts 2 and 3 of the questionnaire. 2) Inferential statistics were used to test research hypotheses, using Multiple Regression Analysis to analyze the influence of motivation factors and service quality on the work effectiveness of salespersons.

Research Findings

The study found that the majority of the sample were female, numbering 220, representing 55.00%. The age group 31–40 years was the most prevalent, numbering 122, representing 30.50%. Those with a bachelor's degree numbered 166, representing 41.50%. Married individuals numbered 192, representing 48.00%. The average monthly income range of 20,001–30,000 baht was the most common, with 151 individuals, representing 37.75%. Those with 3–5 years of experience as a salesperson numbered 140, representing 35.00%.

Regarding work motivation factors, which were divided into two aspects—Motivator Factors and Hygiene Factors—the overall level of opinion was "high," with a total mean of 3.85 and a standard deviation of 0.51. In terms of Motivator Factors, the item "Feeling proud when achieving work goals" had the highest mean of 4.10 and a standard deviation of 0.65. Meanwhile, the item "Receiving opportunities for promotion or advancement" had the lowest mean of 3.46 and a standard deviation of 0.77.

Regarding Hygiene Factors, the item "Good relationships between colleagues and supervisors" had the highest mean of 4.01 and a standard deviation of 0.72. Meanwhile, the item "Satisfaction with the compensation received" had the lowest mean of 3.02 and a standard deviation of 0.84.

For service quality factors, the overall level of opinion was "high," with a total mean of 3.92 and a standard deviation of 0.49. When considering each dimension, the dimension with the highest average score was "Assurance," especially the item "Confidence in one's own ability when providing information to customers," which had a mean of 4.18 and a standard deviation of 0.62. The dimension with the lowest average score was "Tangibles," especially the item "Employees' uniforms or image are professional," which had a mean of 3.58 and a standard deviation of 0.81.

The work effectiveness of salespersons was divided into three aspects: sales target achievement rate, customer retention ability, and customer satisfaction. Overall, the level was "high," with a total mean of 3.89 and a standard deviation of 0.47. The item "Consistently closing sales according to set targets"

had the highest mean of 4.11, while the item "Receiving continuous praise from customers" had the lowest mean of 3.59.

Table 1: Multiple Linear Regression Analysis of Motivation Factors Influencing Work Effectiveness of Salespeople in Terms of Customer Satisfaction in the Central Region of Thailand

Motivational Factors	Unstandardized Coefficients		Standard Coefficients	t-test	p-value
	B	Std.Error	Beta		
(Constant)	0.62	0.17		3.57	0.000**
Achievement	0.23	0.04	0.25	6.26	0.000**
Recognition	0.09	0.03	0.11	2.55	0.011*
Responsibility	0.23	0.04	0.24	5.79	0.000**
Career Advancement	0.02	0.04	0.03	0.55	0.585
Compensation and Benefits	-0.04	0.04	-0.06	-1.09	0.276
Policy and Administration	-0.02	0.03	-0.02	-0.33	0.745
Work Environment	0.06	0.04	0.08	1.63	0.103
Interpersonal Relationships	0.28	0.03	0.35	7.98	0.000**
R = 0.751; R ² = 0.565 ; Adjusted R ² = 0.556 ; F = 63.413					

Note: **Statistically significant at the 0.01 level., * Statistically significant at the 0.05 level

Multiple regression analysis of motivational factors influencing sales performance in terms of customer satisfaction among sales personnel in the Central Region of Thailand revealed that the following motivational factors had significant influence: achievement (Sig = 0.000), recognition (Sig = 0.011), responsibility (Sig = 0.000), and interpersonal relationships (Sig = 0.000). These factors were statistically significant at the 0.01 and 0.05 levels, with Beta coefficients of 0.25, 0.11, 0.24, and 0.35, respectively. The analysis showed an R value of 0.751, an R² value of 0.565, and an Adjusted R² value of 0.556. These results indicate that motivational factors explain 56.5% of the variance in sales performance in terms of customer satisfaction.

Table 2: Multiple Linear Regression Analysis of Motivational Factors Influencing Sales Performance in Terms of Sales Target Achievement among Sales Personnel in the Central Region of Thailand

Motivation Factor	Unstandardized Coefficients		Standard Coefficients	t-test	p-value
	B	Std.Error	Beta		
(Constant)	0.16	0.22		0.73	0.464
Achievement	0.22	0.05	0.20	4.65	0.000**
Recognition	0.12	0.04	0.13	2.72	0.007**
Responsibility	0.18	0.05	0.16	3.55	0.000**
Career Advancement	0.06	0.05	0.07	1.36	0.174
Compensation and Benefits	0.03	0.04	0.04	0.75	0.451
Policy and Administration	0.08	0.04	0.10	1.75	0.080
Work Environment	0.05	0.05	0.06	1.10	0.271
Interpersonal Relationships	0.22	0.04	0.23	5.02	0.000**
R = 0.719; R ² = 0.517 ; Adjusted R ² = 0.507 ; F = 52.230					

Note: ** Statistically significant at the 0.01 level

Multiple regression analysis of motivational factors influencing sales performance in terms of sales target achievement among sales personnel in the Central Region of Thailand revealed that the following motivational factors were significant predictors: achievement, recognition, responsibility, and interpersonal relationships. The Sig values for these factors were 0.000, 0.007, 0.000, and 0.000, respectively, indicating statistical significance at the 0.01 level. The corresponding Beta coefficients were 0.20, 0.13, 0.16, and 0.23, respectively. Therefore, these factors significantly predict sales performance in terms of sales target achievement. The analysis yielded an R value of 0.719 and an

Adjusted R-squared value of 0.507, indicating that motivational factors account for 50.7% of the variance in sales performance in terms of sales target achievement in the Central Region of Thailand.

Table 3: Multiple Linear Regression Analysis of Motivational Factors Influencing Sales Performance in Terms of Customer Retention among Sales Personnel in the Central Region of Thailand

Motivation Factor	Unstandardized Coefficients		Standard Coefficients	t-test	p-value
	B	Std.Error	Beta		
(Constant)	0.97	0.20		4.84	0.000**
Achievement	0.29	0.04	0.30	6.84	0.000**
Recognition	0.01	0.04	0.01	0.26	0.792
Responsibility	0.15	0.05	0.16	3.37	0.001**
Career Advancement	0.06	0.04	0.09	1.47	0.142
Compensation and Benefits	0.01	0.04	0.01	0.22	0.823
Policy and Administration	0.01	0.04	0.02	0.34	0.733
Work Environment	0.01	0.04	0.02	0.32	0.752
Interpersonal Relationships	0.24	0.04	0.29	6.00	0.000**
R = 0.682; R ² = 0.465 ; Adjusted R ² = 0.454 ; F = 42.444					

Note: ** Statistically significant at the 0.01 level

Multiple regression analysis of motivational factors influencing sales performance in terms of customer retention among sales personnel in the Central Region of Thailand revealed that the following motivational factors were significant predictors: achievement (Sig = 0.000), responsibility (Sig = 0.001), and interpersonal relationships (Sig = 0.000). These factors were statistically significant at the 0.01 level. The corresponding Beta coefficients were 0.30, 0.16, and 0.29, respectively. The analysis yielded an R value of 0.682, an R-squared value of 0.465, and an Adjusted R-squared value of 0.454. This indicates that the motivational factors studied account for 45.4% of the variance in sales performance in terms of customer retention.

Table 4: Multiple Linear Regression Analysis of Service Quality Factors Influencing Sales Performance in Terms of Customer Satisfaction in the Central Region of Thailand

Service Quality Factors	Unstandardized Coefficients		Standard Coefficients	t-test	p-value
	B	Std.Error	Beta		
(Constant)	0.74	0.158		4.70	0.000**
Tangibles	0.03	0.027	0.04	0.93	0.351
Reliability & Responsiveness	0.31	0.041	0.36	7.35	0.000**
Assurance	0.29	0.040	0.31	7.13	0.000**
Empathy	0.20	0.042	0.20	4.79	0.000**
R = 0.776; R ² = 0.602 ; Adjusted R ² = 0.598 ; F = 149.48					

Note: ** Statistically significant at the 0.01 level

Multiple regression analysis of service quality factors influencing sales performance in terms of customer satisfaction among sales personnel in the Central Region of Thailand revealed that the following service quality factors were significant predictors: reliability & responsiveness (Sig = 0.000), assurance (Sig = 0.000), and empathy (Sig = 0.000). These factors were statistically significant at the 0.01 level and had Beta coefficients of 0.36, 0.31, and 0.20, respectively. Tangibles (Sig = 0.351) did not significantly influence sales performance in terms of customer satisfaction, as its significance level was greater than 0.01. Therefore, reliability, assurance, and empathy can significantly predict sales performance in terms of customer satisfaction. The analysis yielded an R value of 0.776 and an Adjusted R-squared value of 0.598, indicating that the service quality factors studied account for 59.8% of the variance in sales performance in terms of customer satisfaction.

Table 5: Multiple Linear Regression Analysis of Service Quality Factors Influencing Sales Performance in Terms of Sales Target Achievement in the Central Region of Thailand

Service Quality Factors	Unstandardized Coefficients		Standard Coefficients	t-test	p-value
	B	Std.Error	Beta		
(Constant)	0.48	0.209		2.27	0.024*
Tangibles	0.21	0.035	0.26	6.06	0.000**
Reliability & Responsiveness	0.22	0.055	0.21	3.99	0.000**
Assurance	0.36	0.053	0.33	6.81	0.000**
Empathy	0.08	0.056	0.07	1.50	0.135
R = 0.716; R ² = 0.512 ; Adjusted R ² = 0.507 ; F = 103.599					

Note: ** Statistically significant at the 0.01 level, * Statistically significant at the 0.05 level

Multiple regression analysis of service quality factors influencing sales performance in terms of sales target achievement in the Central Region of Thailand revealed that the following service quality factors were significant predictors: tangibles, reliability & responsiveness, and assurance. The Sig values for these factors were 0.000, 0.000, and 0.000, respectively, indicating statistical significance at the 0.01 level. The corresponding Beta coefficients were 0.26, 0.21, and 0.33, respectively. Therefore, tangibles, reliability & responsiveness, and assurance can significantly predict sales performance in terms of sales target achievement at the 0.01 level. Empathy, however, had a Sig value of 0.135, which is not statistically significant at the 0.01 level. The analysis yielded an R value of 0.716, an R-squared value of 0.512, and an Adjusted R-squared value of 0.507, indicating that the service quality factors studied account for 51.2% of the variance in sales performance.

Table 6: Multiple Linear Regression Analysis of Service Quality Factors Affecting Salesperson Performance in Customer Retention in the Central Region of Thailand

Service Quality Factors	Unstandardized Coefficients		Standard Coefficients	t-test	p-value
	B	Std.Error	Beta		
(Constant)	0.80	0.177		4.52	0.000**
Tangibles (X1)	0.05	0.030	0.06	1.54	0.126
Reliability and Responsiveness (X2)	0.24	0.047	0.27	5.09	0.000**
Assurance (X3)	0.27	0.045	0.28	6.00	0.000**
Empathy (X4)	0.27	0.047	0.26	5.67	0.000**
R = 0.733; R ² = 0.537 ; Adjusted R ² = 0.532 ; F = 114.521					

Note: ** Significant at the 0.01 level

The multiple regression analysis of service quality factors influencing salesperson performance in customer retention in the Central Region of Thailand revealed that reliability and responsiveness, assurance, and empathy had Sig values of 0.000, 0.000, and 0.000, respectively, indicating statistical significance at the 0.01 level. Their corresponding Beta values were 0.27, 0.28, and 0.26, respectively. The tangibles factor had a Sig value of 0.126, which is greater than the significance level of 0.01, indicating no statistically significant effect. The analysis showed an R value of 0.733 and an Adjusted R² value of 0.532, indicating that the service quality factors explain 53.2% of the variance in salesperson performance in customer retention in the Central Region of Thailand.

Conclusion and Discussion

Discussion of the analysis to test the hypothesis of motivation factors influencing the work effectiveness of salespersons in the Central Region.

The analysis of data on motivation factors affecting the work effectiveness of salespersons in the Central region of Thailand revealed that both motivator factors and hygiene factors were at the "strongly agree" level, with an overall mean of 4.32. This reflects that salespersons have a high level of work motivation, especially in terms of achievement ($\bar{x}$ = 4.43), responsibility ($\bar{x}$ = 4.41), and

interpersonal relationships ($\bar{x} = 4.37$), which are classified as motivator factors according to Herzberg's concept that significantly affects job satisfaction. This is also consistent with the research findings of Sasineeth Yemram (2022), which found that motivation in achievement, recognition, the nature of the work, and career advancement positively affect the work performance of employees in pharmaceutical companies. In other words, feeling successful at work motivates salespersons to feel proud and driven to maintain results or further develop themselves. The responsibility that the organization assigns to take care of customers or manage sales themselves also promotes the feeling of autonomy and ownership of the work, which leads to full potential development. At the same time, good interpersonal relationships within the organization, both with supervisors and teammates, are psychological support that helps create a work environment conducive to cooperation and the maintenance of stable motivation levels. This result is consistent with Herzberg's concept, which suggests that motivator factors directly affect job satisfaction, and is also in line with Sasineeth Yemram's (2022) research, which states that the nature of the work, responsibility, recognition, and career advancement are important variables that positively affect work performance. Especially in the context of salespersons who face numerical targets and pressure from competition, having internal motivation is a critical condition that helps drive high-quality work performance continuously and sustainably.

Regarding hygiene factors, namely work environment ($\bar{x} = 4.31$), compensation and benefits ($\bar{x} = 4.25$), and policies and administration ($\bar{x} = 4.19$), all were at the "strongly agree" level. Although the mean was lower than the motivator factor group, they are still considered important in promoting work effectiveness, which is consistent with the study by Thitaphat Thuthumma (2020), which pointed out that policies and administration, interpersonal relationships, and job security are significant factors in statistical significance to engagement and willingness to commit to the organization. In addition, Sirinthorn Chomintrajak (2023) also confirmed that the work environment and career advancement have an influence on employee retention, which reflects the importance of hygiene factors in maintaining the workforce.

This analysis also aligns with the findings of Pete Niemelä (2018), which showed that recognition and feedback are the most important factors in motivating salespersons and differ significantly between high and low performers. Therefore, developing human resource management approaches that focus on strengthening internal motivation, such as recognition, achievement, and responsibility, as well as creating a supportive environment and appropriate compensation, is an important strategy that can be applied to enhance the work effectiveness of salespersons sustainably. That is, even though hygiene factors are not the direct drivers of maximum satisfaction like motivator factors, they play a role in "maintaining psychological stability" of employees. If these factors are lacking, it may lead to job dissatisfaction, affecting organizational commitment and long-term work intentions. A good work environment ($\bar{x} = 4.31$), such as a conducive atmosphere, readily available tools, and physical safety, is a component that helps reduce pressure and emotional fatigue, which Sirinthorn Chomintrajak (2023) confirms as a factor that affects employee retention decisions in the organization, especially in industries with stress from continuous sales target competition. Compensation and benefits ($\bar{x} = 4.25$), although not the most effective stimulus in creating motivation (according to Pete Niemelä's (2018) findings), are a necessary foundation for maintaining a quality workforce. If compensation is inappropriate or unfair, it may make employees feel insecure and unmotivated to maintain or improve performance. Policies and administration ($\bar{x} = 4.19$) that are clear, flexible, and consistent with the reality of practice will help employees feel that the organization provides fair support, which Thitaphat Thuthumma (2020) points out has a positive relationship with the willingness to commit and engage with the organization significantly. Therefore, even though hygiene factors have less outcome weight than motivator factors, they are considered an important foundation for maintaining overall motivation and preventing negative motivation. If the organization can take care of the environment, compensation, and administration comprehensively, along with promoting internal motivation, such as responsibility and recognition, it will be able to enhance the work effectiveness of salespersons in both the short and long term sustainably.

Discussion of the analysis to test the hypothesis of service quality factors influencing the work effectiveness of salespersons in the Central Region.

From the analysis, it was found that service quality factors significantly influence customer satisfaction at the 0.01 level, especially in the dimensions of Reliability, Assurance in service, and Empathy, which are important components that affect customer perceptions when contacting

salespersons. Reliability in providing information and attentive customer care can create a sense of trust and impression, resulting in customer satisfaction with products and services, and a tendency to return to use the service repeatedly or recommend it to others. The research results are consistent with the work of Phattaraphorn Thanakarnsith and Piyapong Klaiklung (2022), which found that when employees feel that their work is meaningful and the service is adequately supported, it will enable employees to deliver a good experience to customers efficiently. This suggests that customer satisfaction is the result of truly quality service.

The analysis shows that service quality factors, especially Tangibles, Assurance, and Reliability, significantly influence the sales target achievement rate at the 0.01 level. The availability of facilities, the professionalism of employees, and the skills to build customer confidence help employees persuade customers effectively, directly affecting closing sales and achieving set targets. This part reflects the concept of Sasineeth Yemram (2022), which found that motivation related to the nature of work and confidence from the organization directly affects the amount of work, and is also consistent with the findings of Teresa Santos Ferreira (2017), which pointed out that confidence in interactions with supervisors can extend to the confidence that employees pass on to customers, leading to sales success.

From the analysis, it was found that factors of Communication Success, Empathy, and Interpersonal Relationships all play an important role in the ability of salespersons to retain customers with the organization, with a statistical significance at the 0.01 level. Customers who feel that they are being cared for on an individual basis and are given attention to detail will tend to return to use the service repeatedly and be loyal to the organization. This concept is supported by the research of QPFIT (2022), which states that the ability to maintain the quality of service in all five dimensions of the SERVQUAL Model, especially "Empathy" and "Assurance," will not only affect customer attitudes but also affect the attitudes and motivation of employees to continuously deliver a good experience to customers.

In conclusion, service quality in various dimensions plays a very important role in enhancing the work effectiveness of salespersons in each aspect. Organizations should therefore prioritize the development of service skills, personality training, technological support, and the creation of a sustainable service culture to enhance the competitiveness of employees and organizations in the long term.

Suggestions

1. Regarding Work Motivation Factors: Entrepreneurs should prioritize promoting motivation in both "Motivator Factors" and "Hygiene Factors." In terms of Motivator Factors, emphasis should be placed on creating opportunities for employees to achieve success in their work, such as setting clear sales targets, providing rewards based on performance, and providing recognition in meetings or internal communication channels within the organization. For Hygiene Factors, the work environment should be improved to be appropriate, modern and safe tools should be provided, and compensation policies should be reviewed to be in line with the increasing workload. Opportunities should also be provided for employees to express their opinions on the working conditions and desired benefits freely and creatively.

2. Regarding Service Quality: Organizations should provide continuous training to salespersons in customer service to enhance communication skills, understanding of customer needs, and confident service provision, such as simulating sales situations, providing product recommendations that are to the point, and responding to complaints professionally. In addition, a customer service evaluation system should be supported periodically so that employees are aware of the standards that should be maintained and continuously developed.

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Assessing the Influence of Spiritual Belief, Perceived Quality, Perceived Value, Trust, Social Influence on Purchase Intention: A Study of Spiritual Jewelry in Thailand

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Abstract

The study examines the determinants of purchase intention for spiritual jewelry in Thailand, focusing on the interplay between spiritual belief, perceived quality, perceived value, trust, and social influence. Despite growing a cultural and economic significance of this market in Thailand, research on consumer behavior that incorporates emotional and symbolic value factors within this context remains limited. Employing empirical analysis of data from 413 respondents through structured questionnaires, multiple regression analysis revealed that trust ($\beta = .210, P < .001$) exerted the strongest influence on purchase intention, followed by social influence ($\beta = .158, P < .05$) and perceived quality ($\beta = .177, P < .05$), spiritual belief ($\beta = 0.072, P < .1$), and perceived value ($\beta = .105, P < .1$) also showed positive significant influence with purchase intention. These findings indicate that all hypothesized factors significantly influenced purchase intentions, with trust and social influence emerging as the strongest predictors. The findings contribute to special context marketing literature by highlighting the importance of symbolic values alongside traditional factors, and provide actionable insights for practitioners in developing effective strategies to influence consumer choices and drive sales within the spiritual jewelry market in Thailand. Despite these the contributions of this study, the generalizability of the findings is limited by the sample size and age composition, and as well as a cross-sectional design. To enhance generalizability, future research could address these limitations by collecting a more diverse sample encompassing a wider range of age groups and by employing longitudinal design to investigate the causal relationships between the identified factors and customer behavior over time.

Keywords: Purchase Intention, Spiritual Jewelry, Perceived Quality, Perceived Value, Trust, Social Influence

Introduction

The global spiritual jewelry market is projected to reach \$19.69 billion in 2028 (Research and Markets, 2024). In Thailand, spiritual marketplace has emerged as a significant economic force, generating between 10 to 15 billion THB in 2024 (SME Thailand, 2024). This growing sector—Encompassing amulets, blessed rings, earrings, bracelets, protective pendants, and necklace—has attracted both local SMEs and major brands. However, while academic literature has explored consumer behavior and digital retail, limited research examines the non-traditional drivers of spiritual jewelry purchase intention, particularly where spiritual fulfillment transcends traditional economic or utilitarian factors. In other words, despite increasing consumer interest in products that provide emotional or spiritual fulfillment beyond traditional economic or marketing explanations, prior research has examined jewelry consumption and religious consumption separately. Critically, spiritual jewelry consumption differs from conventional jewelry due to its unique perceived value and perceived quality (Belk et al., 1989; Faure and Fang, 2008), challenging traditional consumer behavior models.

While the cultural and economic significance of spiritual jewelry in Thailand is widely acknowledged, comprehensive empirical investigations into holistic drivers of purchase intentions in

this spiritual consumption context remain scarce. Addressing this critical gap, this study examines how spiritual beliefs, perceived quality, perceived value, trust, and social influence shape purchase intention for spiritual jewelry in Thailand. Drawing on Theory of Planned Behavior (Ajzen, 1991) and extending measurement instruments from Consumer Value Theory (Zeithaml, 1988), this research advances current our understanding by incorporating spiritual dimensions into traditional consumer behavior frameworks. Existing scholarship has established the importance of factors such as perceived quality, perceived value, trust, and social media (Matzler et al., 2006, Patrick, 2002), often highlighting emotional attachment as a key mediator between product attributes and purchase intentions. This study builds on this foundation while introducing spiritual considerations in the analytical model.

By empirically testing this integrated framework, we advance our understanding of belief-driven consumption in Thailand's spiritual marketplace. Beyond theoretical contributions, the findings also provide practical insights for marketers and retailers. Specifically, the insights from this research can inform the development of more effective business strategies.

Research Objectives

The purpose of this research is to investigate how spiritual belief, perceived quality, perceived value, trust, and social influence purchase intention for spiritual jewelry in Thailand. To achieve this aim, the following objectives will be pursued:

To investigate to what extent do spiritual beliefs influence purchase intentions for spiritual jewelry products?

To examine how do traditional purchase determinants (perceived quality, perceived value, and trust) influencing purchase intentions

To investigate what role does social influence play in the purchase decision for spiritual jewelry products?

Literature Review

This study draws on two primary theoretical frameworks: the Theory of Planned Behavior (TPB) (Ajzen, 1991) and Consumer Value Theory (Zeithaml, 1988). According to TPB, behavioral intention is determined by attitude, subjective norms, and perceived behavioral control. In the context of spiritual jewelry consumption, TPB serves as the dominant foundation framework for understanding how personal psychological attitudes—shaped by spiritual beliefs) . Extending Consumer Value Theory, consumption decisions reflect a multidimensional perception shaped by cognitive domains (influenced by perceived quality and perceived price) , and social domains (influenced by trust and social influence).

1. Spiritual Belief and Consumer Behavior

Spiritual Beliefs significantly influence purchasing behavior across various contexts (Marthras et al., 2016). Numerous empirical studies have demonstrated a link between spiritual consumption and symbolic values in domains such finance (Pichler & Hemetsberger, 2007), luck (Chen et al. 2015), and career success (Vejlgaard, 2008). Notably, the consumption of spiritual products—such as lucky charms—has been associated with symbolic consumption (Minton and Kahle, 2014). For Thai consumers, particularly in the market where intangible value outweighs tangible features, Belief systems play a crucial role in shaping consumer decisions (Pongsakornrungrungsilp & Schroeder, 2011). Thus, belief-driven consumption is not only deeply emotional and symbolic, but also aligns with the concept of experiential consumption (Halbrook & Hirschman, 1982). Drawing on this body of literature, the study proposes:

H1: Spiritual Belief has a positive effect on purchase intention.

2. Perceived Quality in Spiritual Jewelry Context

Perceived quality can be defined as the characteristics and features of product that fulfill customer needs often involves in core product (Chua, Lee, Goh, & Han, 2015; Das, 2014). Consumer's subjective judgment of a product's excellence (Zeithaml, 1988)—is a critical driver of purchase intention, particularly for luxury goods like jewelry. Prior research confirms that higher perceived quality enhances consumer confidence and willingness to pay premium price (Buchanan, Simmons, & Bickart, 1999;

Calvo-Porrall & Lévy-Mangin, 2017; McWilliam, 1993) In the jewelry context, perceived quality encompasses craftsmanship, material authenticity, and design uniqueness (Tjiptono et al., 2017). Studies suggest that consumers equate superior quality with long-term value, directly influencing repurchase and word-of-mouth intention (East, Romaniuk, Chawdhary, & Uncles, 2017).

H2: Perceived quality has a positive effect on purchase intention.

3. Perceived Value as Luxury Consumption

Perceived value, defined as the consumer's assessment of product utility with customers attitude (Hsiao & Chen, 2017). Customers determine between benefits and costs (Zeithaml, 1988), mediates the relationship between quality and purchase intention. For jewelry, emotional value (e.g., symbolic meaning) often outweighs functional utility. Research highlights that perceived value is amplified by brand heritage (Wiedmann, Hennigs, Schmidt, & Wuestefeld, 2011) and ethical sourcing (Janssen et al., 2014), which are pivotal in luxury purchase decisions. Therefore, the hypothesis is:

H3: Perceived value has positive effect on purchase intention.

4. Trust in Jewelry Purchases

Trust defined as confidence on the exchange party's partner's reliability and integrity which plays a critical role to develop relationships with consumers (Alzaidi & Agag, 2022). Trust related with product quality while reduces perceived risk in high-involvement purchases like jewelry (Morgan & Hunt, 1994). Factors such as brand reputation, certification (e.g., GIA for diamonds), and transparent return policies significantly enhance trust (Chaudhuri & Holbrook, 2001). Online jewelry purchases further necessitate trust in platform security and product authenticity (Harris & Goode, 2010). Building on these findings, the study proposes:

H4: Trust has positive effective on purchase intention.

5. Social Influence and Luxury Consumption

Social influence studied how external stimuli trigger internal responses leading to the behavioral response of purchase. Social influence encompassing peer recommendations, the opinions of family and friends (Hossain et al., 2025; Islam, Thomas, & Albishri, 2024), celebrity endorsements, and social media trends sway on purchase intentions,—shapes jewelry purchase intentions through conformity and aspirational consumption (Bearder, Netemeyer, & Teel, 1989). The rise of influencer marketing has intensified this effect, particularly among Gen Z consumers (Sheldon, Antony, & Ware, 2021). Luxury jewelry often serves as a status symbol, driven by social norms (Veblen, 1899 (Eastman, Iyer, Shepherd, Heugel, & Faulk, 2018). Drawing on these findings, the study hypothesize:

H5: Social Influence has a positive effect on purchase intention.

6. Purchase Intention in Sprigtail Jewelry Context

Purchase intention, defined as the likelihood that consumers plan or willing to buy a specific product or service in the future or purchase routinely (Calvo-Porrall & Lévy-Mangin, 2017), is often recognized as a significant predictor of actual buying behavior (Fishbein & Ajzen, 1975). To enhance our understanding of spiritual jewelry consumption, purchase intention is thus considered as a proximal predictor of actual purchase behavior, particularly in explaining complex consumption as the symbolic or emotional values.

Research Methodology

This study utilized a quantitative survey approach with multiple regression analysis to investigate how spiritual belief (SB), perceived quality (PQ), perceived value (PV), trust (TR), social influence (SI), affect purchase intention (PI) for spiritual jeweler in Thailand. To ensure data quality, we implemented several measures to control bias and enhance sample representativeness. The research instrument was a structured questionnaire divided into four main sections, preceded by two screening questions to verify participants' eligibility (having purchased or considered purchasing spiritual jewelry within the past year). Part one focused on collecting the purchase behavioral questions. Part two measured respondents' perceptions of spiritual jewelry, including spiritual belief, perceived quality, perceived value, trust, and social influence. The third part is measured purchase intention toward spiritual jewelry. Finally, fourth part is collected the demographic profile of the respondents.

We gathered responses from 413 Thai consumers who had purchased or considered purchasing spiritual jewelry within the past 12 months. The sample was collected based on a non-probability sampling technique, and with a convenience sampling approach. The survey was administrative in Thai language through a combination of intercept surveys and social media platforms. All constructs instruments were measured using multi-item scale adopted from previous research, with modification to fit the spiritual jewelry context. Items adapted from established instruments (e.g., from Alzaidi & Agag, 2022; Bearden, Netemeyer & Teel, 1989; Hsiao & Chen, 2017; Zeithaml, 1988). Responses were recorded on a standard five-point Likert scale (1= strongly disagree to 5= strongly agree) for all construct measures.

The hypothesized relationships were tested using multiple regression analysis the following equation:

$$PI_i = \beta_0 + \beta_1 SBI_i + \beta_2 PQ_i + \beta_3 PVI_i + \beta_4 TRI_i + \beta_5 SI_i + \epsilon_i$$

PI_i: Purchase Intention (DV)

SBI_i: Spiritual Belief

PQ_i: Perceived Quality

PVI_i: Perceived Value

TRI_i: Trust

SI_i: Social Influence

To ensure robustness of our estimated model, we conducted comprehensive diagnostic tests to assess reliability and validity. Descriptive statistics, reliability coefficients (Cronbach's alpha), and multicollinearity diagnostics, including Tolerance and Variance Inflation Factor, (VIF) were calculated and are summarized in Table 1 and Table 2. The results demonstrate excellent internal consistency with Cronbach's alpha values surpassing the recommended threshold of 0.70 (Hair et al., 2010) with the lowest value of 0.84. These findings confirm the reliable or our measurement and their suitability for further analysis. Additionally, the means for all variables were above the midpoint of their respective scales, which indicates generally positive perceptions among participants.

Table 1: Summary of Selected Descriptive and Robustness Check Statically Results

Variables	Mean (n=413)	S.D (n=413)	Cronbach's Alpha (n=413)
Spiritual Belief	3.92	.83	.87
Perceived Quality	4	.65	.84
Perceived Value	4	.71	.84
Trust	4	.65	.84
Social Influence	4	.71	.86
Purchase Intention	4.2	.69	.88

For multicollinearity diagnostics, Table 2 shows the results suggest that the independent variables do not show problem of intercorrelation. Tolerance values for all variables were above the critical limit of 0.10, and VIF scores were below the conservative threshold of 10 (Hair et al., 2014; Kline, 2015). Overall, all indications demonstrate the internal consistency of measures.

Table 2: Summary Multicollinearity Diagnostics Results

Variables	Tolerance >.02 (or > .01)	VIF < 5 (or <10)	Interpretation
Spiritual Belief	0.585	1.709	No severe multicollinearity Predictors are sufficiently independent
Perceived Quality	0.380	2.630	No severe multicollinearity Predictors are sufficiently independent
Perceived Value	0.406	2.461	No severe multicollinearity Predictors are sufficiently independent

Variables	Tolerance >.02 (or > .01)	VIF < 5 (or <10)	Interpretation
Trust	0.429	2.333	No severe multicollinearity Predictors are sufficiently independent
Social Influence	0.488	2.049	No severe multicollinearity Predictors are sufficiently independent

Research Findings

The study analyzed responses from 413 participants who had either purchased or expressed intention to purchase spiritual jewelry products. The sample's demographic profile includes 56% female respondents, with a mean age of 24 years and a mean income of 18,000 THB/month. The education background of the sample included 81% with undergraduate degree, 11% with graduate degrees, and 8% with high school or lower education attainment. For the correlation matrix results, there are statically significant positive correlation among all the variables. The moderate positive correlation is between perceived quality and purchase intention ($r = .54$, $p < 0.01$), indicating that the consumer who have a higher perceived quality of spiritual jewelry are considerably more likely to express a stronger intention to purchase. Overall, the correlation analysis provides initial support for the hypothesized relationships between all independent variables and purchase intention.

Table 3 presents the results of the hypotheses tests. In this study, multiple regression analysis was employed to examine the relationships between the independent variables (spiritual belief, perceived quality, perceived value, trust, and social influence) and the dependent variable (purchase intention). The model explained a substantial portion of the variance in purchase intention (* $P < .1$, ** $P < 0.05$, *** $P < .001$).

H1: Spiritual Belief has a positive effect on purchase intention.

The result of regression analysis indicates that spiritual belief has significant positive effect on purchase intention ($\beta = 0.072$, $P < .1$). Thus, H1 is supported. This suggests that a one-unit increase in spiritual belief is associated with .072 increase in purchase intention, holding other factors constant.

H2: Perceived quality has a positive effect on purchase intention.

Perceived quality was found to have a significant positive effect on purchase intention ($\beta = .177$, $P < .05$). Therefore, H2 is supported. This indicates that consumer who perceive higher quality in spiritual jewelry are more likely to express a stronger intention to purchase.

H3: Perceived value has positive effect on purchase intention.

The effect of perceived value on purchase intention was found to be significant and positive ($\beta = .105$, $P < .1$). This findings supported and suggests that consumers who perceive higher value in spiritual jewelry are more likely to express a stronger intention to purchase.

H4: Trust has positive effective on purchase intention.

Trust has a strongest significant positive effect on purchase intention ($\beta = .210$, $P < .001$). Thus, H4 is supported. The result highlights the importance of trust in the spiritual jewelry market in Thailand.

H5: Social Influence has a positive effect on purchase intention.

The analysis reveals a significant positive effect of social influence on purchase intention ($\beta = .158$, $P < .05$). H5 is supported. This result indicates that social cues, cultural and norm influence consumers' decisions to purchase spiritual jewelry.

As presented in Table 3, our analysis support all hypotheses but reveals varying degree of significance across predictors. The results highlight trust and social influence emerged as the strongest predictor of purchase intention. While perceived quality showed conventionally significance, and spiritual belief and perceive value demonstrated more marginally significant. This findings corroborate prior research showing that spiritual consumption decisions involve multiple dimensions. Beyond purely economic considerations, the findings suggest that emotional, symbolic value and cultural factors all play vital role in shaping consumer behavior in the spiritual consumption context.

Table 3: Multiple Regression Results for Purchase Intention

Number	Predictor	Beta	t-value	p-value	Hypothesis Testing Result
H1	Spiritual Belief	.072	1.719	.086	Supported
H2	Perceived Quality	.177	2.707	.007	Supported
H3	Perceived Value	.105	1.772	.077	Supported
H4	Trust	.210	3.366	.001	Supported
H5	Social Influence	.158	2.927	.004	Supported

Note: Dependent Variable: Purchase Intention, (*P<.1, **P < 0.05 ***P < .001)

Conclusion and Discussion

This study investigated purchase intention for spiritual jewelry in Thailand's culturally and economically significant market. Empirical analysis of data from 413 consumers revealed that while all hypothesized factors significantly influenced purchase intentions, trust and social influence emerged as the strongest predictors, followed by perceived quality, spiritual belief, and perceived value. These findings align with existing literature, suggesting that symbolic, social, emotional and economic dimensions collectively play crucial roles in shaping consumer decision-making in spiritual consumption contexts—extending beyond purely economic reasoning.

Extending Consumer Behavior Theories to Spiritual Consumption

Our findings contribute to consumer behavior literature by demonstrating how conventional theoretical frameworks require substantive modification when applied to spiritually invested consumption. Unlike previous studies on symbolic or emotional products that primarily focus on self-expression or hedonic benefits, our research reveals a distinct dimension where metaphysical efficacy beliefs fundamentally alter the decision-making processes. The Theory of Planned Behavior (TPB), traditionally emphasizing attitude, subjective norms, and perceived control, required expansion to accommodate the transcendent dimension of spiritual belief—a factor that transforms conventional economic decision-making into a precise process where products serve as mediators between physical and spiritual realms.

Moreover, trust emerged as the dominant predictor of purchase intention, extending McWilliam's (1993) work on trust-based consumer relationships. In Thailand's spiritual jewelry context, trust functions as an assessment to encompass faith in metaphysical efficacy, creating unique hybrid of commercial and spiritual trust. This finding also challenges conventional Consumer Value Theory by demonstrating how value assessment becomes entangled with spiritual authenticity perception.

Consequently, to fully understand spiritual jewelry purchasing decision, researchers must incorporate dimensions that assess not only product attribute but also the trustworthiness of business entity in its interactions with customer. The analysis underscores the importance of assuring customers of reliability and integrity across multiple touchpoints—including accurate information provision, impartial advice, transparent service, and responsiveness to product inquiries, as well as overall trustworthiness. This multifaceted conceptualization of trust aligns with Morgan and Hunt's (1994) commitment-trust theory while adapting it to the specialized domain of spiritual consumption. Theoretically, this findings demonstrates how traditional consumer decision models require modification when applied to spiritual product markets. In other words, this study extends the Theory of Planned Behaviors by highlighting how spiritual and cultural factors reshape conventional consumption determinants. Specially, in the context of spiritual jewelry, trust-based relationships and Thailand's collectivist cultural dimension play pivotal roles in this complex decision-making process.

The Role of Social Influence in Digitalized Spiritual Marketplace

The emergence of social influence as the second strongest predictor reflects broader sociocultural shifts in how spiritual beliefs are communicated and validated in Thailand's rapidly digitalized society. This aligns with Bearden et al.'s (1989) assertion regarding the impact of celebrity endorsements and social media trends on purchase intentions. Notably, the social influence plays

pivotal role in shaping consumer behavior, particularly among Generation Z—a growing segment in the spiritual jewelry market. Unlike previous generations, Gen Z's engagement with spirituality is predominantly mediated through digital platforms. Recent years have witnessed a surge in supernatural-themed television programs, spiritually oriented podcasts, and social media content centered on traditional Thai spiritual practices. These digital spaces foster new reference groups that actively promote spiritual consumption, thereby influencing purchasing decisions. Furthermore, the relationships between social influence and purchase intention must be examined within Thailand's evolving media landscape, which has seen a rise in supernatural and spiritual-themed entertainment. Content featuring spiritual practitioners, ghost stories, and paranormal phenomena has gained significant traction on streaming platforms, reinforcing a need to account for digitally amplified social influence in traditional consumer behavior models.

Furthermore, the results reinforce Zeithaml's (1988) foundational theoretical framework by reaffirming the critical role of perceived quality and value in influencing purchase decisions. To fully understand the complexities of spiritual product consumption, it remains essential to integrate traditional economic dimensions—such as perceived quality (a consumer's judgment about product's overall excellence) and value perception—into analytical models. Perceived quality showed a strong positive effect on purchase intention, indicating that in the context of spiritual jewelry, consumers base their purchase decision on evaluations of product authenticity, craftsmanship, and retailer reputation. Furthermore, perceived value showed a marginally significant relationship with purchase intention, suggesting that emotional and symbolic attributes may outweigh economic considerations in this specialized market.

However, the study also reveals that Thai consumers purchase spiritual jewelry not merely for utilitarian benefits but for spiritually motivated purposes, including prosperity enhancement, romantic relationship fortification, protection from negative energies, and career advancement. These findings significantly extend prior work by Chen et al.'s (2015) on fortune-seeking behavior and Vejlgard's (2008) exploration of symbolic consumption as career success facilitators. Notably, the investigation supports Minton and Kahle's (2014) conceptualization of spiritual artifacts as vehicles for symbolic communication—objects acquired not only for functional utility but also to embody deeper meaning, express identity, and signal cultural belonging. By empirically validating these relationships within Thailand's unique cultural-spiritual context, the study advances understanding of how traditional consumer behavior theories manifest in a contemporary market.

Practical Implications

For practitioners, our findings suggest that the effective marketing strategies for spiritual jewelry should emphasize multidimensional trust-building while fostering social validation. Retailers should not only through conventional quality assurance but also position their products as authentic spiritual products. Digital marketing approaches should leverage trusted-spiritual influencers while creating opportunities for community engagement and validation. In other words, digital influencers not only drive awareness but also cultivate word-of-mouth advocacy, a crucial element for these products. To targeting Gen Z consumers, entrepreneurs should strategically partnering with authentic and trusted digital influencers who share genuine testimonials. This approach amplifies social proof and leverages the strong influence of social factors on purchase decisions, ultimately fostering brand advocacy.

Suggestions

Limitations and Future Research

While this study provides valuable insights into the role of spiritual belief, perceived quality, perceived value, and social influence in purchase intention, we acknowledge several limitations and also provide suggestions for future research. First, the sample was limited to Thai consumers, which may limit generalization to other cultural contexts. Future research should adopt a cross-cultural approach to examine how different spiritual and cultural backgrounds influence purchase intentions for spiritual products. Additionally, we should also consider alternative methods such as stratified

sampling by age cohort or quota sampling across income levels could yield more generalizable results. Second, the future studies could employ longitudinal designs to explore how spiritual jewelry consumption patterns evolve over time. Finally, while our use of multiple regression analysis aligns with our primary objective of identify the predictor strength, structural equation modeling (SEM) could test more complex path relationships. Thus, future research could employ SEM to explore potential mediating and moderating relationships among the variables in model specification. For instance, investing how spiritual belief mediates the relationship between social influence and purchase intention, or how cultural factors moderate the influence of economic factors. Such approaches would further enhance our understanding of spiritual consumption behaviors.

In conclusion, this study contributes to our theoretical understanding by demonstrating how spiritual dimensions interact with conventional consumption determinants, extending Theory of Planned Behavior and consumer behavior theories. This study highlights the complex interplay between spiritual, cultural, and economic factors in specialized markets like Thailand's spiritual jewelry industry.

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A Conceptual Framework for Analyzing Condominium Purchase Behavior under Earthquake Risk Using an Extended UTAUT Model

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Abstract

This study is a conceptual paper based on literature synthesis, aimed at developing a framework for understanding condominium purchase decision-making behavior under the risk of earthquakes. It draws upon the UTAUT (Unified Theory of Acceptance and Use of Technology), which has been extended to include five key predictors: performance expectancy, effort expectancy, social influence, safety awareness, and facilitating conditions. Additionally, the model incorporates the variable of earthquake situations as a moderating factor and examines the role of purchase intention behavior as a mediating variable influencing the actual purchase decision. This study synthesizes knowledge from relevant literature and research on consumer behavior, disaster risk, and condominium purchasing to develop a systematic conceptual framework. The synthesis results indicate that all five factors have a positive influence on purchase intention, with performance expectancy and safety awareness having the strongest effects. Furthermore, facilitating conditions and purchase intention directly impact the actual purchase decision. Meanwhile, earthquake situations play a role in amplifying the relationship between the key factors and purchase intention, particularly in high-risk areas. The findings of this study have both theoretical and practical implications. They provide guidance for project developers and policymakers in designing housing that is resilient to disasters, while also enhancing consumer confidence in making investment decisions.

Keywords: UTAUT Model; Condominium Purchase Intention; Earthquake Risk; Behavioral Intention

Introduction

Currently, the condominium market in urban areas has gained popularity and continues to grow, driven by space limitations, urban expansion, and shifts in living patterns. This is especially true in Bangkok and other major cities with high population density, where condominiums have become a viable choice for meeting both housing needs and lifestyle preferences among middle to high-income consumers (Korawich, 2022; Preechapanichayagarn & Piyawiboon, 2022). The decision to purchase a condominium is a process in which consumers take time to research, compare, and consider multiple factors, including financial security, convenience of transportation, the surrounding environment, as well as psychological and social factors. Therefore, it is classified as a high involvement decision, particularly in uncertain situations, such as natural disaster risks (Kabir, Jamal, & Kairy, 2024). In recent years, the risk of disasters, such as earthquakes, has influenced consumer attitudes and behaviors when choosing a place to live. People in high-risk areas tend to prioritize the safety of building structures and the long-term value of their investment (Shi & Naylor, 2023; Hua, 2022). Factors related to safety and access to transparent information affect purchasing behavior and housing prices (Blake et al., 2021; Hua, 2022). While numerous studies have used behavioral theories, such as the Theory of Planned Behavior (TPB) and the Technology Acceptance Model (TAM), most have focused on general situations rather than those involving specific risks, such as natural disasters.

Although the UTAUT (Unified Theory of Acceptance and Use of Technology) framework provides a comprehensive explanation of technology acceptance behavior, its application in high-risk situations, such as condominium purchase decisions in earthquake-prone areas, remains relatively limited. Specifically, it does not fully address aspects related to the perceived safety of life and property. The original UTAUT model does not incorporate these elements, thus failing to reflect the psychological motivations of consumers in high-risk contexts. Previous research has shown that safety awareness, ease of access to services, and social network influence all impact consumer attitudes and behavior during disasters (Bhojak et al., 2024; Novendah et al., 2024). Furthermore, no existing model systematically integrates these factors or provides an in-depth explanation of consumer behavior. Therefore, this study extends the UTAUT framework by incorporating specific factors, namely Safety Awareness and Earthquake Situation, which act as moderating variables in analyzing the relationship between the key factors and purchase intention. It also examines the role of purchase intention as a mediating variable between the actual purchase decision and the actual purchase decision. Additionally, this study addresses the theoretical gap in applying UTAUT systematically to disaster situations, particularly those related to condominiums and consumer safety. This represents a new avenue for applying behavioral theory in a highly specific field.

This research is a documentary study that synthesizes knowledge from relevant literature and research to present a modern conceptual framework that addresses both theoretical and practical aspects. The framework can be used as a foundation for further development in commercial condominium projects and the formulation of housing policies in high-risk areas, ensuring effective implementation.

Research Objectives

This research aims to develop a conceptual framework by extending the UTAUT (Unified Theory of Acceptance and Use of Technology) to understand the key factors influencing behavioral intention and purchase decision regarding condominiums in the context of earthquake risk. The study focuses on examining the impact of various variables, including performance expectancy, effort expectancy, social influence, safety awareness, and facilitating conditions, as well as the moderating role of earthquake situations on these relationships. Additionally, the study considers the role of purchase intention as a mediating variable between the predictor factors and the actual purchase decision.

This research aims to develop a conceptual framework by extending the UTAUT (Unified Theory of Acceptance and Use of Technology) to understand the key factors influencing behavioral intention and purchase decision regarding condominiums in the context of earthquake risk. The study focuses on examining the influence of various variables, including performance expectancy, effort expectancy, social influence, safety awareness, and facilitating conditions, as well as the moderating role of earthquake situations that may affect these relationships. Additionally, it explores the role of purchase intention as a mediating variable between the predictor factors and the actual purchase decision.

Literature Review

Unified Theory of Acceptance and Use of Technology (UTAUT)

Unified Theory of Acceptance and Use of Technology (UTAUT), developed by Venkatesh et al. (2003), integrates and synthesizes concepts from eight theories related to technology acceptance behavior. These include the Theory of Reasoned Action (TRA), the Technology Acceptance Model (TAM), the Motivational Model (MM), the Theory of Planned Behavior (TPB), the Combined TAM and TPB Model (C-TAM-TPB), the Model of PC Utilization (MPCU), the Diffusion of Innovation Theory (DOI), and the Social Cognitive Theory (SCT). The UTAUT model is particularly relevant to decision-making regarding the use of systems or product purchases, especially in situations involving uncertainty. Previous research, such as studies by Octaviani et al. (2023) and Adiratna & Wulansari (2021), has shown that UTAUT can be applied to areas not directly related to technology, such as online shopping and real estate behavior. However, critical analyses suggest that while UTAUT effectively explains technology usage behavior, it has limitations when applied to situations where consumers face natural

disasters or high-risk scenarios, such as earthquakes. Therefore, the researchers have chosen to extend the UTAUT framework by incorporating the variable of Safety Awareness, aiming to provide a more in-depth and comprehensive understanding of consumer behavior in high-risk situations.

The UTAUT theory consists of four main factors: (1) Performance Expectancy, which refers to the belief that using the technology will improve performance; (2) Effort Expectancy, the perceived ease of use; (3) Social Influence, the impact of others on the decision to use the technology; and (4) Facilitating Conditions, the supportive conditions that enable the use of the system.

Multiple research studies indicate that the factors of Performance Expectancy, Effort Expectancy, and Social Influence have a direct impact on Behavioral Intention. These three factors consistently influence behavioral intention and are commonly used to predict user behavior toward new systems or technologies, including purchase intentions (Adiratna & Wulansari, 2021; Octaviani et al., 2023; Petcharat & Leelasantitham, 2021). Additionally, four moderating variables, gender, age, experience, and voluntariness of use, help enhance the accuracy of these behavioral predictions.

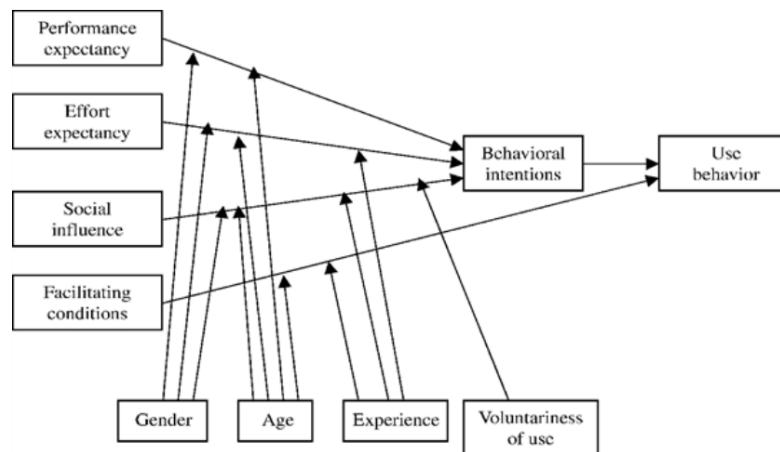


Figure 1: A diagram of the Unified Theory of Acceptance and Use of Technology.

Factors influencing purchasing decisions

Purchase decisions and purchase intentions can be explained using the UTAUT model, as shown in Figure 1, which consists of two key factors: 1) Behavioral intention refers to the consumer's level of willingness to purchase a condominium in the future, which is reflected through behaviors such as information searching or purchase planning. 2) Facilitating Conditions refer to concrete behaviors that demonstrate the decision to buy a condominium, such as signing a contract or making a payment, which arise from the support or conditions that enable the purchase decision.

As shown in Figure 3, there are five key factors that lead to purchase intentions in terms of behavior: 1) Performance Expectancy, which refers to the perception that buying a condominium will yield valuable returns, such as increased property value, improved quality of life, or confidence in the project; 2) Effort Expectancy, which refers to the perception that the purchasing process is straightforward, including activities like information searching, booking, and loan application; 3) Social Influence, which refers to the perception that opinions from close contacts affect the decision-making process; 4) Safety Awareness, which refers to the perception that there are systems in place to support safe access and living in the condominium; and 5) Facilitating Conditions, which refer to the readiness of various measures, such as security systems, emergency prevention, and hygiene, that help motivate the purchase. Additionally, the Earthquake Situation, defined as awareness or experience related to earthquakes, acts as a moderating variable influencing the relationship between these five factors and behavioral purchase intentions, especially in high-risk areas.

Although the UTAUT theory is widely recognized as a framework for explaining technology acceptance behavior, its application to purchase decision-making in specific contexts, such as risks arising from natural disasters, reveals several limitations. Notably, it does not fully address dimensions related to concern, insecurity, and safety, which are critical factors in consumers' risk-related decision processes. To highlight this theoretical gap, the researcher has summarized and compared the original UTAUT

framework, studies applying it in similar contexts, and the extended framework proposed in this study, illustrating the model's development and key distinctions, as shown in Table 1.

Table 1: Comparison between the original UTAUT framework and the extended UTAUT framework in the context of earthquake risk.

Model/Study	Constructs	Context	Key Contribution
Venkatesh et al. (2003) The original UTAUT model	Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions	Technology use in organizations	Synthesized from eight theories to explain technology acceptance
Adiratna & Wulansari (2021)	UTAUT + Gender, Age, Experience, Voluntariness	The use of e-lancing platforms (online freelance work)	Extension of UTAUT application in the online context
Octaviani et al. (2023)	UTAUT + Trust and Risk for Online Travel Platforms	Online travel service bookings by Generation Z	Adding variables that reflect trust and risk
Tankongchamruskul & Rojniruttikul (2024)	UTAUT + Perceived Convenience, Perceived Reliability; Moderator: Number of Cars in Property	Acceptance of automated parking systems in detached houses in urban areas of Thailand	Extending UTAUT by adding variables specific to the context of detached property and user behavior in automated systems
This study Extended UTAUT model	UTAUT + Safety Awareness, Earthquake Situation (Moderating Variable)	Condominium purchasing behavior in earthquake-prone areas	Extending UTAUT to accommodate behavior under disaster conditions by incorporating dimensions of safety and specific situational factors

From the table, it is evident that most studies applying the UTAUT theory have focused on behavior in general situations or in low-risk online environments, such as online shopping or using various platforms. These studies primarily examine standard variables like performance expectancy, effort expectancy, and social influence. However, none have explicitly incorporated factors related to safety awareness and earthquake situations within a single theoretical framework. This study thus represents a theoretical novelty by developing and extending the UTAUT model to better address high-risk contexts, particularly in terms of consumer psychology, housing safety assessment, and decision-making motivation under uncertainty dimensions not previously captured in the original UTAUT model.

Research Methodology

In this study, the researcher employed a documentary research methodology, systematically selecting literature to align with the conceptual framework and research objectives. The articles synthesized were retrieved from reputable databases, including Scopus, Web of Science, Google Scholar, and ThaiJO (TCI). Only articles published between 2020 and 2025 were chosen to ensure up-to-date and relevant information related to the research topic. Search terms used included “UTAUT model,” “purchase intention,” “condominium decision,” “disaster risk,” “earthquake awareness,” “safety awareness,” and “behavioral intention under uncertainty,” reflecting the specific context of real estate purchase decisions under disaster risk. The inclusion criteria were: (1) peer-reviewed articles; (2) studies applying or extending the UTAUT theory in consumer behavior or risk-related contexts; and (3) relevance to developing countries. Exclusion criteria included: (1) studies focusing solely on technology use in

organizations without relation to purchase decisions or natural disasters, and (2) articles not published in reputable academic sources. The selected literature was systematically analyzed and compared to establish a comprehensive and clear conceptual framework that can effectively support the development of quantitative hypotheses.

To ensure the conceptual framework is developed systematically and can be clearly explained, the researcher followed a series of interconnected steps, including defining the research framework, conducting a literature review, performing content analysis, designing the conceptual model, and formulating empirical hypotheses. This sequential process is summarized in Figure 2 to provide an overview of the entire approach.

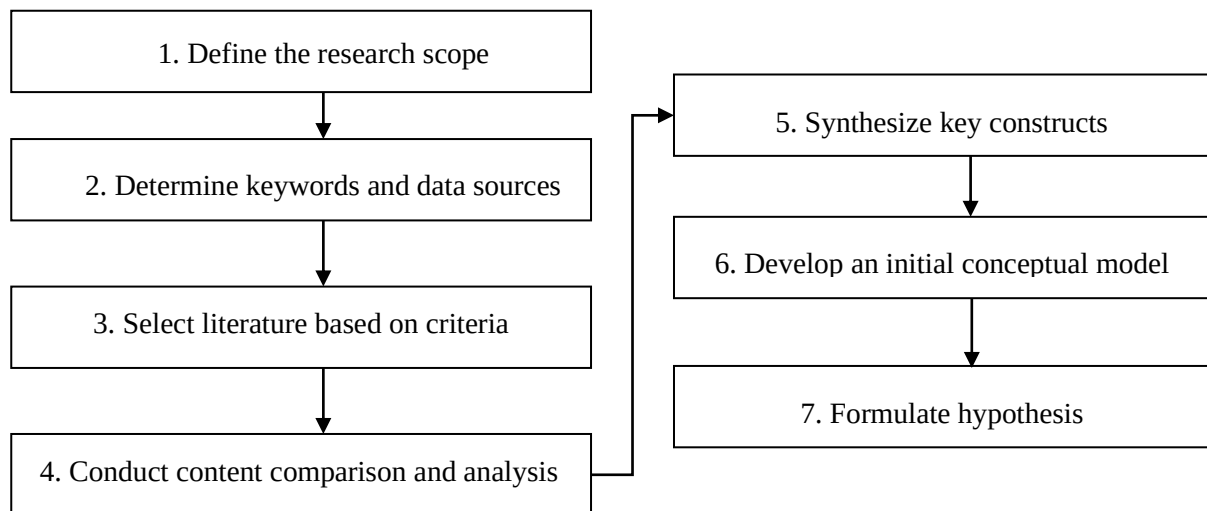


Figure 2: Steps in Synthesizing the Conceptual Framework

Research Findings

This article presents a conceptual framework for studying and predicting purchase intention behavior influencing condominium buying decisions following an earthquake event. The framework is based on the UTAUT theory, with the addition of factors related to consumer safety awareness. The findings indicate that Performance Expectancy, Effort Expectancy, Social Influence, and Safety Awareness positively affect purchase intention, while Facilitating Conditions have a direct impact on both behavioral intention and the actual purchase decision. Furthermore, behavioral intention is positively associated with the actual decision-making behavior.

Based on the UTAUT conceptual framework shown in Figure 1, which includes moderating variables such as gender, age, experience, and voluntariness of use to enhance the accuracy of behavioral predictions, this study employs the earthquake situation as a moderating variable. This reflects the decision-making process of consumers residing in high-risk areas, acknowledging that internal factors alone cannot fully explain their behavior.

Santoso and Almadana (2023) found that performance expectancy is positively associated with the intention to purchase condominiums; when consumers perceive a product to be of high quality, they are more likely to decide to buy. Additionally, perceived building quality has a significant influence on both performance expectancy and purchase intention (Dalbosco et al., 2021). Performance expectancy and effort expectancy also affect the intention to use real estate technology (PropTech) (Bach, 2023), highlighting that product quality and ease of use are critical factors influencing property purchase decisions in the current era. This expectation is framed into hypotheses as follows:

H1: Performance expectation has a positive influence on condominium purchase intention.

Effort expectancy is a crucial factor in purchase decisions, particularly when it comes to housing-related applications. When users perceive an application as easy to use, they are more likely to choose to purchase real estate through online channels (Chiu et al., 2023). This convenience encourages condominium transactions via digital platforms (Hendrajaya et al., 2024). Furthermore,

ease of use enhances consumer trust, which serves as a mediator between effort expectancy and purchase intention (Cao & Putit, 2024). This expectation is framed into hypotheses as follows:

H2: Effort expectancy has a positive influence on condominium purchase intention.

Social media influencers play a significant role in driving consumers' purchase intentions, especially for high-involvement products such as condominiums. They contribute to brand awareness, build trust, and encourage further information seeking (Patmawati & Miswanto, 2022; Azkiah & Hartono, 2023). Parasocial communication and credible imagery can strengthen the relationship between influencers and consumers, thereby affecting purchase decisions (Mathea & Laksmidewi, 2024). At the same time, influence from friends or social networks, whether through trust or shared community values, also impacts consumers' willingness to invest in real estate (Marsasi et al., 2024). This expectation is framed into hypotheses as follows:

H3: Social influence has a positive influence on condominium purchase intention.

Facilities have a significant impact on the intention to purchase condominiums, particularly in densely populated urban areas where consumers consider not only price, location, or unit size but also proximity to workplaces, security systems, shops, parks, and healthcare facilities (Hei & Dastane, 2017; Onderwater et al., 2019). High-income buyers often seek convenience and a better quality of life, which well-managed facilities can provide (Benoit et al., 2017). Access to public transportation, effective building management, and environmental care systems help build investment confidence and reduce hesitation (Hua, 2021). Therefore, developers should prioritize the quality and management of facilities to enhance consumers' purchase decisions. This expectation is framed into hypotheses as follows:

H4: Facility condition has a positive influence on condominium purchase intention.

Condominium purchase decisions are complex processes influenced by multiple factors. One key factor is the condition of facilities, which directly affects satisfaction and purchase willingness (Adelia et al., 2023; Masali et al., 2023). High-quality facilities such as swimming pools, fitness centers, gardens, and common areas enhance project value and cater to the lifestyle needs of modern consumers (Kholifah & Sulaiman, 2024). They also promote quality of life and social relationships within the community, serving as important purchase motivators (Han et al., 2022). Therefore, developing and maintaining facilities is a strategic approach that helps create a competitive advantage in the real estate market. This expectation is framed into hypotheses as follows:

H5: Facility conditions have a positive influence on condominium purchasing decisions.

In today's society, safety has become a crucial factor considered by consumers, especially in urban areas exposed to crime and natural disasters (Hassan et al., 2019). Security features such as key card systems, CCTV, and 24-hour security services enhance residents' confidence, particularly for families with children or elderly members (Folorunso et al., 2022). Good safety measures not only protect lives and property but also provide residents with peace of mind and confidence in their long-term investment (Bhojak et al., 2024). Clear communication of safety protocols helps build trust and stimulates consumers' purchase intentions. This expectation is framed into hypotheses as follows:

H6: Safety awareness has a positive influence on condominium purchase intention.

Findings from multiple studies indicate that purchase intention is a key variable linking factors such as price, location, brand, and quality of life to actual purchase decisions (Korawich, 2022; Thaldumrong, 2024). In the Bangkok–Thonburi area, convenience, safety, and facilities serve as critical accelerators for closing sales (Preechapanichayagarn & Piyawiboon, 2022). Similarly, international studies show that location, access to financing, and building quality influence purchase intention, especially among Generation Z, who place great importance on perceived value and have financial concerns (Kabir et al., 2024; Dinh et al., 2022; Islam et al., 2022; Yang & Methavasarakphak, 2021; Zhang & Nuangjamnong, 2022). This expectation is framed into hypotheses as follows:

H7: Purchase intention has a positive influence on condominium purchasing decisions.

The variable *earthquake situation* is assessed based on the frequency and severity of earthquakes (Geffers et al., 2023), which influence buyers' risk perception levels and create a tendency to relocate from high-risk areas to safer ones (Shi & Naylor, 2023). Earthquake situations also affect consumers' confidence in their ability to control safety (performance expectancy) and motivate them to seek more information about building structure and project stability (effort expectancy) (Blake et al., 2021; Novendah et al., 2024). At the same time, support from social networks and information from various sources (social influence and facilitating conditions) play crucial roles in decision-making, especially regarding safety, which is a

critical condition for purchasing condominiums (Omrane & Bag, 2022; Hua, 2022). This expectation is framed into hypotheses as follows:

H8: Earthquake situation moderates the relationship between performance expectancy, effort expectancy, social influence, facility condition, and safety awareness on purchase intention.

H8a: Earthquake situation is an increaser of performance expectancy that influences condominium purchase intention.

H8b: Earthquake situation is an increaser of effort expectancy that influences condominium purchase intention.

H8c: Earthquake situation is an increaser of social influence that influences condominium purchase intention.

H8d: Earthquake situation is an increaser of facility condition that influences condominium purchase intention.

H8e: Earthquake situation is an increaser of safety awareness that influences condominium purchase intention.

The earthquake situation acts as a deterrent to purchase intention and influences the final purchase decision due to increased perceived risk levels and the tendency for housing prices near affected areas to decline (Shi & Naylor, 2023; Hong et al., 2022). Although the disclosure of safety information can alleviate some concerns, key factors remain economic stability and clear disaster prevention measures (Fatih & Keskin, 2024). Elderly residents or long-term inhabitants with strong ties to the area may still choose to buy housing in the same location, while lower-income groups tend to avoid disaster-prone areas (van der Kloet et al., 2023; Kayaalp, 2025). In such circumstances, these factors become decisive in the purchase decision, often outweighing initial purchase intentions (Hoxha & Ymeri, 2023). This expectation is framed into hypotheses as follows:

H9: Earthquake situation moderates the influence of purchase intention on condominium purchase decision.

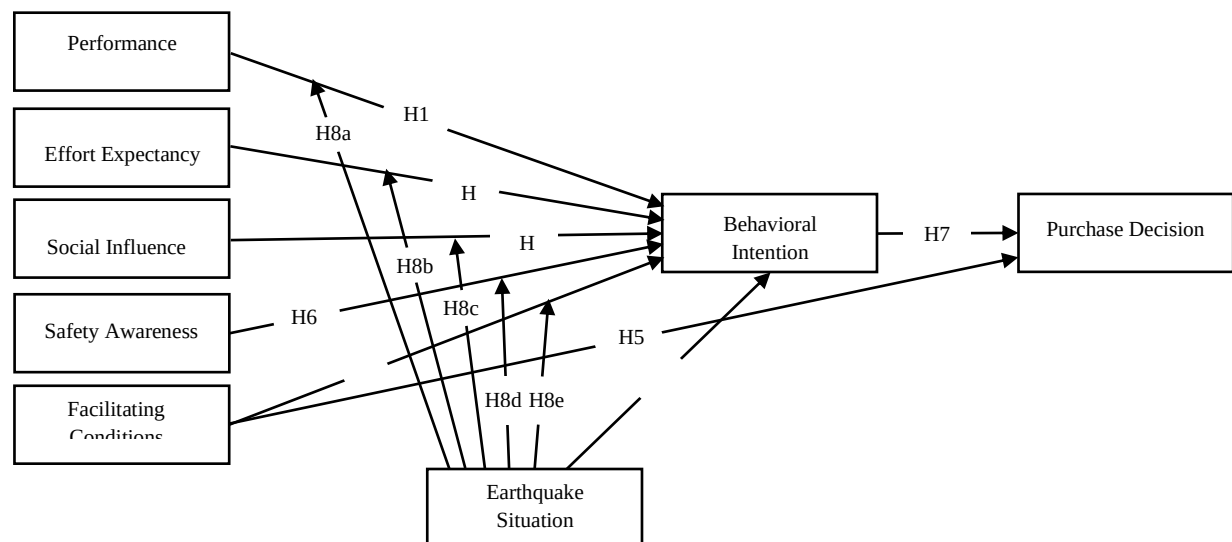


Figure 3: Conceptual Framework

Conclusion and Discussion

This study proposes a conceptual framework that applies the Unified Theory of Acceptance and Use of Technology (UTAUT) to the context of earthquakes, aiming to analyze purchase intentions and decisions for condominiums in disaster-prone areas. The developed model consists of five core factors: performance expectancy, effort expectancy, social influence, facilitating conditions, and safety awareness, with the earthquake situation serving as a moderating variable.

The synthesis reveals that performance expectancy and safety awareness are the most influential factors, as consumers in disaster-prone areas prioritize building stability and personal safety above all else. Meanwhile, facilitating conditions such as access to services and adequate infrastructure affect both purchase intention and actual buying decisions. The earthquake situation plays a reinforcing role, strengthening the relationship between these factors and purchase intention, particularly among those who have experienced disasters. Such consumers tend to seek comprehensive information, exercise greater caution in their decisions, and be more receptive to opinions from their social circles. All of these factors collectively influence purchase decision behavior, and as consumers become more aware of disaster risks, their purchase intentions are increasingly likely to translate into actual purchase decisions.

The integration of UTAUT theory with safety factors and the earthquake situation enhances the systematic explanation of consumer behavior in purchasing condominiums in disaster-prone areas. Incorporating these variables into the UTAUT model framework addresses its previous limitations in capturing psychological motivations, risk perception, and factors related to the safety of life and property. This extended framework provides a more comprehensive basis for subsequent empirical research.

Recommendations

Although the conceptual framework developed in this study expands the scope of the UTAUT theory to encompass the context of natural disasters such as earthquakes, this work remains a conceptual paper and has not yet undergone empirical testing. Therefore, the statistical relationships between variables cannot be definitively confirmed. To ensure a more complete development of the framework and its practical applicability, the researcher proposes directions for future studies as well as policy and management recommendations as follows:

Recommendations for Future Research

- 1) Data should be collected from actual target groups in earthquake-prone areas, such as individuals interested in or planning to purchase condominiums in these high-risk zones.
- 2) Structural Equation Modeling (SEM) should be employed to validate the structural model's fit and to examine the causal relationships between variables.
- 3) It is recommended to examine differences in consumer behavior between high-risk and low-risk areas by using Multi-group Structural Equation Modeling (SEM) to compare models across subgroups.
- 4) Demographic variables such as gender, age, income, and disaster experience should be included as moderating variables to enhance the accuracy of the analysis.

These approaches will help test and refine the developed model to better fit real-world contexts, enabling its effective use in marketing strategy development and policy formulation.

Policy and Management Recommendations

From a policy perspective, housing planners and urban developers should prioritize establishing disaster preparedness measures at the community level, such as enforcing building structure standards, ensuring readiness of emergency communication systems, and transparently disseminating risk information.

For real estate developers, emphasis should be placed on designing products that address safety concerns and adopting proactive communication strategies to build consumer trust. The use of technologies such as AR/VR structural simulations or simplified presentations of technical safety system data can enhance confidence and positively influence long-term purchase behavior.

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Factors Affecting the Central Region Thai Passengers' Use of Low-Cost Airlines on Domestic Routes

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Abstract

This study investigates the factors affecting the use of low-cost airlines among Thai passengers in Thailand's central region. Data were collected from 400 individuals who had traveled with such carriers within the past year, using a structured questionnaire. Descriptive statistics, t-tests, ANOVA, and multiple regression analysis were employed to examine the effects of demographic variables and elements of the marketing mix. The results show that gender, age, education, and income significantly influenced service utilization, while occupation did not. Older and more educated passengers tended to spend more per trip. Physical evidence was positively associated with average ticket spending, whereas booking convenience negatively influenced it. Additionally, price and process factors were found to reduce travel frequency. Although the model explained a small portion of behavioral variance ($R^2 = 3.5\text{--}4.1\%$), the findings provide useful insights for airlines aiming to refine marketing strategies and improve service experience in the post-pandemic era.

Keywords: Low-cost airlines, Passenger decision-making, Domestic air travel, Consumer behavior, Service utilization

Introduction

In the past decade, low-cost carriers (LCCs) have transformed the domestic airline market in Thailand by providing affordable fares and broad accessibility. Their rise has been fueled by competitive pricing strategies and the increasing demand for short-haul travel. In 2022 alone, the Civil Aviation Authority of Thailand (CAAT, 2023) reported a significant rebound in domestic passenger traffic, signaling a strong recovery trajectory following the COVID-19 crisis. Despite this momentum, structural challenges persist. Passengers have voiced concerns over vague pricing structures, limited customer service, and operational inefficiencies—such as frequent delays and inflexible booking and refund systems.

These service-related frictions have become even more pronounced in the post-pandemic era, where travelers now expect greater flexibility, transparency, and digital convenience. Understanding the factors that influence passenger decision-making in this context is both timely and critical. As the domestic aviation sector continues to evolve, LCCs must balance cost-efficiency with service quality to maintain competitiveness and consumer trust. This study therefore investigates how demographic characteristics and perceptions of service factors affect the utilization of low-cost domestic air travel among passengers in Thailand's central region. The findings are expected to offer actionable insights for improving strategic service delivery, marketing communication, and long-term engagement within this sector.

Research Objectives

1. To investigate the behavior of Thai passengers in the central region regarding the use of low-cost airlines on domestic routes.
2. To examine the differences in low-cost airline usage behavior among Thai passengers in the central region, classified by demographic factors.
3. To explore the influence of marketing mix factors on the use of low-cost domestic airline services among Thai passengers in the central region.

Literature Review

Personal Characteristics

Phatthakan Sophonchaokul (2020) explained that individuals possess both visible and internal attributes—such as gender, age, education, occupation, income, social context, and religious background—which shape their attitudes, feelings, and behaviors. Understanding these variables offers insights into psychological differences among consumers.

Demographic Factors

Sasiporn Bunchoo (2017) emphasized that demographic characteristics can significantly affect individuals' decision-making, attitudes, and behavioral responses. Variations in age, education, marital status, occupation, and monthly income are all associated with differences in perception and consumer behavior.

Marketing Mix Concepts

Aekkarong Worasriha (2017) defined the marketing mix as a controllable set of marketing tools used to achieve goals within a defined target market. Nuengruethai Siangchin (2014) added that to attract consumers, businesses must offer products that meet customer needs at an acceptable price while ensuring product availability through effective distribution and engaging promotions.

Chompoonut Aranyapan and Karnjira Limsirithong (2013) noted that the marketing mix is a set of tools used to coordinate marketing elements in order to generate satisfaction among the target audience. These internal marketing factors are within the control of the firm and essential for achieving strategic objectives. Orchan Sirichot (2012) further expanded the concept for service businesses by outlining seven key components that must be integrated for competitive success: product, price, place, promotion, process, physical evidence, and people. The integration of these components—known as the 7Ps—enables service providers to meet customer expectations effectively and consistently.

Consumer Behavior

Manatchanok Chairat (2020) described consumer behavior as observable actions in selecting and using products or services, with satisfaction inferred through expressions such as facial reactions and gestures. Similarly, Siriporn Supatosah (2017) defined consumer behavior as the decision-making process driven by both internal needs and external stimuli, ultimately guiding consumption and purchase behavior.

Low-Cost Airline Industry in Thailand

Saowarin Sairangsee (2008) documented that Thailand's low-cost airline industry emerged in late 2003, starting with the launch of Thai AirAsia—jointly founded by Shin Corp and Malaysia's AirAsia. This was soon followed by One-Two-Go Airlines under Orient Thai Airlines and Nok Air, a subsidiary of Thai Airways, which commenced operations in June 2004.

Empirical Research on LCC Usage

Pilailak Kairat (2018) investigated consumer behavior in choosing low-cost airlines. Her findings showed that most respondents favored Thai AirAsia, particularly for trips to the northeastern region, with travel occurring mostly on weekdays and check-in completed at airport counters. Physical evidence, product quality, and airline image significantly influenced both the frequency of service usage and the likelihood of future selection. Price and process were also key behavioral drivers.

Jiraphat Sriphothingam (2023) examined post-COVID-19 consumer behavior influencing the marketing mix in domestic low-cost air travel. The study found that most respondents were women aged 21–30, holding bachelor's degrees, working in private companies, and earning between 15,000–30,000 THB per month. Demographic factors such as gender, age, education, and occupation were

found to influence LCC service usage during the post-pandemic period. Additionally, consumer behavior factors such as average spending per flight and influential decision-makers affected airline choice. Notably, the “people” element of the marketing mix—specifically, the capability of ground staff and flight attendants in addressing issues and answering questions—was rated highest. The study recommended consistent training and scenario-based simulations to build professionalism and customer trust, thereby encouraging repeat usage.

Marketing Mix in Low-Cost Airlines

According to Pakdil and Aydin (2007), the service quality perceptions of airline passengers are significantly shaped by marketing mix factors such as responsiveness, assurance, and tangibility. These elements directly affect customer satisfaction and loyalty, particularly in the low-cost airline segment where price competition is intense. Similarly, Mason and Morrison (2008) argue that LCCs must strategically manage service delivery through simplified product offerings and cost-effective distribution channels to remain viable in competitive domestic markets.

Demographic Influences on Airline Passenger Behavior

Research by Bejou and Palmer (1998) showed that age, income, and education significantly influenced consumer expectations and their tolerance for service limitations. In low-cost contexts, older and higher-income passengers were more willing to pay for perceived reliability and punctuality. This is consistent with findings by Wen and Yeh (2010), who emphasized that demographic traits, particularly income and occupation, moderated the relationship between price sensitivity and service evaluation in Taiwan’s low-cost air travel sector.

International Perspectives on Consumer Behavior in LCCs

Chen and Chang (2005) found that brand image, perceived value, and convenience were strong predictors of repeat purchase behavior among passengers of budget airlines in East Asia. Furthermore, Zeithaml,

Bitner, and Gremler (2017) proposed that psychological factors such as trust, perceived risk, and experiential value are particularly critical in the LCC environment, where passengers often trade service depth for affordability.

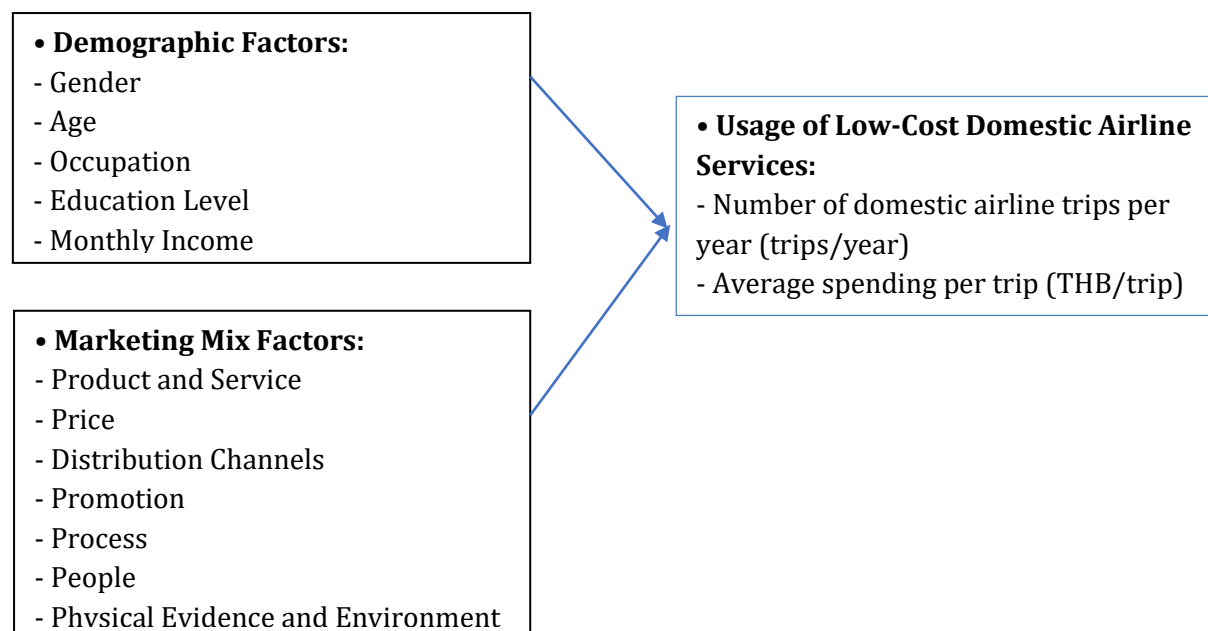


Figure 1: Conceptual Framework

Research Methodology

The target population in this study consisted of Thai passengers residing in the central region of Thailand who had used low-cost domestic airline services at least once in the past year. Given the unknown population size, the sample size was determined using Cochran's formula with a 95% confidence level, resulting in 400 valid responses. A purposive sampling technique was applied to select respondents from the five most populous provinces in the region: Bangkok, Samut Prakan, Nonthaburi, Pathum Thani, and Nakhon Pathom (Department of Provincial Administration, 2023). Data were collected through both online and offline surveys.

The research instrument was a structured questionnaire comprising five sections: (1) screening questions, (2) demographic information, (3) perceptions of marketing mix factors, (4) behavioral patterns regarding low-cost airline usage, and (5) open-ended questions for additional comments. The questionnaire's content validity was assessed by three academic experts using an item-objective congruence (IOC) index, with all items exceeding the minimum threshold of 0.50. A pilot test conducted with 30 participants yielded a Cronbach's alpha of 0.926, indicating strong internal consistency.

Descriptive statistics (frequency, percentage, mean, and standard deviation) were employed to summarize demographic characteristics and behavioral data. To test for significant differences in service usage based on demographic factors, independent sample t-tests were applied for binary variables (e.g., gender), while one-way ANOVA was used for variables with more than two categories (e.g., age, education level). These techniques were selected to determine whether there were statistically significant differences between demographic groups.

Multiple linear regression analysis was conducted to examine the predictive relationships between the seven marketing mix dimensions—product/service, price, place, promotion, process, people, and physical evidence—and two key behavioral outcomes: travel frequency and average ticket expenditure. This technique was appropriate for identifying the relative influence of multiple independent variables on continuous dependent variables, thereby offering insights into which service components most affect consumer decision-making. Statistical significance was evaluated at the 0.05 and 0.01 levels. The study revealed that the majority of respondents were male (219 individuals or 54.75%), aged 45 years and above (191 individuals or 47.75%), and held a bachelor's degree (252 individuals or 63.00%). Most respondents were employed in private companies (124 individuals or 31.00%) and had a monthly income exceeding 40,000 THB (183 individuals or 45.75%).

Regarding the service usage behavior of Thai passengers in the central region for low-cost domestic airlines, 70.00% (280 respondents) were the main decision-makers. Most used regular scheduled flights (82.50%), citing low cost as the primary reason (63.75%). The majority of flights were taken on weekdays (54.50%), and the most frequently traveled route was Bangkok–Chiang Mai (47.75%). Travel was mainly with family or relatives (34.75%), and tickets were most commonly booked through the airline's official website (40.75%). The average cost per trip was 2,425.15 THB, with an average frequency of 5 flights per year.

In terms of the **marketing mix factors**, the overall opinion level among respondents was categorized as “strongly agree,” with a mean score of 4.41 and a standard deviation of 0.50, indicating relatively consistent opinions. When broken down by individual components, the ranked findings were as follows:

1. Product/Service

Respondents reported the highest level of agreement with this factor (mean = 4.52, SD = 0.56). This indicates that they strongly valued the quality and clarity of the airline's products and services. The consistency of opinions was also high, as shown by the low standard deviation.

2. People

This factor, referring to staff and personnel, received a mean score of 4.50 with a standard deviation of 0.59. Respondents expressed strong agreement with the quality of service provided by airline staff, both on the ground and in-flight.

3. Process

This component also received a mean of 4.50 and a standard deviation of 0.62. The results show that passengers highly appreciated the airline's operational procedures and service delivery system, such as check-in, boarding, and customer support processes.

4. Promotion

The promotional activities carried out by the airlines, such as special offers and advertisements, were rated with a mean of 4.43 and a standard deviation of 0.59. This suggests respondents were highly aware and influenced by the marketing campaigns.

5. Place (Distribution Channels)

With a mean score of 4.35 and a standard deviation of 0.63, this factor reflects satisfaction with the availability and accessibility of ticket booking options—particularly the convenience of online platforms and mobile applications.

6. Physical Evidence

This factor, which includes the tangible aspects such as the appearance of aircraft, uniforms, and boarding areas, was rated with a mean of 4.30 and a standard deviation of 0.67. While still rated highly, it ranked sixth, indicating room for improvement in physical presentation.

7. Price

Despite being the most frequently cited reason for choosing low-cost airlines, price was ranked lowest among the 7Ps in terms of perceived importance, with a mean of 4.29 and a standard deviation of 0.67. This suggests that while price is important, other service-related factors may influence satisfaction and loyalty more.

Table 1: Differences in Low-Cost Airline Usage by Demographic Factors of Thai Passengers

Demographic Variable	Statistical Test	Measurement Scale	Sig. (p-value)
Gender	Independent Samples t-test	Nominal	0.010 *
Age	One-Way ANOVA (F-test)	Ordinal	0.000 **
Education Level	One-Way ANOVA (F-test)	Ordinal	0.041 *
Occupation	One-Way ANOVA (F-test)	Nominal	0.137
Monthly Income	One-Way ANOVA (F-test)	Ordinal	0.002 **

Note: * Statistically significant at the 0.05 level

** Statistically significant at the 0.01 level

The hypothesis testing results revealed that differences in gender, age, education level, and monthly income were significantly associated with variations in the usage of low-cost domestic airline services among Thai passengers in the central region. Conversely, occupation was found not to have a statistically significant effect.

Table 2: Multiple Regression Analysis on Average Spending per Trip

Marketing Mix Factor	B Coefficient	Std. Error	Beta	t-value	Sig.
Constant	1905.831	479.625		3.974	0.000**
Product/Service	2.659	130.402	0.001	0.020	0.984
Price	-273.373	102.910	-0.176	-2.656	0.008**
Place	-2.535	127.434	-0.002	-0.020	0.984
Promotion	-10.947	130.209	-0.006	-0.084	0.933
People	356.049	148.030	0.201	2.405	0.017*
Physical Evidence	86.373	131.282	0.056	0.658	0.511
Process	-52.141	147.895	-0.031	-0.353	0.725
R = 0.202 R Square = 0.041 Adjusted R Square = 0.024 Std. Error of the Estimate = 1026.015					

Note: * Statistically significant at the 0.05 level, ** at the 0.01 level.

The regression analysis examining marketing mix factors influencing the average fare per trip among Thai passengers in the central region revealed two statistically significant variables. The physical evidence factor showed a positive effect ($\beta = 0.201$, $p = 0.017$), indicating that better perceptions of tangible aspects—such as aircraft appearance and facilities—were associated with higher spending per trip. In contrast, the place factor (distribution channels) had a negative effect ($\beta = -0.176$, $p = 0.008$), suggesting that easier access to booking systems may lead to lower fare levels, possibly due to more price comparisons or promotions. Other factors—including product/service, price, promotion, people, and process—were not statistically significant. The model yielded an R value of 0.202 and an R^2 of 0.041, explaining 4.1% of the variation in average fare per trip, with the remaining 95.9% likely influenced by external or unmeasured factors.

Table 3: Multiple Regression Analysis on Number of Trips per Year

Marketing Mix Factor	B Coefficient	Std. Error	Beta	t-value	Sig.
Constant	4.810	2.457		1.957	0.051
Product/Service	-0.9734	0.668	-0.090	-2.136	0.033*
Price	1.0865	0.527	-0.147	2.281	0.023*
Place	1.103	0.653	0.130	1.690	0.092
Promotion	0.571	0.667	0.064	0.856	0.393
People	1.019	0.758	0.113	1.344	0.180
Physical Evidence	-1.2248	0.673	-0.175	-2.065	0.013*
Process	0.618	0.758	0.072	-2.497	0.415
R = 0.188 R Square = 0.035 Adjusted R Square = 0.018 Std. Error of the Estimate = 5.257					

Note: * Statistically significant at the 0.05 level

The multiple regression analysis revealed that three marketing mix factors had a statistically significant influence on the number of low-cost domestic flights taken by Thai passengers in the central region. The process factor showed a negative relationship ($\beta = -1.2248$, $p = 0.013$), suggesting that higher satisfaction with service procedures was associated with fewer flight uses. Similarly, the price factor was negatively related ($\beta = -0.9734$, $p = 0.033$), indicating that price-conscious passengers tended to travel less frequently. In contrast, the place factor—referring to ticket booking and distribution channels—had a positive effect ($\beta = 1.0865$, $p = 0.023$), implying that accessible and convenient booking systems encouraged more frequent travel. Other factors such as product/service, promotion, people, and physical evidence were not statistically significant in this model. The overall model had an R^2 value of 0.035, explaining only 3.5% of the variation in flight frequency, with the remainder likely influenced by external or unmeasured variables.

Conclusion and Discussion

The empirical findings of this study revealed statistically significant relationships between marketing mix factors and passenger behavior in the low-cost airline sector. Physical evidence, including visible aspects of the aircraft and onboard environment, was positively correlated with average ticket expenditure. This suggests that passengers are not solely price-driven; rather, they are willing to spend more when they perceive tangible signs of safety, professionalism, and reliability. In contrast, booking convenience had a negative effect on expenditure. This may reflect passengers' tendency to seek lower prices when booking through online channels, where price comparison tools and flash promotions are more accessible.

Similarly, price and process dimensions exhibited negative associations with travel frequency. A plausible explanation is that passengers who find pricing structures unclear or experience friction during check-in processes may be discouraged from frequent travel, particularly those with tight schedules or limited travel experience. In a market that emphasizes affordability, even minor service complexities can create psychological barriers to repeated usage.

It is important to acknowledge that the predictive power of the statistical models used in this study was modest, with R^2 values ranging from 3.5% to 4.1%. This indicates that while marketing mix factors do influence passenger behavior, a majority of the variance is likely explained by other variables not included in the present model—such as service satisfaction, travel purpose, brand trust, or post-pandemic health concerns. Future research may benefit from incorporating these additional constructs.

Overall, the results support existing theories in service marketing and consumer behavior, affirming that perceived value and ease of service delivery are crucial elements shaping the decision-making process in low-cost air travel. These findings contribute to a deeper understanding of how LCCs can strategically align their services with evolving consumer expectations in an increasingly competitive domestic aviation landscape.

The analysis of demographic characteristics of 400 Thai passengers residing in the central region who had used low-cost domestic airline services revealed that most respondents were female, aged 45 and above, held a bachelor's degree, were employed in the private sector, and had a monthly income of more than 40,000 baht.

In terms of service usage behavior, most passengers served as the primary decision-makers and primarily used regular scheduled flights. The key reason for choosing low-cost airlines was affordability. Weekdays were the most common travel period, with the Bangkok–Chiang Mai route being the most popular. The number of respondents who traveled alone and those who traveled with family or relatives was relatively equal. Online booking through airline websites or applications was the most preferred channel. The average expenditure per flight was approximately 2,425.15 baht, with an average usage of five trips per year.

Regarding the marketing mix factors, respondents expressed a high level of agreement overall, with an average score of 4.41 and a standard deviation of 0.50. When ranked by mean score, the most influential factors were: (1) product/service (4.52), (2) people (4.50), (3) process (4.50), (4) promotion (4.43), (5) place/distribution channels (4.35), (6) physical evidence (4.30), and (7) price (4.29).

In-depth analysis revealed that product/service was most valued for safety standards aligned with international benchmarks (mean = 4.79). In the price category, the most important item was the appropriateness of fares relative to route distance (mean = 4.57). For distribution channels, convenience and speed of booking via the airline website (mean = 4.52) were most emphasized. In the promotion dimension, attractive deals and discounts were the most compelling aspect (mean = 4.57). Passengers particularly appreciated the emphasis on safety by flight attendants in the people dimension (mean = 4.68), and the availability of essential onboard equipment, such as seat belts and storage compartments, was highly valued in the physical evidence category (mean = 4.68).

Hypothesis testing indicated that gender, age, education level, and monthly income significantly influenced airline service usage behavior. Specifically, female passengers aged 45 and above, with higher education and income exceeding 40,000 baht, spent more per trip. This reflects a greater emphasis on quality and safety, consistent with the theoretical framework proposed by Sophonchaokul (2020) and the empirical findings of Saneewong Na Ayudhya (2018), which highlight the role of demographic factors in shaping consumer behavior.

For Hypothesis 2, certain elements of the marketing mix, particularly process, distribution channels, and price, were found to significantly influence the number of flights taken and the average fare. The model explained between 3.5 and 4.1 percent of passenger behavior, in line with the marketing principles of Kotler and Keller (2006), and empirical research by Kairat (2018) and Wangkaunklang (2019), which emphasize the strategic importance of process and distribution in the low-cost airline sector.

The findings of this study offer several strategic implications for low-cost airline operators seeking to improve service delivery and passenger retention. First, the strong association between physical evidence and higher ticket expenditure highlights the importance of maintaining aircraft appearance, cabin cleanliness, and consistent branding. Investments in visible service quality can reinforce passenger perceptions of safety and professionalism, which in turn justify price premiums.

Second, the negative impact of booking convenience on spending suggests that while online channels are widely used, they often attract price-sensitive consumers. To address this, airlines should consider implementing tiered booking options that bundle added-value services—such as seat selection or

baggage allowances—alongside promotional fares, helping to balance accessibility with revenue optimization.

Lastly, the process and pricing dimensions that reduce travel frequency warrant operational attention. Simplifying check-in procedures, increasing transparency in fare structures, and improving mobile service interfaces may help mitigate passenger frustration and foster loyalty. These adjustments are particularly vital in the post-pandemic era, where consumers increasingly value speed, clarity, and minimal physical contact throughout the travel journey.

While the present study contributes valuable insights into the behavioral factors influencing low-cost airline usage among Thai passengers, certain limitations should be acknowledged. First, the relatively low explanatory power of the regression models ($R^2 = 3.5\text{--}4.1\%$) suggests that other variables not included in the framework may significantly influence passenger decision-making. These may include psychological factors such as perceived risk, trust in brand, post-pandemic health concerns, or previous service experiences—all of which merit future exploration.

Additionally, the study focused exclusively on passengers in the central region of Thailand. Comparative studies involving other regions or international passenger samples could provide broader generalizability and highlight geographic or cultural variations in behavior. Future research may also consider mixed-methods approaches, integrating qualitative interviews or focus groups to capture deeper motivations and emotional drivers behind passenger choices—dimensions that are not always fully captured through quantitative surveys alone.

Suggestions

1) The marketing mix factor of physical evidence was found to have a positive influence on the average fare per trip for Thai passengers using low-cost domestic airlines in the central region. This suggests that passengers perceive higher value when the airline's tangible service aspects are well managed. Therefore, domestic airline operators should maintain a strong service image—such as punctuality, avoidance of sudden flight cancellations, and consistent in-flight service quality—to reinforce trust and justify pricing.

2) The place dimension (distribution channels) exhibited a negative relationship with average fare per trip. This indicates that greater accessibility in ticket distribution may be associated with lower fares, potentially due to increased price competition across platforms. Thus, it is recommended that airlines regulate and standardize ticket sales across all channels to ensure fairness and avoid passenger dissatisfaction resulting from price discrepancies.

3) Both place and process factors were negatively associated with the number of flights taken per year by passengers. To encourage repeat travel, domestic airlines should focus on enhancing the efficiency of the booking process. Introducing features such as passenger profile recognition or quick rebooking options could support greater travel frequency and improved customer retention.

4) The process factor alone was also found to negatively impact flight frequency. Long or complicated pre-flight procedures—such as baggage drop-off or check-in delays—may deter passengers from flying frequently. As such, airlines should streamline service processes to reduce time and inconvenience before boarding, thereby increasing the appeal of air travel as a regular transport option.

5) Respondents expressed comparatively lower satisfaction with the price dimension than with other marketing mix components. To address this, domestic airlines should ensure that fare pricing remains reasonable, especially during peak travel periods. Additionally, pricing structures should be perceived as fair and transparent, even when fares are adjusted based on demand.

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Enhancing User Engagement with Design Connex for Architects and Designers

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Abstract

Design Connex is a web-based platform enabling architects and designers to share their design portfolios. To enhance user engagement, specifically by increasing the frequency of return visits and the level of interaction on the platform, this study explored the integration of artificial intelligence (AI) to address key pain points in the architectural design workflow. Interviews with architects and designers revealed a common challenge in sourcing real and purchasable materials that matched design concepts. A high-fidelity prototype of an AI-based visual product search tool was developed to help architects and designers quickly find suitable materials. The design of the prototype incorporates functions for analyzing uploaded design draft images to identify visual elements such as colors, shapes, and textures and automatically recommending purchasable materials that closely match those seen in the draft. Initial testing indicated that this tool significantly reduced time spent on product search and sourcing. Additionally, the study identified the problem of using three-dimensional (3D) models that inaccurately represented real or locally available products. A 3D Models Affiliate Program was proposed so that architects and designers could use real-product-based 3D models in their design proposal and potentially earn a commission from a client's purchase. Testing showed strong interest in this feature, as it reduced friction during product specification and procurement. Combining AI for material identification and 3D models for realistic representation linked design inspiration to real-world materials. This integration proposed potential approaches to enhancing the platform's overall user experience, satisfaction, and engagement.

Keywords: AI Visual Search, Affiliate Marketing, User Experience

Introduction

Establishing a strong online presence in the digital age is essential in expanding professional opportunities and fostering meaningful connections. Design Connex (<https://designconnex.com/>) is a central platform specifically tailored for design professionals including architects, interior designers, and landscape architects to showcase their works by uploading and sharing design portfolios. The platform is envisioned as a space where professionals can demonstrate their expertise, increase visibility, and attract new clients, collaborators, or career prospects.

Despite the strength of its underlying concept, the platform has been facing limited user engagement, defined as frequency of return visits and user interaction with the system, which hinders its growth and overall impact. This issue stems from its core functionality being confined mainly to portfolio uploads, without offering additional features that align with user behavior or encourage active participation. As a result, users typically upload their work and then leave, since there are no other features that attract them or support their workflow in a meaningful way. Consequently, the

platform tends to foster one-time use rather than ongoing engagement, making it challenging to build a loyal and active user base over time.

To address this challenge, the project explored the integration of artificial intelligence (AI) tools to boost engagement and create a more personalized user experience. In today's digital landscape, AI is increasingly adopted across industries to improve usability, enhance interaction, and deliver tailored services, making it a potential addition to support and strengthen the platform's core functionality.

In addition, the project identified other features that aligned with real user behavior and workflows and complemented AI functionality. These added features tended to foster continuous user interaction and encourage long-term engagement. They would potentially contribute to the platform's core values and may, in the future, create opportunities for revenue generation.

Research Objectives

This study investigated the potential to enhance user engagement of the Design Connex platform. The specific objectives are as follows:

1. To examine user needs and behavior in using Design Connex to support architectural design workflows.
2. To explore the application of AI technologies to improve Design Connex's functionality for architectural design workflows.

Literature Review

Applications of AI in Business

In recent years, the integration of AI in electronic business has expanded rapidly, playing a significant role in enhancing user experience and improving operational efficiency. Common AI applications in this context, such as personalized recommendation systems, AI-powered chatbots, and predictive analytics, have demonstrated strong potential to support customer interaction and business performance (Haerawan et al., 2024). Personalized recommendation systems analyze user behavior to suggest products that match individual preferences. AI-powered chatbots provide real-time customer support, guiding users through platforms and responding to frequently asked questions. Predictive analytics use historical data to forecast customer trends, optimize inventory management, and support data-driven decision-making.

These developments are particularly relevant to Design Connex, which could benefit from applying similar AI technologies. For instance, personalized recommendation systems could suggest materials that reflect an architect's individual style or design preferences. Chatbots could help answer common questions, guide product discovery, and assist with platform navigation. Predictive analytics could support architects in analyzing target audiences, tracking design trends, monitoring competitors, and identifying opportunities for improvement. Given the wide range of possibilities, selecting, and researching specific AI technologies for use in this platform could offer valuable insights and future development potential.

In the field of architecture, AI tools are gradually being adopted to support various stages of the design process. One common application is using AI-generated prompts to create draft examples of interior or exterior spaces, which helps align understanding between team members and clients at the early stages of a project. A study conducted at Tatung University in Taiwan involved 15 architecture students who were asked to work in groups and use AI prompting tools to generate initial design ideas. This approach enabled each group to establish a shared visual understanding from the beginning of the project. After the study, most participants reported a high level of satisfaction with the use of AI. They indicated that the AI tools were effective, useful, convenient, and helped facilitate their work more efficiently (Lin & Kim, 2023). Similarly, AI has also been used to analyze room images and recommend products. Researchers from the Royal College of Engineering and Technology in Kerala developed an AI-powered system that combines image generation, object detection, and product recommendation to create interactive design experiences. This system not only redesigns a room using AI but also links each piece of furniture to real shopping websites, helping

users visualize and purchase items easily (Albi et al., 2025). In addition to product recommendations, AI is also being used to suggest 3D models for architects. One study introduced a smart tool called DrStyle, which helps architects select the best-matching 3D models based on the design style learned from the architect's picture project file, aligning closely with the designer's stylistic intentions, and reducing the time spent on product selection (Zhou et al., 2023).

These findings indicate strong potential for integrating AI into platforms like Design Connex, as there is a growing trend in adopting AI tools in design professionals' workflows. The prior study also revealed positive user feedback, with participants viewing AI as a valuable and effective tool enhancing their design process.

Related Platforms for Design Portfolio Sharing

This section reviews features of other well-known portfolio-sharing platforms similar to Design Connex, such as Behance (<https://www.behance.net>), Dribbble (<https://dribbble.com>), and LinkedIn (<https://www.linkedin.com>). Each platform offers unique features that contribute to their success as creative hubs. While these platforms offer strong visibility and networking, they are not without limitations. None of the three platforms is specifically tailored to the unique needs of architectural professionals. Their primary focus tends to be on graphic design, user interface and user experience design, and other visual arts, leaving a gap in features that support the workflows in architectural practice. This creates an opportunity for Design Connex to better serve unique needs of design professionals.

Both Behance and Dribbble closely align with the core concept of Design Connex, serving as spaces where users can showcase design portfolios. However, unlike Design Connex, these platforms also function as online communities, where users can like, comment, and interact with each other's work, creating a more dynamic and interconnected user experience. This community-driven approach is widely recognized as a critical factor in the success of online platforms, as it fulfills one of the most fundamental human needs, the need for connection and communication (Stanoevska-Slabeva & Schmid, 2001). Given this, incorporating similar community features into Design Connex presents a potential opportunity to increase user engagement and encourage more active participation on the platform.

Additionally, both Behance and Dribbble integrate marketplace models that allow users to sell their design assets or purchase works from others, further enhancing the potential for creative professionals to monetize their skills. According to the marketplace taxonomy framework proposed by Täuscher and Laudien (2018), marketplaces can be categorized based on three key dimensions: value creation, value delivery, and value capture. Based on this framework, Behance and Dribbble can be classified as digital product communities, characterized as consumer-to-consumer (C2C) platforms that foster a sense of belonging among users while facilitating transactions involving both digital and tangible products. In contrast, Design Connex is more closely aligned with the on-demand offline services category, where clients (e.g., homeowners) can browse architectural portfolios and hire professionals for offline design services. However, the platform still lacks features that directly address the needs of design professionals, a critical gap for building trust, generating revenue, and ensuring long-term growth. This emphasizes the importance of incorporating community elements to build user loyalty and increase platform stickiness.

Moreover, platforms like Behance and Dribbble also offer job matching features, acting as central hubs for both full-time employment and short-term freelance projects, thereby bridging the gap between creators and potential clients. While LinkedIn is not specifically focused on design-related fields, it remains a critical tool for architects and designers seeking to expand their professional networks, showcase their work, access learning opportunities, and contribute to broader industry discussions (Sauer, Skaik & Tumpa, 2024).

Finally, all three platforms utilize a freemium business model, offering basic services at no cost while providing premium features through paid subscriptions, such as enhanced portfolio analytics, job insights, and increased visibility. This approach not only supports user growth but also creates diversified revenue streams, aligning well with the long-term growth strategy of Design Connex.

However, to ensure long-term financial viability, it is also essential to evaluate whether the proposed features genuinely create value for users. Rohn et al. (2021) emphasized that the success of platform-based business models depends on six critical factors: value creation, value delivery, value capture, digital transformation, platform architecture, and startup culture. These elements are particularly

relevant in industries like architecture, where client relationships are often built on trust and long-standing connections, rather than purely digital interactions. For Design Connex, this means that simply adding features is not sufficient. The platform must deliver meaningful value that addresses real user needs, efficiently deliver solutions, and effectively capture revenue, whether through premium services, transaction commissions, or other monetization strategies.

Incorporating these strategic considerations into the design and development of Design Connex can help the platform transition from a simple portfolio-sharing website to a comprehensive ecosystem that supports professional growth, collaboration, and long-term user engagement.

Research Methodology

This project conducted two separate studies in parallel to gain insights into workflows and pain points faced by design professionals during the design process. The studies included three research activities: user research, design, and testing. This section, thus, presents the research methodology in two subsections.

Study I: Potential Use of AI

1. User Research

Target users for this study were architects, interior designers, or landscape designers. The sampling method used was **self-selection sampling**, meaning participants volunteered themselves. A post was shared in relevant Facebook groups to invite people to participate. After receiving the first five responses, in-depth interviews were conducted with each participant, which were conducted online via Zoom, an online video conference program. The interview questions focused on their professional background, their experience using AI tools in architectural works, their opinions on AI's potential to support their tasks, their overall workflow, and specific pain points they encountered throughout their projects.

2. Design

After analyzing the interview data for patterns across the five participants, several common pain points among architects and designers were identified. These insights directly informed the direction of the prototype design. As a result, the team decided to develop an AI visual product search tool. A brainstorming session was conducted to determine how this feature should be integrated into the platform. The team also defined the design system, including the color scheme, font selection, and layout grid.

3. Testing

Using the Figma application, a high-fidelity prototype of an AI visual product search tool was built, as shown in Figures 1–6 in the Research Findings section, allowing users to try out the proposed features. The testing phase involved interviews with five architects and designers. One of the participants had already taken part in the earlier user interview, while the other four were new participants who volunteered after seeing an open call posted in relevant Facebook groups. The participants interacted with the prototype features and were asked their opinions on whether the AI visual product search would encourage them to engage more with the platform, how frequently they would want to use the AI tool, and any suggestions they had for improving the AI features.

Study II: Additional Features Supporting Architects and Designers

1. User Research

The goal of the user research in this second study was to understand user behaviors and expectations towards online platforms supporting their workflows, as well as the willingness to pay for features provided by the platforms. Architects, interior designers, and landscape designers were the target users of the study. Participants were selected using a snowball sampling method, where one initial participant was recruited and then referred to other professionals with similar backgrounds. This method was chosen to help reach freelance architects and designers. In total, six participants agreed to in-depth interviews held via Zoom.

The interview questions were organized based on the three additional features of interest for platform development: (1) job matching, referring to services helping people find project opportunities; (2) architecture-focused marketplace, where professionals could buy and sell design-related products; and (3) online community, offering exclusive content or networking. Participants

were asked about their current use of such services, the purposes behind their usage, and their perceptions of the value and acceptability of paid features in each category.

2. Design

The project analyzed interview findings, conducted brainstorming sessions, and developed a feature concept that addressed the needs of architects and designers and aligned with the context of Design Connex. This process led to the development of the 3D Models Affiliate Program, which can be integrated with the AI visual product search feature to enhance overall user experience. Additionally, a design system was established to guide the creation of the platform prototype, ensuring consistency and usability in the final design.

3. Testing

An interactive prototype, as shown in Figures 7–12 below in the Research Findings section, was developed using the Figma program and then presented to users through online sessions via a video conference program. Five architects participated in the testing: one had previously taken part in the interview phase, while the other four were new participants recruited through an open call posted in relevant Facebook groups targeting design professionals. During the session, participants were guided through the prototype and asked to interact with its key functions. After the walkthrough, each participant was interviewed regarding their interest in using the feature, its perceived usefulness, how it could support their workflow, and whether they had any suggestions for improvement.

Research Findings

The results are organized in correspondence with the two studies mentioned in the research methodology section. The first subsection presents findings related to the integration of AI visual product search, while the second subsection focuses on the supplementary feature.

AI-based Visual Product Search Tool

After conducting user research, insights were gathered from five participants, as shown in Table 1, regarding their experience with AI and their professional workflows. In terms of AI usage, it was found that most architects have limited experience with AI tools in their careers. If they did use AI, it was typically limited to basic tools such as ChatGPT or Gemini, mainly for asking general work-related questions. Regarding their workflow, a common pattern was identified. Most professionals began by drafting house plans and then moved on to selecting materials for client specifications. In some cases, such as when the client was a material company looking to build a store, the process started with material selection followed by architectural planning. However, this reverse workflow was relatively rare. A major pain point in the process was the difficulty in finding materials that visually matched their design plans. Participants reported that they often struggled to find materials that aligned with the visual concept in their drawings, which led to frustration and a significant waste of time. This inefficiency in the material selection process highlights a key opportunity for AI integration to support their workflow.

Table 1: Demographic Characteristics of Participants in User Research of Study I

Age	Occupation	AI use	Workflow	Pain points
23	Architect	None	Draft the design before selecting materials	Search limitation due to unknown product name
24	Architect	None	Draft the design before selecting materials	Have material image but unable to locate the product
41	Architect	None	Draft the design before selecting materials	Face a mismatch between ordered material and draft
32	Interior designer	Gemini	Depend on the situation	Unable to find material matching the draft
38	Architect	ChatGPT	Draft the design before selecting materials	Unable to find necessary specific material

Based on user insights, AI visual search was selected as the focus of continued development due to its alignment with architectural workflows and its potential to address difficulties in locating materials that visually match with architectural design drafts. The design prototype consists of six pages, as illustrated in Figure 1 to Figure 6. The first page is for uploading portfolio images, where architects can select and upload their drafts. The second page is a filtering interface that allows architects to refine AI recommendations for improved accuracy. This page includes several filters: a price range filter to narrow down product results, a brand filter to select preferred product brands, a building type filter based on the draft, and a component location filter to specify areas within the building for targeted recommendations. The third page displays AI-generated results, showing the uploaded draft image alongside a list of similar products. The fourth page provides detailed information about each recommended product, allowing users to click and explore further. The fifth page is a collection view where users can save products for later consideration. The sixth page presents the details of each collection, including the products it contains.

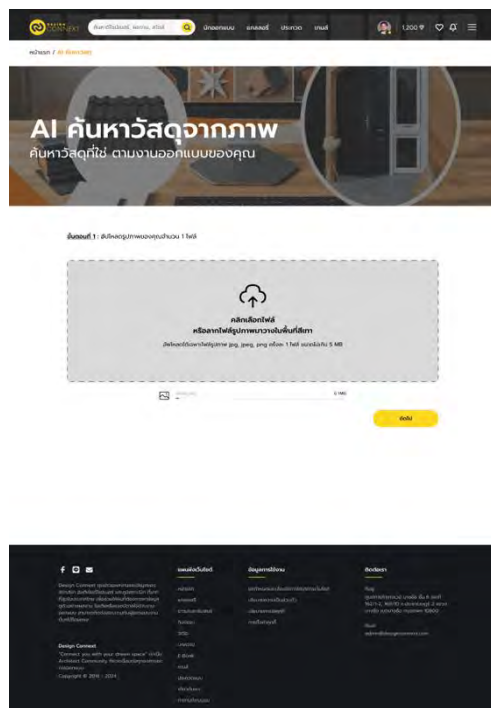


Figure 1: Upload file page

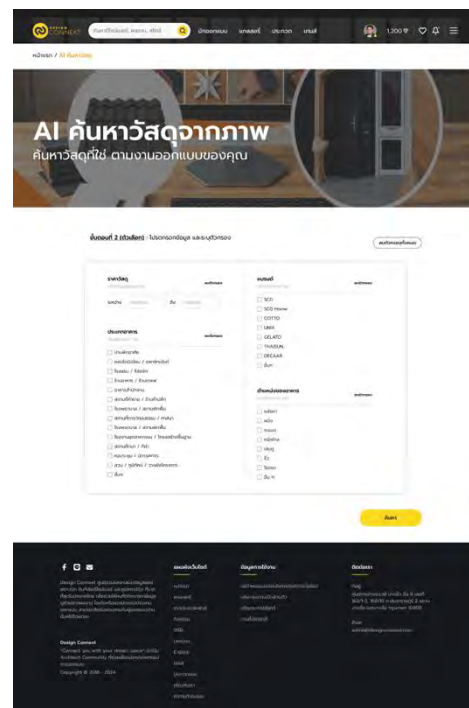


Figure 2: Filter page

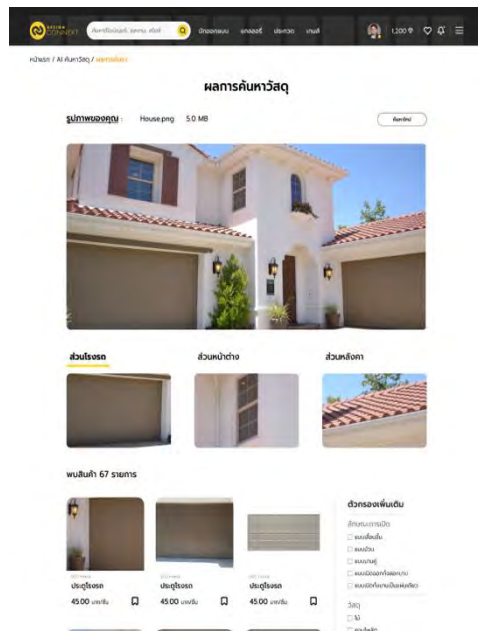


Figure 3: AI result page

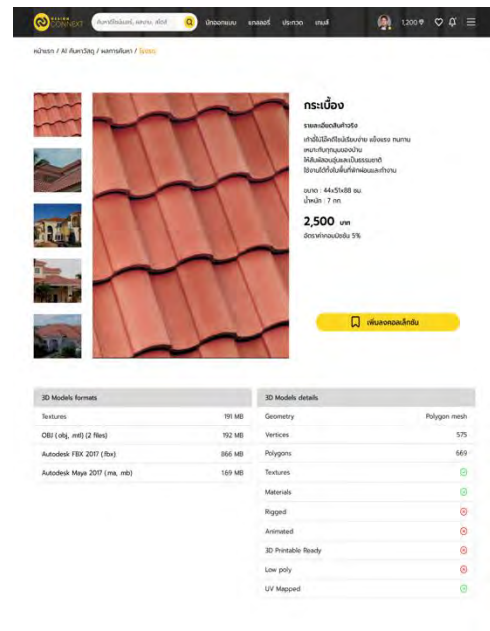


Figure 4: Product details page

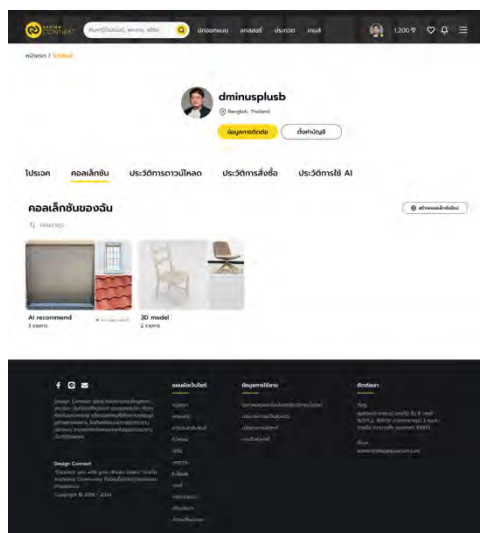


Figure 5 Collection page

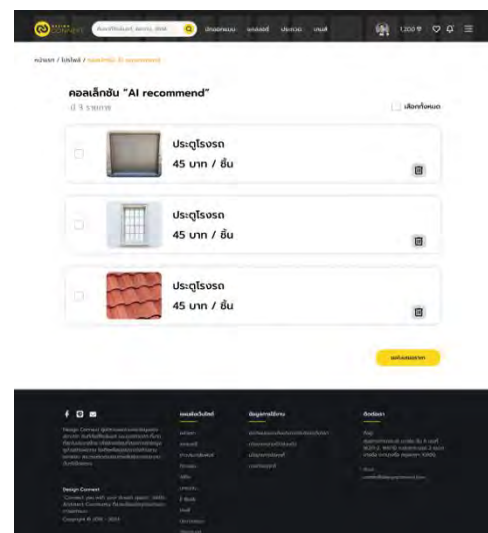


Figure 6 Collection details page

Table 2 shows the testing results of study I. Most participants stated that the feature would be useful in their workflow particularly in the process of finding materials and expressed interest in using it if it were launched on the platform. They also mentioned they would likely use the feature frequently, as material selection is a regular part of their job. One of the participants stated that “Sometimes it takes a long time and is very difficult to find materials that look like the ones in the picture. If this feature becomes real, it will be very useful, and I want to use it. The material finding process takes up about 60% of a project, and we usually manage more than one project per month, so I think I and others would use this feature often.” However, opinions were mixed regarding pricing. Some users believed the feature should be free, while others said they might be willing to pay. Still, a few participants indicated that they would prefer not to pay if it could be offered for free.

Table 2: Testing Results of Study I

Age	Occupation	Opinion	Frequency of use	Willingness to pay
41	Architect	Considered it very useful in the material finding process	Will use frequently if there is a project involved	Willing to pay if AI is highly accurate, but otherwise prefers it free
33	Architect	Believed the AI concept is good and would use it often	Will use frequently if there is a project involved	Unwilling to pay
25	Landscape architect	Desired to use it for its time-saving benefits and ease in material selection	Will use frequently if there is a project involved	Willing to pay if AI is highly accurate, but otherwise prefers it free
26	Landscape architect	Stated that the AI concept is very interesting and aligns well with their work as an architect.	Will use frequently if there is a project involved	Unwilling to pay
25	Landscape architect	Stated that it helps reduce time and is more convenient for finding materials.	Will use frequently if there is a project involved	Unwilling to pay

3D Models Affiliate Program

The interviews of participants, as shown in Table 3, revealed that features such as job matching, a design-related marketplace, and an online community were seen as less impactful for supporting architects' daily workflows, with many participants considering them supplementary rather than essential tools. Job matching was deemed unnecessary, as architects typically rely on their personal social media presence and word-of-mouth referrals to secure projects. The marketplace feature also received low interest; most architects already have access to built-in 3D models within design software and showed little inclination to purchase or sell additional assets online. Similarly, the online community feature also received little attention, as architects tend to use such platforms passively for updates or reference, rather than actively engaging as community members.

However, the interviews uncovered a significant pain point in that architects often use 3D models during the design process that do not correspond to real and purchasable products, particularly those not available in the local market. This often leads to inefficiencies during the product specification and procurement stages, as architects must spend additional time discussing alternative options with clients and searching for substitute products that are locally available. In response, the study proposed and tested a new feature: the 3D Models Affiliate Program, integrated with the AI visual product search. This feature allowed architects to download real-product-based 3D models for free. These models were sourced from actual vendors, and when clients chose to purchase a featured product, architects could place orders through the Design Connex platform and receive a commission from the sale. This feature was designed not only to streamline the design process by providing readily usable assets, but also to incentivize user engagement through a built-in monetization mechanism that benefits both the platform and its users.

Table 3: Demographic Characteristics of Participants in User Research of Study II

Age	Occupation	Opinion towards each feature		
		Job matching	Marketplace	Online community
27	Architect	Prefer using their own social media channels.	Occasionally purchase for suitable or beautiful products	Passive participation mainly reads but rarely engages.
41	Architect	Prefer word-of-mouth for side gigs.	Built-in 3D models in software are sufficient.	Passive participation mainly reads but rarely engages.

Age	Occupation	Opinion towards each feature		
		Job matching	Marketplace	Online community
41	Architect	Prefer word-of-mouth for side gigs.	Built-in 3D models in software are sufficient.	Passive participation mainly reads but rarely engages.
38	Architect	Prefer word-of-mouth for side gigs.	Built-in 3D models in software are sufficient.	Passive participation mainly reads but rarely engages.
32	Interior Designer	Prefer using their own social media channels.	Occasionally purchase for suitable or beautiful products	Passive participation mainly reads but rarely engages.
38	Architect	Prefer word-of-mouth for side gigs.	Built-in 3D models in software are sufficient.	Passive participation mainly reads but rarely engages.

The prototype of the 3D models affiliate program consists of several key interfaces, as shown in Figure 7 to Figure 12. A main landing page showcases featured products and organizes them into categories. A product listing page displays all available 3D models, and a product detail page provides comprehensive information about each item. Additionally, there is a collection page where users can create personalized collections and save selected items for future use. When ready to proceed with a purchase, users can select products from their collections and initiate an order. They can also track their activity through the order history page, which displays order details, statuses, and transaction records.

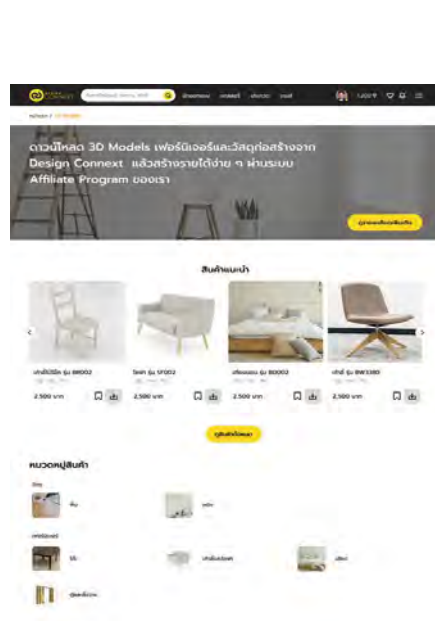


Figure 7: Main landing page

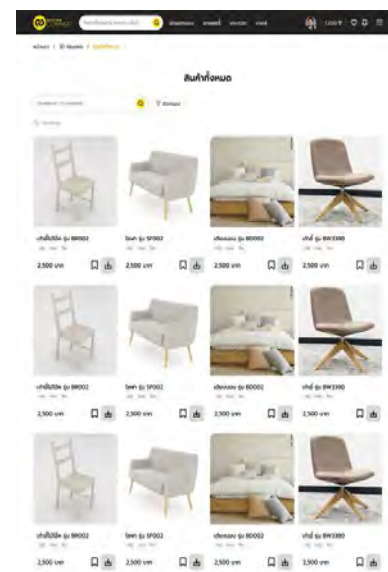


Figure 8: Product listing page

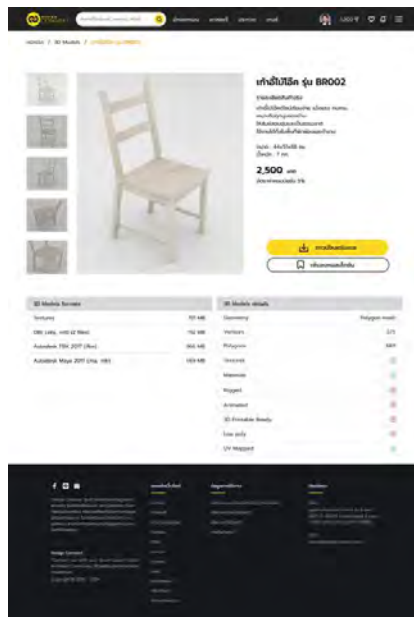


Figure 9: Product detail page

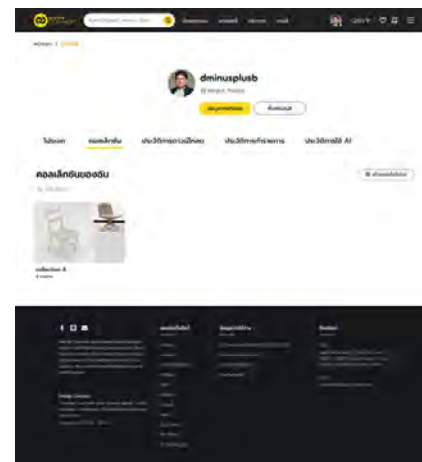


Figure 10: Collection page

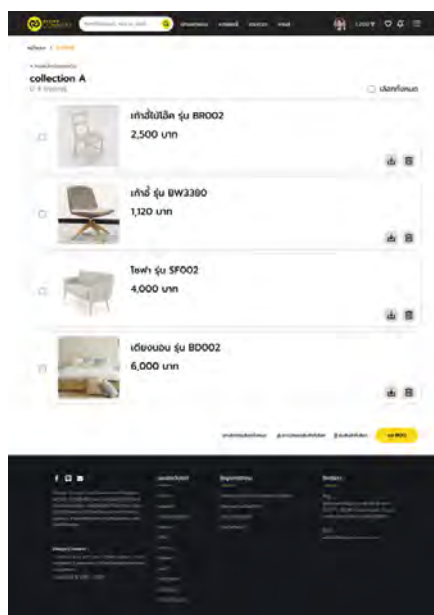


Figure 11: Collection detail page

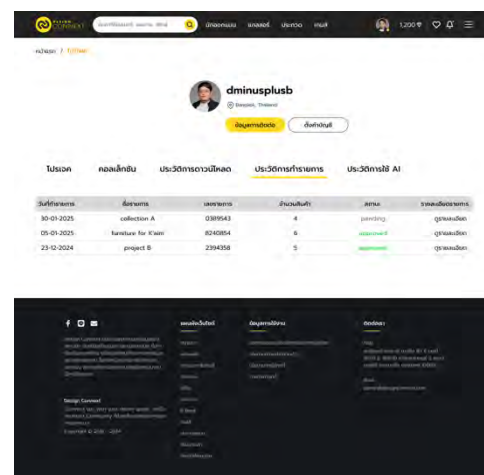


Figure 12: Order history page

In Table 4, user testing of the prototype demonstrated strong interest and positive feedback. Participants noted that the feature streamlined their workflow by reducing time spent sourcing products and eliminating the need to contact suppliers directly. One participant mentioned, "Very useful, makes it easier to find products, see prices immediately, and handle everything without a middleman." However, some concerns were raised regarding the ethical implications for architects, as professional standards generally discourage accepting commissions from product brands, which could create conflicts of interest and potentially compromise the integrity of design decisions.

This feature has strong potential to attract and retain active users, thereby addressing a core issue of low user engagement on Design Connex. As the user base grows, the platform may unlock further monetization opportunities through partnerships, vendor integrations, or premium services built upon this core utility.

Table 4: Testing Results of Study II

Age	Occupation	Feedback	Suggested Improvement
26	Landscape Architect	Easy to use, seems well-suited for freelancers.	Consider guidelines on designer ethics, such as avoiding direct payments from brands.
25	Landscape Architect	Easy to use, helps streamline work by providing upfront pricing.	More detailed product filters would improve the search experience.
33	Interior Designer	Easy to use, helps streamline work by providing upfront pricing.	Consider grouping products into scenes for better style visualization.
41	Architect	User-friendly, but some commission structures may be challenging.	Consider alternative commission models, as architects may not always make direct purchases.
25	Landscape Architect	Easy to use, helps streamline work by providing upfront pricing.	More detailed product filters would improve the search experience.

Conclusion and Discussion

Both the AI visual product search feature and the affiliate integration align closely with the typical workflow of architects, who are frequently engaged in producing house drafts and sourcing appropriate materials to propose to clients. These features directly address a commonly identified pain point which is the difficulty in locating materials that visually correspond with elements in architectural drafts. The AI visual search and affiliate features were designed to mitigate this issue by simplifying and enhancing the material selection process. Testing feedback from architects demonstrated strong interest in both features, with participants expressing a willingness to use them in future practice. If implemented, these features hold strong potential to attract user traffic.

In the context of the design field, the study's findings are consistent with the concept of performance expectancy, one of the constructs defined in the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh, Morris, Davis, & Davis, 2003). Performance expectancy, defined as a user's perception that using a system will gain better job performance, is significantly related to the user's intention to use the system. As the architects and designers in this study believed that using the proposed features would help them perform better in finding suitable design materials, they showed a strong intention to use these features.

However, several aspects still need to be carefully considered before proceeding with implementation. Some user feedback raised concerns about the variability of material products, which could make training the AI to deliver accurate recommendations more difficult. Additionally, feedback on the affiliate feature highlighted ethical concerns among some architects, who felt that receiving commissions from affiliates might conflict with professional values. Most users demonstrate a low willingness to pay and tend to prefer free tools. These features could serve as foundational components for future developments.

This study distinguishes itself from previous literature by focusing on the integration of AI visual search specifically within the architectural field, rather than general business applications such as chatbots or analytics. Furthermore, it explores the use of an affiliate model as a long-term business strategy, diverging from more conventional approaches like marketplace or subscription-based models.

Suggestions

This study was conducted as a preliminary phase for the Design Connex project, aiming to explore user needs and behavior on a broad level. Since it was an early-stage investigation, the study did not strictly control the age or occupation of the participants. Instead, it included a wide range of users with diverse backgrounds, such as architects, interior designers, and landscape architects. The ages of participants also varied significantly. This broad approach was appropriate for a pre-starter

study. However, if the project is developed further, future research may benefit from focusing on a specific age group or professional role. Doing so could lead to deeper insights or help identify behavioral patterns that were not captured in this initial phase.

In addition, the user group interviewed during the early user research phase was not entirely the same as the group involved in the testing phase, as some participants were unavailable for follow-up interviews. The number of users also varied slightly, with six participants in the user research phase and five in the testing phase. These inconsistencies in the participant group may have led to minor gaps in the findings. For future studies, using the same participants for both research and testing, and keeping the number consistent, is recommended to improve the reliability of the results.

Acknowledgement

Appreciation is expressed to all participants who volunteered for interviews and provided insightful feedback, as well as to the product owner and the Design Connex team for their constructive input and suggestions that contributed to the improvement of this project. This manuscript benefited from language editing and proofreading assistance provided by ChatGPT, a language model developed by OpenAI. The authors assume full responsibility for the originality and integrity of the content and data presented herein.

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Applying Gamification to Promote Continuous User Engagement: A Case Study of the FIRENZE Project Management System

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Abstract

New Product Development (NPD) is essential in today's highly competitive business environment. To enhance NPD efficiency, The Siam Cement Public Company Limited developed FIRENZE, a project management system built on Notion. However, users found it challenging to adapt to the new system. To address this, gamification — guided by the Octalysis Framework — was introduced as a strategy to improve user engagement. This study involved qualitative user research with current FIRENZE users, followed by the development of two gamified design concepts: non-competitive and competitive. Concept testing results revealed that user preferences varied based on personality traits, with some favoring non-competitive features and others responding more positively to competitive elements. The findings suggested that FIRENZE should offer customizable motivational styles — non-competitive and competitive styles — to accommodate diverse user needs and maximize engagement.

Keywords: Gamification, New Product Development, User Engagement, User Experience, Octalysis Framework

Introduction

In a highly competitive corporate environment, organizations must continuously innovate to maintain and enhance their market position. For the Siam Cement Public Company Limited (SCG), a leading conglomerate in Thailand, the development of a new product, so-called New Product Development (NPD), plays a critical role in creating competitive advantage. The NPD process is inherently complex and demands close collaboration among multiple departments, including marketing, research and development (R&D), and technical services. However, SCG's previous approach relied heavily on chat-based communication, which lacked a centralized platform for effective information management and collaboration. This often led to fragmented data, communication inefficiencies, and difficulties in project tracking.

To overcome these limitations, SCG has introduced a new project management system built on the Notion platform. This system, referred to as FIRENZE, was designed to serve as a centralized workspace for cross-functional teams, streamlining communication, knowledge management, and project tracking. While the new system offers significant improvements in workflow structure and data accessibility, it also introduces a new way of working that users are not yet familiar with. As a result, employee engagement and adoption of the system have been limited, with users often lacking motivation to fully utilize the platform.

Previous research has shown that engagement with digital tools in the workplace can be significantly improved through the use of motivation-driven design elements. For example, Hobson (2024) examined how gamification could enhance engagement and motivation in the Back Office Tool (BOT), an internal system used at TF Bank. The study found that gamification features — such as points, progress bars, and subtle rewards — significantly improved users' perceived enjoyment and system usability.

Notably, the research emphasized that effective gamification must align with employees' intrinsic motivations, such as problem-solving and social connectedness, to sustain engagement and long-term adoption.

Gamification is the application of game-design elements, such as points, badges, leaderboards, and progress tracking, into non-game contexts to encourage user participation, motivation, and engagement. Recognizing its potential to transform routine digital interactions into more engaging and rewarding experiences, the company is exploring the integration of gamification within the FIRENZE platform. Gamification has the potential to make system use more enjoyable and rewarding, thereby encouraging behavioral change and sustained adoption. This preliminary study aims to examine how gamification can be effectively applied to the FIRENZE system in order to enhance employee motivation and increase long-term usage, ultimately supporting a more efficient and collaborative NPD process

Research Objectives

This study explored the user experience of the new project management system, FIRENZE, with a focus on user behavior, challenges encountered, and system-related needs. It also investigated the potential application of gamification to enhance user engagement and overall satisfaction. Additionally, the research examined user personality traits and how these may influence preferences regarding competitive elements within a gamified environment. By analyzing these factors, the study offered valuable insights into how gamification could be effectively integrated into the workplace to boost motivation and foster a more enjoyable user experience.

Literature Review

Gamification

Gamification refers to the application of game elements and principles in non-game contexts to enhance user engagement with a product or service (Interaction Design Foundation, 2016). Gamification has emerged as a strategic tool for enhancing user engagement across diverse organizational settings. It has been widely implemented across various domains — including production, recruitment, training, and education — as noted by Gerdenitsch et al. (2020), who cited the works of Warmelink et al. (2020), Allal-Chérif & Bidan (2017), and Vinichenko et al. (2016).

In the production and logistics domain, Warmelink et al. (2020) reviewed a range of studies and found that gamification was primarily applied to support production execution and control, particularly in repetitive tasks such as assembly work. Techniques like motion recognition, projected visual feedback, and game metaphors were implemented to enhance task engagement, motivation, and performance. These game elements — especially goal-setting, progress tracking, and multimedia feedback — were integrated directly into real work environments rather than isolated training simulations, making them more impactful for daily operations. In the realm of collaborative e-learning and procurement, Allal-Chérif & Bidan (2017) analyzed serious games used by firms like L'Oréal, IBM, and Thales. Their study demonstrated how integrating MOOC-style open training with serious games facilitated knowledge sharing, innovation, and engagement among employees and external stakeholders. Elements such as role-playing, point systems, and real-time challenges allowed participants to interact in simulated professional scenarios, improving both learning outcomes and organizational branding. Meanwhile, Vinichenko et al. (2016) investigated gamification in human resource management in the Russian context, emphasizing its effectiveness in motivating Generation Y employees. Their empirical research in the Moscow Region revealed that tools like virtual badges, leaderboards, and reward-based tasks were particularly effective in training, recruitment, and boosting organizational loyalty. The study highlighted that gamification could align well with the expectations of younger workers who value creativity, flexibility, and recognition. Collectively, these findings indicate that gamification, when thoughtfully designed and contextually grounded, can drive meaningful behavioral and psychological outcomes in organizational settings.

In workplace settings, Uddin & Das (2023) analyzed a case study of KPMG's gamified training program, which incorporated key game elements such as task-based progression, levels, immediate feedback, competition, and point systems. Their findings indicated that integrating game design elements —

such as virtual environments and mini-game tasks — into performance management systems can significantly enhance employee engagement, motivation, and overall performance.

However, Sereno & Ang (2024) offered a more nuanced perspective through a comparative study of gamified versus traditional training systems in the banking sector, using fuzzy-set qualitative comparative analysis (fsQCA). Their results revealed that multiple combinations of factors can produce similar outcomes, and conversely, identical combinations may yield different effects depending on the specific organizational context and individual differences. They cautioned that while gamification can improve engagement and job satisfaction, its success is highly context-dependent and must be carefully tailored to the specific environment and user base.

Octalysis Framework

Octalysis Framework (Chou, n.d.; The Octalysis Group, n.d.) is an approach to gamification which analyzes human motivation into 8 core drives which are:

1. *Epic Meaning and Calling* – the drive to become part of something greater than ourselves
2. *Development and Accomplishment* – the drive to make progress and gain mastery
3. *Empowerment of Creativity and Feedback* – the drive to express creativity and adjust through feedback
4. *Ownership and Possession* – the drive to collect and accumulate
5. *Social Influence and Relatedness* – the drive to collaborate, compete, or gain recognition
6. *Scarcity and Impatience* – the drive to obsess over rare, exclusive, or time-sensitive things
7. *Unpredictability and Curiosity* – the drive to crave unpredictable and new things
8. *Loss and Avoidance*: the drive to avoid undesired outcomes or missing out

These core drives can be categorized into Left Brain Core Drives and Right Brain Core Drives — extrinsic and intrinsic motivators, respectively. They can also be grouped into White Hat or positive motivators and Black Hat or negative motivators. While White Hat motivators enhance user satisfaction, Black Hat motivators may result in feelings of coercion or manipulation.

The framework has shown promise in workplace settings. For instance, Hobson (2024) applied all eight core drives — emphasizing the White Hat motivators — to enhance motivation and engagement among employees working with a back-office tool. Features such as points, progress bars, personalized profiles, and badges were implemented, which improved user engagement during the prototype phase. Similarly, Retnowati, Putranti, & Danang (2022) explored the motivational factors influencing drivers of an online transportation service to engage with a gamified system. Their findings identified *Epic Meaning and Calling*, *Development and Accomplishment*, and *Social Influence and Relatedness* as the most influential core drives, reinforcing the framework's relevance in practical, task-oriented environments. These studies highlight the flexibility and effectiveness of the Octalysis Framework in fostering motivation, particularly when tailored to the users' context and needs.

Research Methodology

This section outlines the research methodology employed to investigate user behavior, identify challenges encountered, and explore system-related needs within the context of the FIRENZE project management system. FIRENZE is a project management platform designed to facilitate collaborative work within teams. The system includes core features such as task creation, status updating, and progress tracking, enabling users to manage their workloads effectively. Additionally, it incorporates a centralized knowledge hub where team members can upload and access shared documents and resources. A qualitative research approach was adopted to gain in-depth insights from users, allowing for a nuanced understanding of their experiences and engagement with the system. In this pilot study, the goal was to assess the viability of incorporating gamification into the FIRENZE system by examining user experience, and preferences for competitive and non-competitive gamified features.

User Research

In-depth semi-structured interviews were conducted to gather insights from users regarding the challenges of conducting NPD, obstacles encountered while using the FIRENZE system, and their perspectives on gamification.

The interview questions were divided into six main sections: (1) participants' roles and responsibilities, (2) experiences with NPD projects, (3) usage and pain points of the FIRENZE system, (4) prior experience with

other project management tools, (5) work motivation and gaming behavior, and (6) opinions on the potential integration of gamification into the FIRENZE platform. Each section consisted of 3 to 5 guiding questions aimed at uncovering detailed insights. For example, users were asked to describe their typical work process, challenges with inter-team communication during NPD, specific points of friction when using FIRENZE, and their thoughts on features like experience points, leaderboards, or reward systems.

Participants were selected using convenience sampling due to time constraints. Each interview lasted between 30 to 60 minutes, allowing for open-ended responses and follow-up questions to explore individual experiences in depth.

The collected data were analyzed and organized using an affinity diagram to identify key themes and patterns across user responses. This method was chosen for its effectiveness in structuring large amounts of qualitative data by grouping related ideas into meaningful clusters. This allowed us to visually map user feedback, uncover relationships between challenges, behaviors, and perceptions of gamification, and ultimately inform key design and system improvement considerations for the FIRENZE project management system.

Design

Based on the user research findings, two distinct versions of the gamified FIRENZE system were developed: a non-competitive design and a competitive design. Both prototypes were designed following the White Hat motivators from the Octalysis Framework, which emphasize intrinsic motivation. The design process focused on translating relevant motivators into practical system features using Notion, the platform on which FIRENZE was originally built.

Prototyping and Concept Testing

A demo version of the gamified FIRENZE system was developed using Notion to present the core design concepts and illustrate how gamification elements could be integrated into the existing workflow. Notion's features such as different views of databases, formulas, and automations were used to create a visually appealing user interface.

To explore user feedback for further development, concept testing sessions were conducted covering three main stages: (1) a brief introduction to the proposed gamified features, (2) an interactive exploration of the demo system, and (3) a short follow-up interview. The interviews focused on participants' overall impressions, whether the system would increase their engagement, motivation, and productivity, their preferences between the two design versions (competitive vs. non-competitive), and any additional features they would like to see implemented. Participants were selected through convenience sampling due to time constraints.

Research Findings

User Research Findings

The study involved five participants, including two members from the marketing team, one from quality assurance, and two from research and development — all of whom had used the FIRENZE system for approximately a month. All participants had between 3 to 5 years of professional experience. Although the number of participants may appear limited, this sample size is consistent with established guidelines in usability research, which suggest that testing with as few as five users is typically sufficient to identify the majority of usability problems (Nielsen & Landauer, 1993). The objective of the study was to obtain rich qualitative insights rather than to produce statistically generalizable results.

The results were analyzed using an affinity diagram to identify recurring patterns and key insights. Through this analysis, three core themes emerged: challenges encountered in past NPD projects, experiences with the FIRENZE system, and user perceptions of gamification, as shown in Table 1.

Table 1: Participants' Background and Opinions on FIRENZE and Gamification

Participant ID	Biological Sex	Department	NPD Experience	Opinion on FIRENZE	Opinion on Gamification
1	Female	Marketing	Has not led an NPD project; previously contributed to product improvement initiatives	Identified as a useful central information hub, though underutilized due to limited understanding of its features and irregular usage patterns.	Effectiveness depends on the nature of rewards; competitive elements may enhance motivation within the marketing team
2	Female	Marketing	Currently engaged in three NPD projects	Viewed as an effective data consolidation tool with intuitive navigation, though challenges remained in exporting files for external use.	Viewed positively if non-intrusive; gamified elements such as deadlines and rewards may improve engagement
3	Female	Quality Assurance	Involved in NPD activities for approximately two years	Primarily used for attaching files; appreciated the ability to view the status of individual product development projects.	Generally indifferent; suggested that reward-based incentives and deadline mechanisms could potentially improve effectiveness
4	Male	Research and Development	Encountered challenges related to time management in NPD processes	Limited firsthand experience with the platform; relied on team members for insights and feedback	May be beneficial if aligned with performance management systems; effectiveness contingent on individual goals and context
5	Male	Research and Development	Experienced in managing significant design changes and trials	Unfamiliarity with the platform; expressed discomfort due to differences from habitual tools such as spreadsheet programs and chat-based applications	Perceived as potentially beneficial; gamification could enhance engagement and data input frequency if rewards are appropriately designed

1) Challenges Encountered in Past NPD Projects

A recurring challenge identified in past new product development (NPD) projects was communication across different teams. Participants reported that technical language often created barriers, as only a few individuals fully understood the specific terminology used. This led to prolonged time spent reading and interpreting documents. Additionally, each team operated within its own context and workflow, making collaboration more difficult and requiring extra effort to align on shared goals and terminology.

2) Experiences with the FIRENZE System

User experiences with the FIRENZE system varied. Some participants appreciated the task tracking features and noted that the interface was generally user-friendly, especially for monitoring progress across teams. However, several users expressed confusion over certain functions, stating that key features were difficult to locate or unintuitive. A major concern was the data entry process in Notion, which differed significantly from the spreadsheet programs they were more familiar with. Participants also pointed out that critical functionalities, such as data analysis and visualization, were lacking, which led many to continue relying on external tools. Although Notion AI was seen as a potential solution for summarizing and analyzing data, limitations remained. Specifically, the AI was unable to interpret certain file types, requiring users to manually review documents — a process that was seen as time-consuming and inefficient.

3) User Perceptions of Gamification

Participants expressed a general openness to a gamified version of the FIRENZE system, regardless of their prior gaming experience. Many interviewees perceived that gamification could positively influence their motivation and engagement with NPD tasks, particularly when it involved clear goals, progress tracking, and tangible incentives.

A recurring theme across interviews was the importance of reward mechanisms. Several users specifically mentioned that the effectiveness of gamification would depend heavily on the perceived value and fairness of the rewards — examples included tangible items like gift cards or recognition-based incentives. These insights suggest that incorporating a well-calibrated reward system could be a key design driver to sustain engagement.

Notably, the interviews revealed differentiated responses to competition. For example, some participants — particularly those from marketing department — expressed enthusiasm about competitive elements, stating that leaderboards or performance comparisons could be motivating within their team culture. In contrast, others preferred non-competitive frameworks, favoring individual progress indicators over social comparisons to avoid stress or negative pressure. This contrast offers a direction for design exploration: comparing competitive versus non-competitive gamification approaches may yield insights into which model better supports user motivation and engagement. This suggests an opportunity for prototyping and testing both models within the FIRENZE system.

Concept Testing Results

1) Non-Competitive Design

For the non-competitive gamification system (Figure 1), the design is based on the idea that users are mainly motivated by personal growth and intrinsic achievement, rather than by comparing themselves to others. The system focuses on White Hat motivators to provide a more meaningful and long-term experience. A key feature is the use of a personalized visual metaphor in the form of a virtual flower that grows as users engage in activities supporting the NPD process, as illustrated in Figure 2. These include creating tasks, updating task statuses, uploading documents to the knowledge hub, and completing daily check-ins (Development and Accomplishment). As the flower grows in response to these activities, it gives continuous visual feedback, encouraging users through a sense of progress. This mechanism is designed to provide a non-verbal, real-time reward system, fostering intrinsic motivation by making progress visibly tangible. Since each flower is unique to the user (Ownership and Possession), it reinforces a sense of personal investment and ownership, enhancing emotional attachment to one's ongoing work. Users are able to influence how their flower looks through their interactions (Empowerment of Creativity and Feedback).

To keep users engaged over time, If users stop interacting, their flower stops growing, signaling missed opportunities (Figure 3). Growth points earned through engagement can be exchanged for real-world rewards, thereby assigning value to continued activity and fostering a sense of personal investment over time (Ownership and Possession; Scarcity and Impatience).. Importantly, the system

avoids competitive features such as leaderboards. All progress is displayed only on the user's personal dashboard, intentionally avoiding social influence and relatedness in its competitive form. This helps create a calm, self-directed environment that supports autonomy and long-term motivation.

The non-competitive design offers a personal dashboard for each user, consolidating all tasks and status tracking on a single page. The point system runs automatically through Notion formulas, assigning points based on task completion, allowing users to focus on their work without distractions.

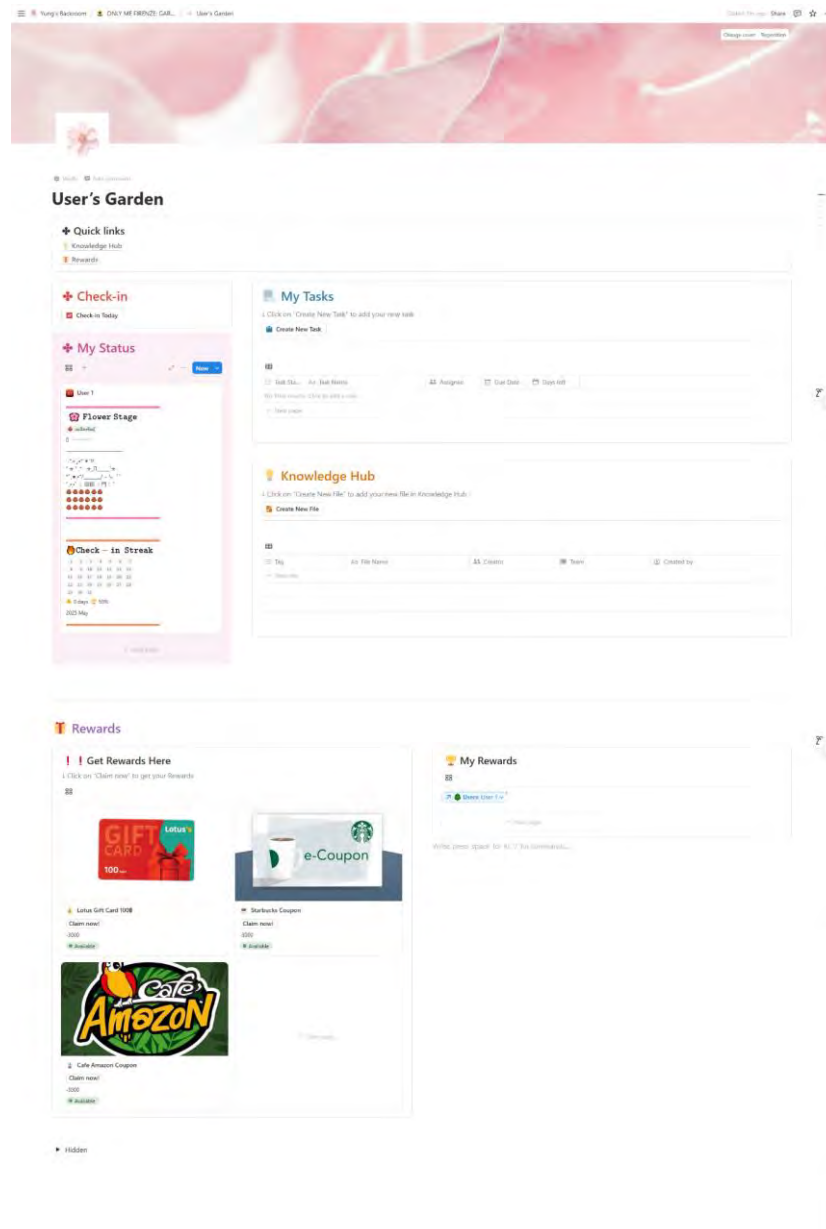


Figure 1: User Personal Homepage in the Non-Competitive Gamified System

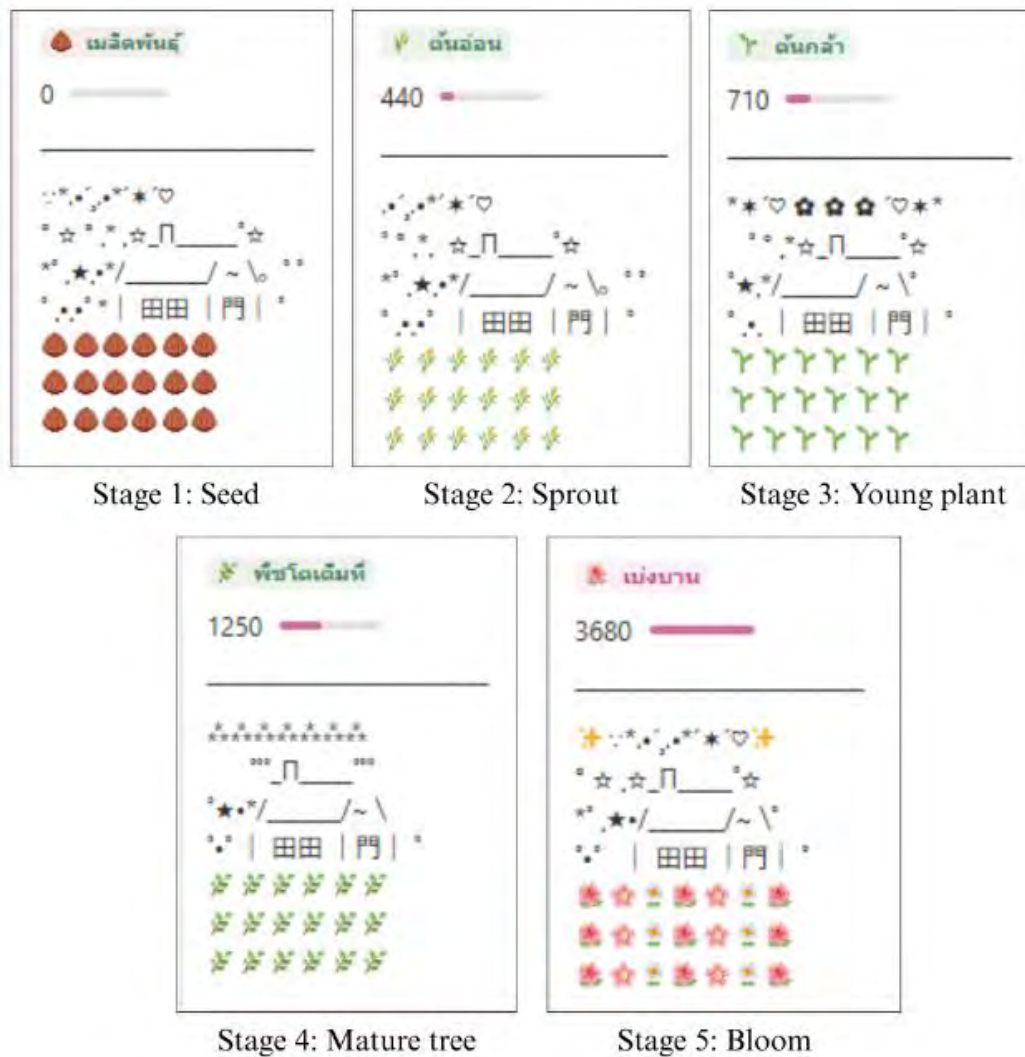


Figure 2: The status of the flower when the user engages with the system continuously; it will gradually grow until it fully "Bloom," representing the highest level.

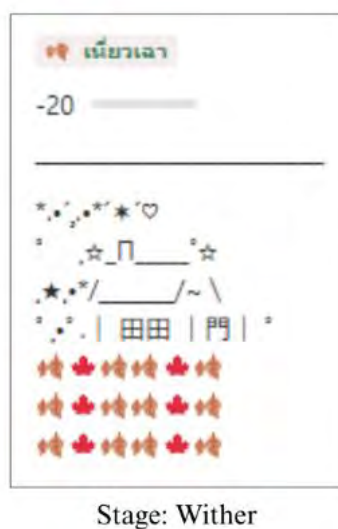


Figure 3: The status of the flower will "Wither" if the user does not engage with the system.

Concept testing was conducted with three participants — the same individuals identified as Participant IDs 1, 2, and 3 during the user research stage. The results indicated a general interest in the new gamified system, with many enjoying the plant-growing mechanic and rewards. Users appreciated the system's ability to track tasks and progress without the added pressure of competition, recognizing its potential to streamline work processes and offer incentives. However, they highlighted the need for improved external sharing capabilities, especially for those collaborating outside the system. While some users who enjoy competition felt the system did not suit their preferences, others who prefer a non-competitive approach found it appealing, as it reduced the stress of comparing progress with others. Overall, users expressed a willingness to adopt the system, provided it remained user-friendly and aligned with their existing workflows, with the task management and reward system being the primary draw rather than the competitive elements.

2) Competitive Design

The competitive gamification system is designed based on the hypothesis that users are motivated by observing others' progress and by a desire to outperform their peers. The design primarily emphasizes White Hat motivators, aiming to foster a more satisfying user experience and support long-term engagement. A point system is implemented to allow users to monitor their own activity levels and compare their performance with others. Accumulated points can be redeemed for real-world rewards, further reinforcing engagement. This would motivate competitive users to engage more with the system in order to gain more points and win other users.

Points can be earned through actions that contribute to the NPD process (Figure 4). Personal points are awarded when users create new tasks, update task statuses, or upload files to the knowledge hub (Development and Accomplishment). Team points are granted when tasks are completed on time, and are distributed equally among team members. Conversely, if tasks are not completed within the deadline, points are deducted from each team member (Loss and Avoidance). All users' total points are displayed on a leaderboard, encouraging social comparison and friendly competition (Social Influence and Relatedness). Finally, the user can redeem points for tangible rewards (Ownership and Possession).

This design aims to minimize changes to the existing FIRENZE system in order to reduce users' cognitive load and ease the transition to the new interface. The point system is integrated using automated formulas and workflows within the databases, enabling seamless point distribution without requiring additional user effort.

Table

Tasks				
Aa Task Name	Due Date	Status	Point Display	
Enlisting Questions for Interview	13/02/2025	Not started	-5 points	
Summarize Interview	11/03/2025	Done	0 points	
Online Market Testing	29/04/2025	Done	10 points	
+ New page				

Figure 4: Team Task Page Showing Point Distribution and Deductions

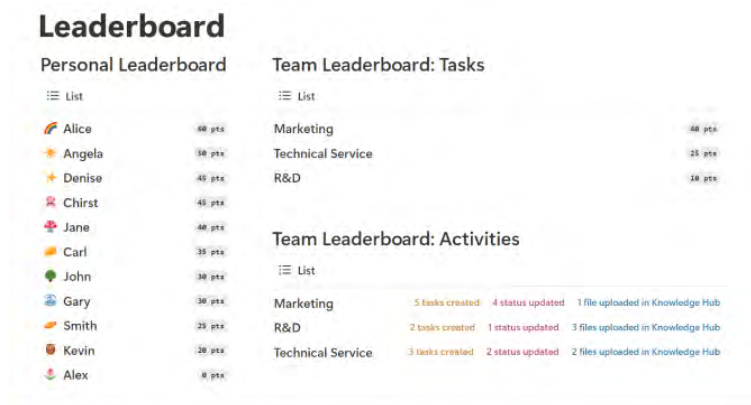


Figure 5: The Leaderboard Page in the Competitive Gamified System

The Leaderboard page (Figure 5) displays user and team engagement levels in descending order. Individual user performance is ranked on the Personal Leaderboard, while the Team Leaderboard ranks two key metrics: (1) points earned from completing tasks within deadlines and (2) the volume of activities completed by team members.

Concept testing was conducted with the same three participants with the non-competitive design. The results revealed a general interest in trying the gamified system. However, users expressed concerns about the point deduction mechanism, noting that it could be demotivating. Since team tasks often involve multiple members, being penalized for another member's incomplete subtasks was perceived as unfair. Feedback on the leaderboard feature revealed two distinct user types: competitive and non-competitive. Competitive users reported that the leaderboard could serve as motivation, encouraging them to engage more actively with the system. In contrast, non-competitive users expressed discomfort with being compared to others and felt that the leaderboard could create unnecessary pressure.

Lastly, users pointed out that the point system heavily depends on user honesty — for example, accurately creating tasks related to the NPD process and only updating task statuses when appropriate. This reliance on self-reporting raises concerns about potential misuse and fairness. As one participant noted after interacting with the demo, *“There should be more rules on earning points, so the reward redemption would be fair for everyone.”* This feedback suggests a need for clearer rules and accountability mechanisms to maintain trust and ensure equitable use of the system.

Conclusion and Discussion

While FIRENZE effectively supports NPD task tracking across teams, users reported usability challenges and a lack of advanced tools, which limited its overall effectiveness and led many to rely on external programs. To enhance user engagement with the system, this preliminary study aimed to explore how gamification — specifically through the Octalysis Framework — and motivational styles could be applied to promote continuous user engagement within the FIRENZE project management system. By prioritizing features based on user motivation, this study presented a novel perspective on integrating gamification with strategic personalization to support NPD processes more effectively.

Two gamified design approaches were developed and tested: a non-competitive design and a competitive design. The non-competitive approach focused on intrinsic motivation, emphasizing progress tracking and personal achievement without peer comparison, featuring a virtual flower that grows as users complete NPD-related tasks, offering visual feedback and reinforcing engagement. In contrast, the competitive design introduced elements such as point systems and leaderboards to drive engagement through competition and performance comparison.

When introduced to a gamified prototype, participants generally responded with interest. Many found the non-competitive design, which emphasized progress tracking and intrinsic rewards, to be engaging, while others were drawn to the competitive features. This variety in responses aligns with prior studies suggesting that gamification can enhance engagement when it appeals to intrinsic motivators (Uddin & Das, 2023; Hobson, 2024).

However, a subset of users expressed a preference for competitive elements, such as earning points and comparing performance with others, which they felt would encourage greater productivity. This divergence appears to reflect differences in personality traits: users who favored non-competitive design tended to be more reflective and individual-focused, while those who preferred competitive features were often driven by goals, comparison, and performance metrics. This observation aligns with findings by Sagiv, Sverdlik, & Schwarz (2011), who noted that individuals with a stronger inclination toward competition tend to prioritize self-enhancement values such as power, achievement, and hedonism, while those who lean toward cooperation are more likely to value benevolence. In this study, no clear relationship was found between users' demographic data and their preferences for gamification styles, suggesting that these preferences are shaped more by individual differences than by biological sex or professional roles.

Suggestions

Based on the insights gained from user preferences regarding non-competitive and competitive gamified designs, there are several key recommendations for improving the FIRENZE system's design and user engagement. These recommendations aim to enhance user experience by accommodating diverse motivational needs, ensuring ease of use, and considering the potential application of different types of motivators. The following points outline the proposed adjustments:

First, the FIRENZE system should offer users the ability to select a motivational style that aligns with their personal work approach. By providing flexibility in how gamification is experienced — such as through individual progress tracking or competitive point-based systems — the system can better cater to various personality types, which in turn can boost user engagement and satisfaction.

Second, to further facilitate the effective use of the system, the FIRENZE team should consider implementing targeted Notion training sessions during the user onboarding process. These sessions should focus specifically on AI features and database management, bridging the gap between the current interface and users' familiarity with traditional tools, which would likely improve both adoption and ease of use.

Third, while this study primarily focused on White Hat motivators (which emphasize intrinsic, positive engagement), future research should investigate the potential role of Black Hat motivators — such as urgency, scarcity, or loss avoidance. These elements could enhance short-term engagement, however, they should be introduced with caution. Improper use may lead to unpleasing consequences such as burnouts, reduced intrinsic motivation, or shift in focus from meaning contribution to gaming for points, which would ultimately undermine long-term engagement. Rigorous user testing would be essential before integrating these motivators into the system. Future studies should involve a larger and more diverse sample to validate the findings and ensure broader applicability of the gamification strategies.

One notable limitation of this study was that many participants had limited prior experience with the FIRENZE system. This lack of familiarity may have constrained the depth of insights provided during interviews. Some users had not yet used the system over the full NPD cycle, making it difficult for them to evaluate its long-term usefulness. In certain cases, users mentioned that they rarely needed to use FIRENZE themselves, as tasks could be delegated to other team members. Future research should involve users who have integrated FIRENZE more thoroughly into their daily workflows to gain richer feedback and a more accurate understanding of long-term engagement patterns.

Acknowledgement

We would like to express sincere gratitude to all the participants from the marketing, quality assurance, research and development teams who took part in user interviews and concept testings for this study. This manuscript benefited from language editing and proofreading assistance provided by ChatGPT, a language model developed by OpenAI. The authors assume full responsibility for the originality and integrity of the content and data presented herein.

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Factors Influencing the Behavior of Using Electric Golf Carts in Service Businesses in the Central and Eastern Regions of Thailand

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Abstract

This research aims to investigate the factors influencing the service usage behavior of electric golf carts in the service industry, focusing on golf courses in the central and eastern regions of Thailand, where the use of electric golf carts is widespread. This study considers various factors, including demographic factors (gender, age, income, etc.), the 4P's marketing mix (product, price, place, and promotion), and service quality (SERVQUAL), which encompasses tangibles, reliability, responsiveness, assurance, and empathy. The sample group consists of 400 electric golf cart users at golf courses, randomly selected from provinces with a high density of golf courses in both regions. The research findings reveal that certain demographic factors, such as age, occupation, and income, significantly affect service usage behavior. Marketing factors, particularly product and price, influence the frequency and expenditure of service usage. Meanwhile, service quality plays a crucial role in creating satisfaction and promoting repeat service usage decisions. The results of this research can be applied to marketing and service strategy planning to improve the quality and enhance the competitiveness of golf course businesses, as well as to support the use of electric vehicles for sustainable ecotourism. These findings highlight key areas for strategic development in electric golf cart services, particularly in promoting sustainable and user-centered service innovation.

Keywords: Consumer Behavior, Electric Golf Cart, Marketing Mix, Service Quality

Introduction

In an era where the world is facing severe environmental problems, the concepts of natural resource conservation and clean energy use have become major global trends. This has led many countries, including Thailand, to begin prioritizing sustainable development, especially in the service sector related to tourism and recreation, such as golf courses. Golf courses are popular recreational destinations for golfers both domestically and internationally. To respond to these trends, many golf courses have switched to using electric golf carts instead of gasoline-powered carts, aiming to reduce noise pollution, reduce greenhouse gas emissions, and enhance the organization's image to align with the Green Economy approach.

However, competition in the golf course business is continuously intensifying, especially in the Central and Eastern regions, which are regions with a high concentration of golf courses and a diverse user base of both Thai citizens and foreign tourists. In this context, electric golf cart service providers face the challenge of maintaining a competitive advantage, whether in terms of price, service quality, or marketing strategies that can meet the expectations of the target customer group. Understanding the behavior of consumers who choose to use electric golf cart services is therefore extremely important. This will help organizations develop strategies that directly address needs, both in maintaining the existing customer base and expanding the new customer base. However, initial surveys have found that research studying consumer behavior in the context of electric golf cart service usage is still limited, especially causal analysis of which factors significantly affect service usage behavior. Consumer behavior is often the sum of several factors, including demographic factors (such as gender, age, income, occupation), marketing factors (4P's: product, price, place, and promotion),

as well as service quality factors, which cover reliability, responsiveness, and understanding of the customer.

Therefore, this research aims to study the demographic factors, marketing mix, and service quality that influence the usage behavior of electric golf cart services at golf courses in the Central and Eastern regions of Thailand, using quantitative methods from actual service users to obtain data that leads to effective marketing and service strategy planning, as well as promoting sustainability in the tourism and service sectors of the country in the long term.

Research Objectives

1. To study the differences in electric golf cart service usage behavior in the service industry in the Central and Eastern regions of Thailand, classified by demographic factors.
2. To investigate the marketing mix factors influencing electric golf cart service usage behavior in the service industry in the Central and Eastern regions of Thailand.
3. To examine the service quality factors influencing electric golf cart service usage behavior in the service industry in the Central and Eastern regions of Thailand.

Research Framework

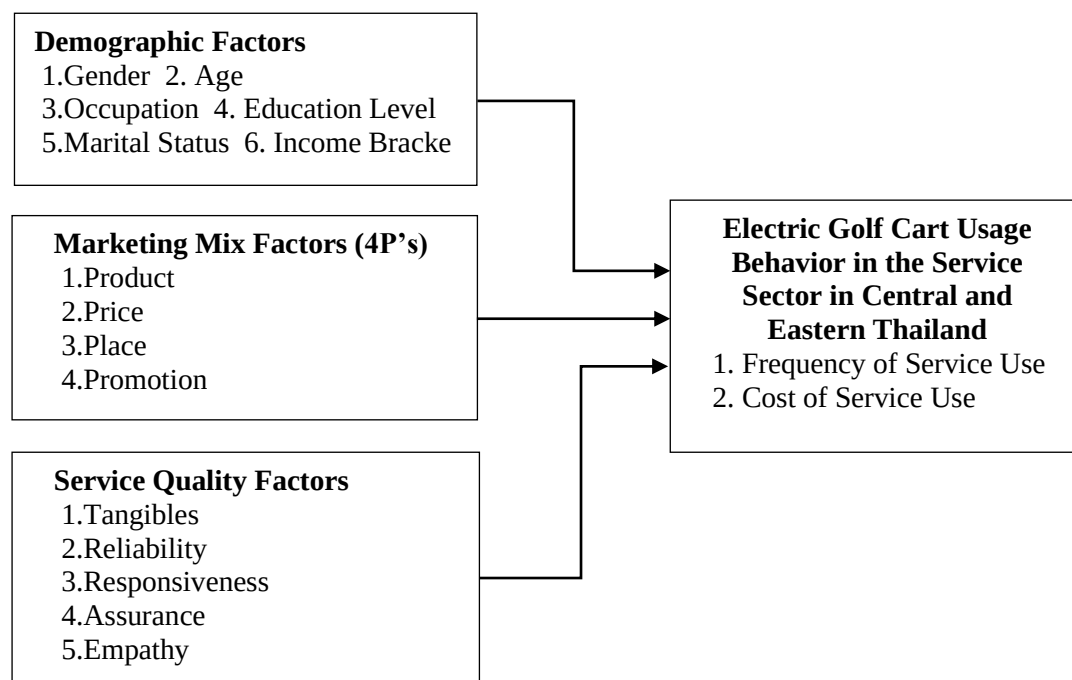


Figure 1: Research Framework

Literature Review

Concepts and Theories of Demographics

Demographic Factors refer to the basic characteristics of individuals used to segment markets, such as gender, age, income, education level, occupation, and marital status, which affect individual consumer behavior. As many scholars, such as Siriwan Serirat (1995), Chatayaporn Samerjai (2007), and Belch (2005), have confirmed, demographic characteristics can be used to effectively define target markets because they directly affect consumer attitudes, needs, and decision-making.

Segmenting the population by gender reflects differences in perception and decision-making, such as women tending to communicate more, while men tend to make decisions about the family. Different ages reflect different perspectives on life, with teenagers favoring new things and the elderly considering health. Income affects purchasing power, education level affects the ability to understand

product information, and occupation influences the demand for different types of products. Based on this concept, the researcher used the demographic concept as a framework for studying the behavior of using electric golf cart services at golf courses, considering that each demographic characteristic reflects different needs and can be used to effectively plan marketing and service strategies.

Concepts and Theories of Marketing Mix

The Marketing Mix concept, consisting of the 4P's of Product, Price, Place, and Promotion, was proposed by Kotler (1997) and has been developed and used in various contexts, especially service businesses. Similarly, Siriwan Serirat (1998) presented 7P's to enhance the potential for comprehensive quality strategy planning. The 4P's are important tools that marketers use to develop strategies to create satisfaction and meet consumer needs. The basic principles are:

1. Product: Goods or services with attributes, quality, and benefits that meet customer needs, both in terms of functionality and image, such as design, modernity, and accessories.
2. Price: The value of goods/services in monetary form, reflecting the comparison between the value and the cost that customers have to pay. Setting the right price promotes purchasing decisions.
3. Place: The methods and locations where goods/services reach customers conveniently, comprehensively, and appropriately, such as the location of the golf course or service systems that are easy to use.
4. Promotion: Marketing communications such as advertising, promotional activities, or various promotions to stimulate interest and encourage service use.

Although the service business has expanded to 7P's by adding People, Physical Evidence, and Process, in this study, the researcher chose to use only the 4P's as a conceptual framework because they are directly related to the decision to use electric golf cart services at golf courses, both in terms of modern products, appropriate prices, ease of access, and attractive sales promotions. Applying the 4P's concept helps understand the important factors that influence service usage behavior and can be used as a guideline for effectively developing marketing plans for golf course businesses.



Figure 2: SERVQUAL Model of Service Quality
Source: Adapted from Mandala AI (2023)

Concepts and Theories of Service Quality

Service quality is an important factor that affects customer satisfaction and the competitiveness of businesses, focusing on providing services that meet or exceed expectations in terms of speed, reliability, and attentiveness. The SERVQUAL model of Parasuraman et al. (1988) is a popular conceptual framework consisting of five dimensions:

1. Tangibles: The physical aspects of the service.
2. Reliability: The reliability of providing the service.
3. Responsiveness: Responding to customer needs.
4. Assurance: The confidence and expertise of employees.
5. Empathy: Understanding and caring for individual customers.

This concept has been supported by many scholars as a tool that comprehensively reflects service quality. In this research, the SERVQUAL model was used to assess the service quality of electric golf carts in the golf course business in order to reflect the true experience of customers.



Figure 3: SERVQUAL Model of Service Quality
Source: Adapted from geeksforgeeks.org (2024)

Concepts and Theories of Consumer Behavior

The concept of consumer behavior in this research is based on the Stimulus-Response Model of Kotler and Keller (2012), which indicates that consumers respond to stimuli through psychological processes within the black box. This is also supported by Chuchai Smithikrai (2013), Zhang & Benyoucef (2016), and Phawinee Kanchanapa (2016), who see that consumer behavior is complex, both external and internal, and is the process and action of individuals related to seeking, purchasing, using, evaluating, and disposing of goods and services, with the aim of meeting their needs. This behavior is influenced by internal factors such as perception, attitudes, personality, and motivation, as well as external factors such as family, reference groups, culture, and social status.

One of the key models is the Stimulus-Response Model (S-R Model), proposed by Kotler and Keller (2012), which states that consumer behavior begins with receiving stimuli that are transmitted into the Buyer's Black Box, which consists of the characteristics of the buyer and psychological processes, affecting purchasing decisions and expressed behaviors. Scholars such as Chuchai Smithikrai and Zhang & Benyoucef agree that consumer behavior not only reflects observable external behavior but also includes internal processes such as thoughts, feelings, and consumption experiences. In this research, consumer behavior is defined as a decision-making process that covers everything from information seeking, purchasing, and usage to evaluation and termination of the use of goods and services, which is important for analyzing trends and usage behavior of electric golf cart services in the golf course business.

Research Methodology

This research utilizes a quantitative methodology designed to analyze factors influencing the behavior of consumers in using electric golf carts. The study was conducted using a structured questionnaire based on the Marketing Mix (4P's) and SERVQUAL models. The sample comprised 400 respondents who had experience using electric golf carts at golf courses in the central and eastern regions of Thailand. A convenience sampling technique was employed due to the specific nature of the user group.

The questionnaire was divided into four parts: (1) demographic information, (2) consumer behavior in service usage, (3) factors of the marketing mix, and (4) service quality dimensions.

The reliability of the instrument was tested using Cronbach's Alpha, with coefficients exceeding the threshold of 0.70 for all sections, indicating high internal consistency. Descriptive statistics were used to summarize demographic data, while inferential statistics such as t-tests, One-way ANOVA, and multiple linear regression were used to test hypotheses and determine relationships between variables.

Research Findings

The study found that among the 400 respondents who had used electric golf cart services at golf courses in the Central and Eastern regions of Thailand the majority were male, with 249 individuals (62.25%). The largest age group was 31–40 years old, with 148 individuals (37.00%). Most respondents were married, totaling 219 individuals (54.75%) and were self-employed with 159 individuals (39.75%). The highest education level was a bachelor's degree, held by 260 individuals (65.00%) and the average monthly income was over 30,000 baht for 148 individuals (37.00%).

The study revealed that respondents had a "high" level of agreement with the marketing mix (4P's) factors with an overall average of 3.49 and a standard deviation of 0.61. This reflects that service users attach importance to marketing in general which influences their decision to use electric golf cart services. When separated by element, the product received the highest score (average 3.58) followed by place (3.50) promotion (3.46), and price (3.41). All four aspects were rated with a "high" level of agreement indicating the importance of each factor from the perspective of service users. In terms of service quality (SERVQUAL) which consists of 5 dimensions (tangibles, reliability, responsiveness, assurance, and empathy) the study indicated that respondents had a "high" level of agreement, with an overall average of 3.53 and a standard deviation of 0.58.

The importance of each dimension, ranked from highest to lowest was: Tangibles – average 3.67; Empathy – average 3.55; Reliability – average 3.52; Assurance; Responsiveness. All dimensions were rated with a "high" level of agreement, demonstrating that service quality is an important component that service users highly value.

Analysis of Electric Golf Cart Service Usage Behavior. The study reveals that the sample group exhibits consistent service usage behavior and a propensity for repeat service use. This can be summarized in two main points:

Service Usage Frequency: The majority of the sample group uses electric golf cart services 1–2 times per month, accounting for 36.25%. This is followed by 3–4 times per month at 30.00%. This reflects that service users are familiar with electric golf cart services and use them continuously.

Service Usage Expenditure: The majority of the sample group spends no more than 400 baht per use, accounting for 42.00%. This is followed by the range of 401–600 baht, accounting for 33.00% which is at a level acceptable to service users compared to the benefits received.

The results indicate that the behavior of the sample group emphasizes continued service usage with an appropriate level of expenditure compared to the average income level and the nature of service use on the golf course which is an activity consistent with the lifestyle of the main target group in this research.

Table 1: Multiple Regression Analysis of Factors Affecting Electric Golf Cart Usage Behavior Among Users in the Central and Eastern Regions of Thailand: Frequency of Electric Golf Cart Usage

Marketing Mix Factors	Unstandardized Coefficients		Standard Coefficients	t-test	Sig
	B	Std. Error	Beta		
(Constant)	2.433	0.281		8.675	0.000*
Product	0.236	0.085	0.209	2.794	0.005*
Price	-0.078	0.087	-0.073	-0.905	0.366
Place	-0.192	0.090	-0.168	-2.139	0.033*
Promotion	0.168	0.093	0.145	1.812	0.071

R = 0.182 R² = 0.033 SEest = 0.723

Note: *Statistically significant at the 0.05 level.

The multiple regression analysis revealed that marketing mix variables explain 3.3% of the variance in the frequency of electric golf cart usage, with an R² of 0.033, a multiple correlation coefficient (R) of 0.182, and a standard error of estimate (SEest) of 0.723. The Product variable has a standardized coefficient (β) of 0.209 and a Sig. value of .005, indicating a statistically significant influence on usage frequency at the 0.05 level. The Place (Distribution Channel) variable has a β of -

0.168 and a Sig. of 0.033, indicating a statistically significant negative influence at the same level. Meanwhile, the Price and Promotion variables are not statistically significant (Sig. > .05). Therefore, it can be concluded that the Product and Place (Distribution Channel) variables are important factors affecting the frequency of electric golf cart usage among consumers.

Table 2: Multiple Regression Analysis of Factors Affecting Electric Golf Cart Usage Behavior Among Users in the Central and Eastern Regions of Thailand: Expenditure on Electric Golf Cart Usage

Motivational Factors	Unstandardized Coefficients		Standard Coefficients	t	Sig
	B	Std.Error	Beta		
(Constant)	475.016	28.91		16.42	0.000*
Product	-10.480	8.718	-0.091	-1.202	0.230
Price	-1.749	8.931	-0.016	-0.196	0.845
Place	27.966	9.257	0.238	3.021	0.003*
Promotion	-10.581	9.552	-0.089	-1.108	0.269

R = 0.154 R² = 0.024 SEest = 74.564

Note: *Statistically significant at the 0.05 level.

Based on the multiple regression analysis, the marketing mix variables explain 2.4% of the variance in "expenditure on electric golf cart usage," with an R² of 0.024, a multiple correlation coefficient (R) of 0.154, and a standard error of estimate (SEest) of 74.564. Among all variables, Place (Distribution Channel) is the only variable with a statistically significant effect, with a standardized coefficient (β) of 0.238 and a Sig. value of .003. This indicates that the distribution channel clearly influences the expenditure on electric golf cart usage. Meanwhile, the Product, Price, and Promotion variables are not statistically significant (Sig. > .05), so it cannot be concluded that they affect the expenditure on usage.

Table 3: Multiple Regression Analysis of Service Quality Factors on Electric Golf Cart Usage Behavior Among Users in the Central and Eastern Regions of Thailand: Frequency of Electric Golf Cart Usage.

Service Quality Factors	Unstandardized Coefficients		Standard Coefficients	t	Sig
	B	Std.Error	Beta		
(Constant)	2.972	0.278		10.684	0.000*
Tangibles	0.211	0.108	0.173	1.961	0.051
Reliability	-0.426	0.113	-0.362	-3.769	0.000*
Responsiveness	-0.022	0.132	-0.019	-0.170	0.865
Assurance	0.102	0.109	0.095	0.937	0.349
Empathy	0.141	0.118	0.126	1.196	0.232

R = 0.209 R² = 0.044 SEest = 0.720

Note: *Statistically significant at the 0.05 level.

From the multiple regression analysis to study the effect of service quality factors on the frequency of electric golf cart usage, the model explains a low level of variance in the behavior (R² = 0.044 or 4.4%), with a multiple correlation coefficient (R) of 0.209, which is considered low to moderate. Among the five dimensions of SERVQUAL, only "Reliability" is a variable that significantly affects the frequency of usage, with a standardized coefficient (β) of -0.362 and a Sig. value of 0.000, which indicates a significant negative relationship. This means that if users feel they cannot trust the system or service, the frequency of usage will decrease accordingly. Meanwhile, other variables, including Tangibles, Responsiveness, Assurance, and Empathy, do not show statistically significant effects ($p > 0.05$), reflecting that these components may not play a crucial role in

stimulating repeat usage. Although the model is statistically significant overall, the low R^2 indicates that there are other latent factors that may affect usage behavior, which are not included in this model.

Table 4: Multiple Regression Analysis of Service Quality Factors on Electric Golf Cart Usage Behavior Among Users in the Central and Eastern Regions of Thailand: Expenditure on Electric Golf Cart Usage.

Service Quality Factors	Unstandardized Coefficients		Standard Coefficients	t	Sig
	B	Std. Error	Beta		
(Constant)	452.585	28.837		15.695	0.000*
Tangibles	27.185	11.149	0.218	2.438	0.015*
Reliability	13.373	11.704	0.111	1.143	0.254
Responsiveness	-13.732	13.659	-0.116	-1.005	0.315
Assurance	-9.843	11.252	-0.089	-0.875	0.382
Empathy	-5.598	12.214	-0.049	-0.458	0.647

R = 0.154 R^2 = 0.024 SEest = 74.662

Note: *Statistically significant at the 0.05 level.

The multiple regression analysis revealed that service quality factors, overall, have a low correlation with expenditure on electric golf cart usage ($R = 0.154$, $R^2 = 0.024$), explaining only 2.4% of the variance, with an SEest of 74.662 baht. When considering individual variables, Tangibles is the only factor that has a statistically significant effect ($\beta = 0.218$, Sig. = 0.015). This means that users who perceive the golf carts as clean, modern, and well-maintained are more likely to be willing to pay more for the service. Meanwhile, other variables such as Reliability, Responsiveness, Assurance, and Empathy did not show a significant influence on expenditure ($p > 0.05$). This model can only partially explain behavior in this aspect, and there may be other factors not included in this study. This study includes two regression models using service quality factors as independent variables: Tangibles, Reliability, Responsiveness, Assurance, and Empathy. Based on the analysis in Table 4, the variables Tangibles and Assurance showed no statistical significance (Sig. > 0.05) in both models (for frequency and cost).

Table 5: The hypothesis testing summary is presented as follows:

Hypothesis	Test Result	Conclusion
H1: Demographic factors (Occupation, Income, Experience)	✓ Significant	✓ Accepted
H2: Marketing Mix – Product	✓ Significant	✓ Accepted
H2: Marketing Mix – Place	✓ Significant	✓ Accepted
H2: Marketing Mix – Price	× Not Significant	× Rejected
H2: Marketing Mix – Promotion	× Not Significant	× Rejected
H3: Service Quality – Tangibles & Assurance	✓ Significant	✓ Accepted
H3: Service Quality – Reliability, Responsiveness, Empathy	× Not Significant	× Rejected
Dependent Variable: Frequency and Expense		
H1: Demographic factors - Frequency & Expense	✓ Significant	✓ Accepted
H2a: Product, Place - Frequency	✓ Significant	✓ Accepted
H2b: Promotion, Price - Frequency	× Not Significant	× Rejected
H2a: Product, Price, Promotion - Expense	× Not Significant	× Rejected
H2b: Place - Expense	✓ Significant	✓ Accepted
H3a: Reliability - Frequency	✓ Significant	✓ Accepted
H3b: Tangibles, Assurance - Frequency	× Not Significant	× Rejected
H3c: Responsiveness, Empathy - Frequency	× Not Significant	× Rejected
H3a: Reliability, Assurance - Expense	× Not Significant	× Rejected
H3b: Tangibles - Expense	✓ Significant	✓ Accepted
H3c: Responsiveness, Empathy - Expense	× Not Significant	× Rejected

Summary of Key Findings from Hypothesis Testing

Demographic factors (H1)

including occupation, average monthly income, and service usage experience, were found to significantly influence electric golf cart service behavior. Users with higher income and long-term usage experience tended to use the service more frequently and were willing to pay higher fees.

Marketing mix factors (4P's) (H2)

Product, such as cleanliness, safety, and maintenance of the cart, had a significant effect on service behavior. Place, including ease of access, booking systems, and service points, also played a major role in encouraging repeated use. Price and Promotion were not statistically significant, indicating that users prioritize quality and convenience over cost or discount incentives.

Service quality (SERVQUAL) (H3)

The Tangibles and Assurance dimensions significantly influenced user behavior. However, Reliability, Responsiveness, and Empathy did not show a significant impact. This suggests that perceived service appearance and trust in staff are more influential than general responsiveness or emotional factors.

Overall, electric golf cart service usage behavior is primarily influenced by tangible service quality and customer trust, rather than pricing or promotional strategies. These findings reflect a premium target group that values convenience, confidence, and brand image, which should be considered when designing services or marketing strategies.

Dependent Variable: Frequency and Expenditure

From the hypothesis testing, it was found that different factors in the marketing mix and service quality dimensions had varying impacts on the frequency and expenditure of electric golf cart usage. Notably, Product and Place significantly influenced the frequency of service use, whereas only Place and Tangibles had a significant effect on expenditure. Most service quality dimensions showed no significant influence, except for "Reliability" affecting frequency.

Conclusion and Discussion

The study found that the majority of the sample who used electric golf cart services at golf courses in the Central and Eastern regions of Thailand were male, aged 31–40 years, married, self-employed, with a bachelor's degree, and with an average monthly income of more than 30,000 baht. These demographic characteristics reflect electric golf cart users who are working adults, have stable social status, and have moderate to high purchasing power, which is consistent with the target group of golf course services in Thailand. Those with stable economic status often prefer to use services for convenience, speed, and reduced physical exertion during sports activities. This study is consistent with the research of Patcharee Suebsai (2019), which found that users of outdoor sports services, such as golf courses, are mostly male, working-age, and earn more than 30,000 baht per month, and with the work of Wisarut Hanmethae (2020), which stated that the target customer group for services at golf courses is the group that owns businesses or is an executive, who wants convenience and a social image. This part of the research also supports the development of marketing strategies that focus on the main target group in this manner and leverages the design of service formats or marketing promotions that are consistent with the characteristics of users.

The results of hypothesis testing 1 found that demographic factors that significantly affect the behavior of using electric golf cart services included occupation, average monthly income, and service usage experience, while other factors such as gender, age, marital status, and education level did not have a statistically significant difference. In terms of occupation, those who are business owners or middle to senior executives tend to use the service with higher frequency and have higher costs per use than general employees or freelancers, which is consistent with the work of Butsakon Rueangwutichai (2021), which stated that those in executive positions often value convenience and social status more than price. In terms of average monthly income, high-income groups exhibit different service usage behaviors, especially in terms of higher costs than low-income groups, which is consistent with the concept of Kotler and Keller (2016), which indicates that purchasing power affects the decision to use services, and supported by Theerada Chansawang (2020), which found that high-income consumers value quality and convenience more than price. Finally, in terms of service usage experience, it was found that groups that have used the service for more than 1 year use the service more often and are

willing to pay more compared to new users, which is consistent with the work of Ryu et al. (2008), which states that long experience affects confidence and reuse.

In terms of the marketing mix (4P's), the results of hypothesis testing 2 found that some components of the marketing mix significantly affect the behavior of using electric golf cart services, including product and place, especially on the frequency and expense of service use. In terms of product, the sample placed importance on the characteristics of the golf cart, such as cleanliness, newness, safety, and maintenance, which clearly affected the frequency of service use, consistent with the concept of Kotler and Keller (2016), which emphasized that the perceived quality of service affects satisfaction and reuse. In terms of place, it was also found that it affected both the frequency of service use and expenses, with ease of access, such as advance booking, efficient queuing, and simple service procedures, stimulating repeat service use and acceptance of higher expenses, which is consistent with the work of Warisa Anuwatwatsak (2019) and the concept of Convenience of Access of Kotler. While the factors of price and promotion were not found to have a statistically significant effect on user behavior, showing that electric golf cart users at golf courses prioritize experience, convenience, and service quality more than price or discounts, which clearly reflects the characteristics of the premium service market.

Data analysis results of electric golf cart service usage behavior of service businesses in the central and eastern regions of Thailand From the researcher's study (2023), the usage behavior of electric golf cart services of the sample at golf courses in the central and eastern regions of Thailand found that the sample has consistent service usage behavior and a tendency to reuse the service, which can be summarized into 2 main issues: Frequency of Service Use The majority of the sample used electric golf cart services 1–2 times per month, accounting for 36.25%, followed by 3–4 times per month, 30.00%, reflecting that users are familiar with electric golf cart services and use the service continuously. Cost of Service Use The majority of the sample had service expenses of no more than 400 baht per use, accounting for 42.00%, followed by the range of 401–600 baht, accounting for 33.00%, which is at a level that users accept when compared to the benefits received. These results indicate that the behavior of the sample focuses on continuous service use with a level of expenses in the range appropriate to the average income level and the nature of service use at golf courses, which is an activity consistent with the lifestyle of the main target group in this research. This study is consistent with the work of the Golf Course Industry Report (2020) and Green (2021), which point out that electric golf cart users value value and convenience, resulting in continuous service usage behavior. It also corresponds to the trend found in the work of Karan Panyo (2020), which stated that the use of golf carts supports tourism and health activities on a regular basis, showing that the majority of the sample tends to reuse the service an average of 2–4 times per month.

Suggestions

From the research results, it was found that the factors of Product and Place have a significant influence on the usage behavior of electric golf cart services, while users place particular importance on Tangibles and Empathy. In addition, a tendency to reuse the service was found in the group with moderate to high income. Therefore, the researcher proposes the following guidelines:

From the discussion of Product, it was found that this variable has the most influence on the frequency of service use. Service providers should therefore prioritize the maintenance of electric golf carts regularly, both in terms of external appearance, cleanliness, readiness for use, and internal systems such as safety, driving stability, and energy efficiency, in order to create confidence and a good experience for users, which will result in repeated service use in the future.

From the discussion of Place, it was found that inconvenient access to services, such as limited service points or lack of an advance booking system, may be an obstacle to service use. Service providers should increase service points, organize a clear queuing system, and develop online platforms such as advance booking systems or contactless payment channels in order to facilitate, reduce congestion, and reduce barriers to accessing services.

From the discussion of Price, although this factor was not statistically significant, it was found that the majority of users accepted a service cost in the range of 400–600 baht per use, which aligned with their perceived value and income level. Therefore, service providers should maintain

clear and transparent pricing, avoiding sudden increases, and may offer flexible pricing based on service time, distance, or user type to maintain user trust and satisfaction.

From the discussion of Promotion, although promotional activities did not significantly influence usage behavior, they can still play a role in increasing service awareness among new users. Service providers may consider using soft promotional methods such as service usage points, referral rewards, or seasonal service bundles to encourage trial and retain existing customers.

From the discussion of Income, it was found that high-income service users tend to use electric golf cart services and have higher costs per use than other groups. Service providers should therefore design group-specific service packages, such as VIP or premium, to create differentiation and meet the needs of upscale customers, while creating a good impression in brand image and increasing customer loyalty in the long term.

Recommendations for Future Research

Further study of consumer psychology factors such as satisfaction, motivation, or user experience that affect the decision to use electric golf cart services should be conducted in order to understand behavior in a more in-depth dimension.

The sample size should be expanded to cover other regional areas such as the North, South, or Northeast in order to compare service usage behavior in each region and lead to the development of approaches that are appropriate to the context of each area.

Consider using qualitative research methods or mixed methods to obtain in-depth information from user opinions, as well as the perspectives of service providers, which will help support the design of services that truly meet the needs of the target group.

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Semi-Autonomous 3D-Printed UAV for Emergency Medical Supply Delivery in Disaster Areas and Hard-to-Reach Areas

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Abstract

The delivery of emergency medical supplies in disaster-affected and hard-to-reach areas presents significant challenges for healthcare systems worldwide, particularly in developing countries with limited infrastructure and resources. During emergency situations such as natural disasters, mass casualties, or disease outbreaks, timely access to essential medical equipment is crucial for saving lives and reducing the severity of injuries. This research focuses on developing a semi-autonomous unmanned aerial vehicle (UAV) using 3D printing technology that offers low cost, easy repair, and customization capabilities. The research methodology was divided into four components: UAV design, simulation and fabrication of components using 3D printing, assembly and installation of structural components, and configuration of control programs and operational design. Testing results revealed that the UAV structure achieved an average assembly and installation capability of 86.67%, with upper and lower structures at 90.00% and the central structure at 80.00%. Manual flight testing demonstrated control capabilities of 100.00% in Loiter mode and 90.00% in Stabilizer mode, yielding an overall average of 95.00%. Autonomous flight testing along predetermined routes showed an average flight capability of 96.00%. Load capacity testing indicated that the UAV could successfully carry up to 4 kilograms with 100% reliability, while its capacity decreased to 60.00% when carrying 5 kilograms. When compared to commercial UAVs, the 3D-printed semi-autonomous UAV has a production cost of approximately 32,000 THB, which is 73-75% lower than comparable commercial models such as the T-DRONES M1200 (120,000 THB) and Aurelia X6 Standard (100,000 THB). Although it has limitations in flight duration and payload capacity, it offers significant advantages in maintenance capabilities, as structural components can be immediately reproduced using 3D printing technology. Additionally, it provides flexibility for customization according to specific area requirements or mission objectives, making it suitable for deployment in disaster-affected areas with high risk of equipment damage and resource limitations.

Keywords: Semi-autonomous unmanned aerial vehicle, 3D printing, Emergency medical transportation, Disaster-affected areas

Introduction

Emergency medical supply delivery to disaster-affected and hard-to-reach areas presents significant challenges for healthcare systems worldwide. In emergency situations such as natural disasters, mass casualties, or disease outbreaks, timely access to essential medical supplies can mean the difference between life and death (Johnson et al., 2021). Traditional delivery methods often face obstacles including damaged infrastructure, geographical barriers, and safety concerns for delivery personnel (Sharma & Sharma, 2024). The World Health Organization estimates that approximately 2 billion people lack access to essential medicines and medical supplies, with this number increasing dramatically during disaster situations (WHO, 2023). In Thailand, where geographical diversity includes mountainous regions, islands, and flood-prone areas, delivering emergency medical supplies to remote communities during disasters remains a persistent challenge for healthcare authorities (Ministry of Public Health Thailand, 2022). Unmanned Aerial Vehicles (UAVs), commonly known as drones, have emerged as a promising solution for emergency medical logistics. Their ability to navigate over damaged infrastructure, traverse difficult terrain, and reach isolated areas quickly makes them particularly valuable in disaster response

scenarios (Roberts et al., 2023). The global medical drone delivery market is projected to grow from \$215 million in 2022 to \$1.1 billion by 2030, with emergency response applications accounting for approximately 35% of this market (Drone Industry Insights, 2023). However, commercial medical delivery drones present several limitations for widespread adoption in developing countries and disaster response scenarios. High acquisition costs, ranging from \$10,000 to \$50,000 per unit, create significant barriers to entry for resource-limited healthcare systems (Das et al., 2023). Additionally, commercial drones often require specialized parts that must be imported, leading to extended downtimes when repairs are needed in remote or disaster-affected areas. Their standardized designs may also be ill-suited for the specific requirements of different disaster scenarios and geographical contexts (O'Sullivan et al., 2024). Three-dimensional (3D) printing technology offers a promising approach to address these limitations. The technology enables local production of drone components at significantly reduced costs, allows for rapid repairs through on-site part fabrication, and facilitates customization according to specific mission requirements (Listek, 2023). The integration of 3D printing with drone technology creates opportunities for developing countries to implement cost-effective emergency medical delivery systems tailored to their unique needs and constraints (Graham MedLegal Research, 2024). This research focuses on developing a semi-autonomous 3D-printed UAV specifically designed for emergency medical supply delivery in disaster-affected and hard-to-reach areas. This study is presented as an engineering prototype report, focusing on the development and testing of a 3D-printed UAV that can be locally manufactured and maintained. The aim is to address the cost and availability limitations of current commercial UAVs. The research gap targeted by this work is the creation of a more affordable, customizable UAV that reduces reliance on imported components, making it better suited for emergency response and deployment in developing countries.

Objectives

1. Design and create components for a semi-autonomous UAV for emergency medical supply delivery using 3D printing.
2. Design control systems for a semi-autonomous UAV for emergency medical supply delivery.
3. Develop a semi-autonomous 3D-printed UAV for emergency medical supply delivery in disaster-affected and hard-to-reach areas.

Methodology

The development of a semi-autonomous 3D-printed UAV for emergency medical supply delivery in disaster-affected and hard-to-reach areas was divided into four parts. The first part involved designing the semi-autonomous UAV for emergency medical supply delivery in disaster-affected and hard-to-reach areas. The second part involved simulating and creating components using 3D printing. The third part involved assembling and installing the structural components of the semi-autonomous UAV. The fourth part involved configuring control programs and designing operations.

Design of Semi-Autonomous UAV for Emergency Medical Supply Delivery in Disaster-Affected and Hard-to-Reach Areas

The design of the semi-autonomous UAV was divided into two parts. The first part involved designing the structure and control systems. The second part involved designing the semi-autonomous UAV for emergency medical supply delivery in disaster-affected and hard-to-reach areas.

Structure and Control System Design

The structure of the semi-autonomous UAV was divided into upper, central, and lower structures. The upper structure supported the installation of the flight control system and accessories, with a top cover to protect the control system. The central structure supported the propulsion system of the semi-autonomous aircraft and served as a base for installing the upper and lower structures. The front of the central structure supported the installation of the camera control system, while the rear connected to the battery. The lower structure included the landing gear, battery pack, and mounting base for emergency equipment. The design of the semi-autonomous UAV structure is shown in Figure 1.



Figure 1: Design of the semi-autonomous UAV structure

The control system design for the semi-autonomous UAV was divided into two parts. The first part involved designing the flight control system, and the second part involved designing the survey camera control system. The flight control system consisted of a Flight Control Board (Pixhawk), BLDC Motor, ESC Module, GPS Module, Telemetry Module, and Receiver Module. The flight control system was installed on the base of the upper structure. Below the flight control system, the power and signal management system for the UAV propulsion system was installed. The survey camera control system consisted of a Camera Control Board (Raspberry Pi5), Camera Module (12 MP), and Power Module. The survey camera control system was installed at the front of the central structure. The top had a cover to protect the survey camera control system, and the bottom had the Camera Module installed with protective components. The design of the semi-autonomous UAV control system is shown in Figure 2.

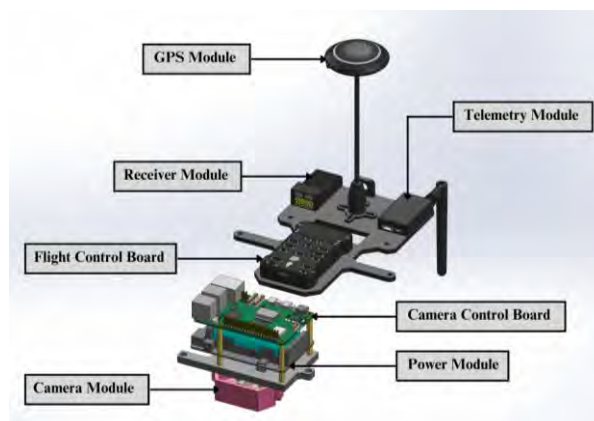


Figure 2: Design of the semi-autonomous UAV control system

Design of Semi-Autonomous UAV for Emergency Medical Supply Delivery in Disaster-Affected and Hard-to-Reach Areas

The semi-autonomous UAV for emergency medical supply delivery in disaster-affected and hard-to-reach areas measured 850 mm x 850 mm x 550 mm (width x length x height) and weighed 5.20 kilograms. The upper, central, and lower structures were made from ABS plastic filament, with a total of 46 structural components. The propulsion system used arms made from 2.54 mm aluminum boxes, 400 mm in length. BLDC Motors and ESC Modules were installed at the ends of the aluminum boxes and attached to the propulsion system mounting components. The flight control system and survey camera control system were installed in the central area and at the front of the central structure. The battery

system consisted of two 22.22 V 5400 mA batteries installed in a box with foam padding to absorb impact. The mounting system for emergency medical equipment was installed below the battery pack, secured with four M5 screws to the central structure. The landing gear used two 16 mm diameter, 450 mm long circular carbon fiber rods attached to the landing gear mounting components on the central structure. The lower part used four 10 mm carbon fiber rods attached to the carbon fiber rod mounting components. The design of the semi-autonomous UAV for emergency medical supply delivery in disaster-affected and hard-to-reach areas is shown in Figure 3.



Figure 3: Design of the semi-autonomous UAV for emergency medical supply delivery in disaster-affected and hard-to-reach areas

Simulation and Creation of Semi-Autonomous UAV Components Using 3D Printing

In designing the semi-autonomous UAV for emergency medical supply delivery in disaster-affected and hard-to-reach areas, the structure and components needed to support the weight of the equipment for installation and assembly. The structure and components had to be created using 3D printing. To prevent errors in the assembly and installation process of structural components that must bear weight, the developer used weight-bearing simulation of critical structural components during assembly. The simulation provided information on the weight-bearing capacity of structural components for component evaluation to guide decision-making in creating the semi-autonomous UAV prototype according to objectives. The simulation of weight-bearing capacity of the semi-autonomous UAV structural components is shown in Figure 4.

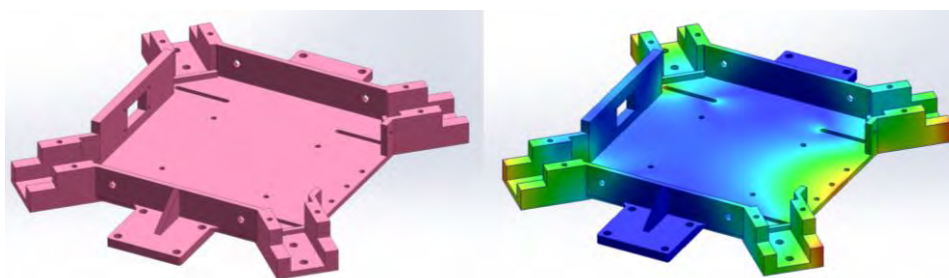


Figure 4: Simulation of weight-bearing capacity of the semi-autonomous UAV structural components

Since the semi-autonomous UAV design used CAD software, the structural component dimensions were accurate to actual usage sizes, allowing for correct assessment and planning of structural assembly, leading to component creation using 3D printing. The developer used ABS Filament as the primary material for creating components, configuring the 3D printer operation with control software that set parameters for printing components. The parameter settings had to be appropriate for the structural components according to specified objectives. The creation of semi-autonomous UAV components using 3D printing is shown in Figure 5.

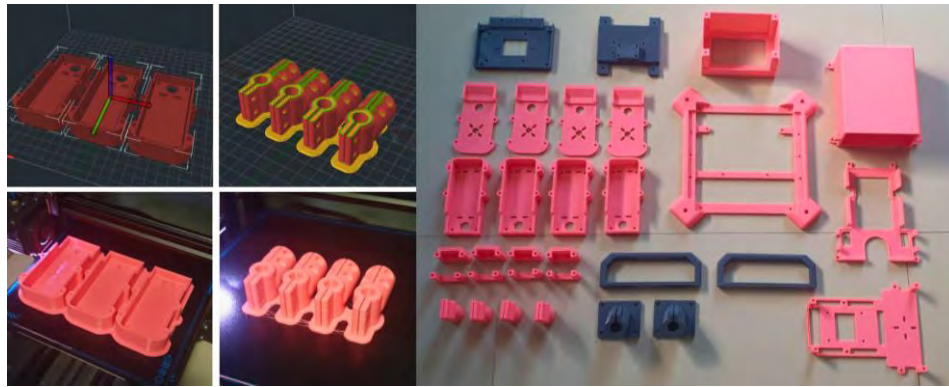


Figure 5: Creation of semi-autonomous UAV components using 3D printing

Assembly and Installation of Semi-Autonomous UAV Structural Components

In assembling and installing the structural components of the semi-autonomous UAV for emergency medical supply delivery in disaster-affected and hard-to-reach areas, the developer began by installing M3 Brass Nut Inserts in all components according to the design, inserting them into the designed channels at the specified depth. For assembling and installing the flight control system, the flight control system base components were used to install the flight control system, which included the Flight Control Board (Pixhawk), GPS Module, Telemetry Module, and Receiver Module. These were then assembled with the flight control system protection components for installation on the upper structure base and handle components using M3 screws to secure the structural components. The survey camera control system was installed at the front of the central structure, with the Camera Control Board (Raspberry Pi5) attached to the Power Module using standoffs on the top, while the Camera Module was attached to the cover component for installation at the bottom of the survey camera control system base component. The propulsion structure assembled from aluminum boxes was then installed on all four sides of the central structure. The landing gear using carbon fiber rods was installed on both sides of the central structure using M5 screws, with the lower part of the landing gear securing the carbon fiber rods to the landing gear base mounting components using M3 screws. The battery pack components were installed below the central structure, along with the mounting base for emergency equipment. The assembly and installation of structural components resulted in a prototype semi-autonomous UAV for emergency medical supply delivery in disaster-affected and hard-to-reach areas, as shown in Figure 6.



Figure 6: Prototype semi-autonomous UAV for emergency medical supply delivery in disaster-affected and hard-to-reach areas

Control Program Configuration and Operation Design

For flight control program configuration, the developer used Mission Planner software to configure all equipment used with the flight control system. The software configured the control of the semi-autonomous UAV by setting parameters in Hardware Config, selecting the Mandatory Hardware section for general settings, and the Optional Hardware section for propulsion equipment and battery power settings. Detailed settings were configured in Software Config, which defined the operational status of the semi-autonomous UAV in control parameters. For setting up automatic flight along defined routes, settings were configured in Flight Planner. The Mission Planner configuration diagram is shown in Figure 7.

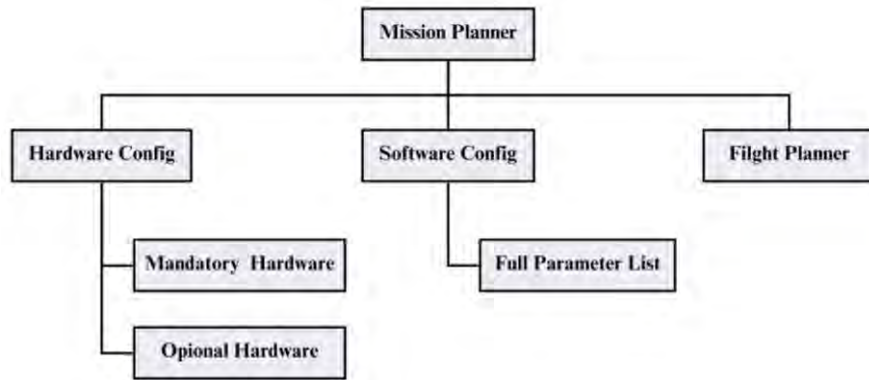


Figure 7: Mission Planner configuration diagram

The operation of the semi-autonomous UAV for emergency medical supply delivery in disaster-affected and hard-to-reach areas was divided into two parts: flight control operation and survey camera control operation. The flight control system was used for surveying along defined routes or flying to desired points, with two operational modes: manual mode and auto mode. For manual mode, the developer defined two flight modes: Stabilizer mode, where the operator could freely control the movement of the semi-autonomous UAV through the remote control, and Loiter mode, where the operator could control the movement of the semi-autonomous UAV through the remote control while the aircraft remembered its position. Auto mode involved flying according to defined waypoints, allowing for the specification of movement characteristics, altitude, and start and end positions through the program that sent control data from the Ground Station. The survey camera control operation involved controlling the survey camera via WiFi from the Ground Station. The developer could control the Camera Control Board (Raspberry Pi5) to have the survey camera send images while the semi-autonomous UAV was operating, with three operational modes: Snapshot mode, Record mode, and Online mode. The purpose was to survey the location where emergency medical equipment needed to be delivered in disaster-affected and hard-to-reach areas, preventing danger and damage to the semi-autonomous UAV as well as personnel waiting for assistance in the area. The flight control and camera control operation diagram is shown in Figure 8.

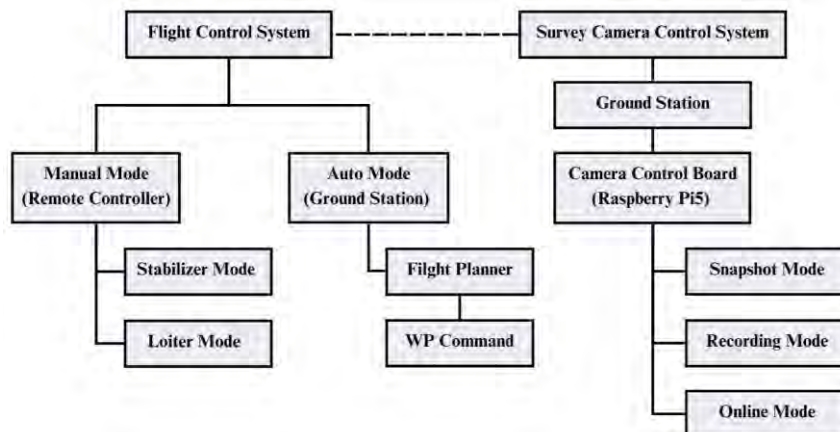


Figure 8: Flight control and camera control operation diagram

Test Results

Testing of the semi-autonomous 3D-printed UAV for emergency medical supply delivery in disaster-affected and hard-to-reach areas was divided into four tests. The first test involved testing the installation of the structure and assembly of components. The second test involved testing manual flight mode. The third test involved testing auto flight mode, and the fourth test involved testing the payload capacity of the semi-autonomous UAV. The testing of structure installation and component assembly evaluated the structural integrity and installation of components according to the design to ensure they could function as intended. Structural integrity was observed from the bending or compression of components under pushing and pulling forces. Installation was observed from the assembly of the structure according to the design. If components had high structural integrity or were difficult to deform and could be correctly assembled according to the design, the test result was recorded as "functional." If components had low structural integrity or were easily deformed or could not be installed according to the design, the test result was recorded as "non-functional." shown in Figure 9.

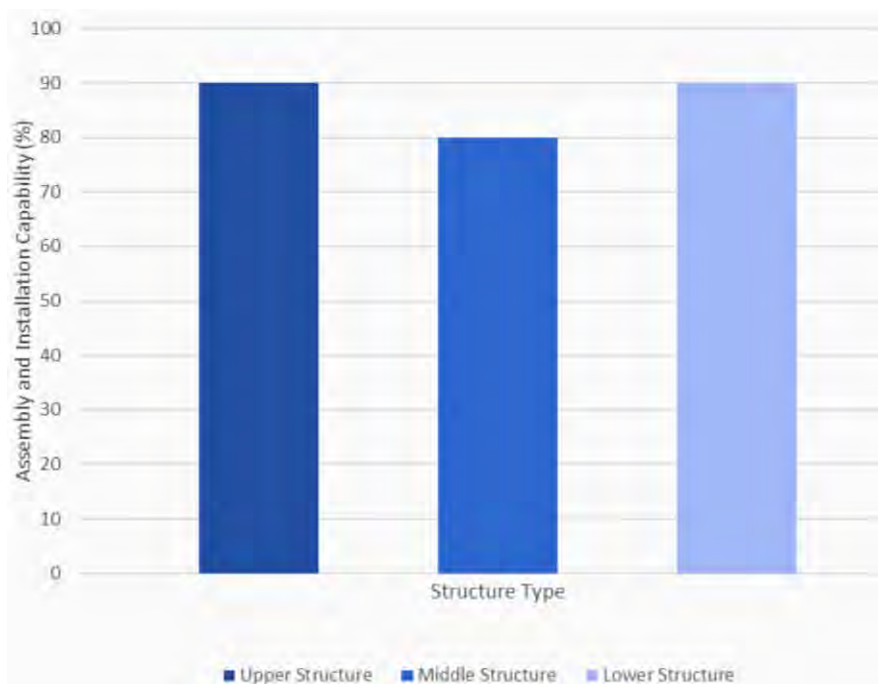


Figure 9: Results of testing the installation and assembly of the semi-autonomous UAV structure and components

The test results showed that the upper structure had an assembly and installation capability of 90.00%, the central structure had an assembly and installation capability of 80.00%, and the lower structure had an assembly and installation capability of 90.00%.

The second test involved testing manual flight mode using a remote control, flying in Stabilizer and Loiter modes. The semi-autonomous UAV was controlled by the remote control to move in 8 directions, observing whether the control was correct according to commands received from the remote control. The test was conducted 5 times to find the average capability in manual flight mode in Stabilizer and Loiter modes. The results of testing manual flight in Stabilizer and Loiter modes are shown in Figure 10.

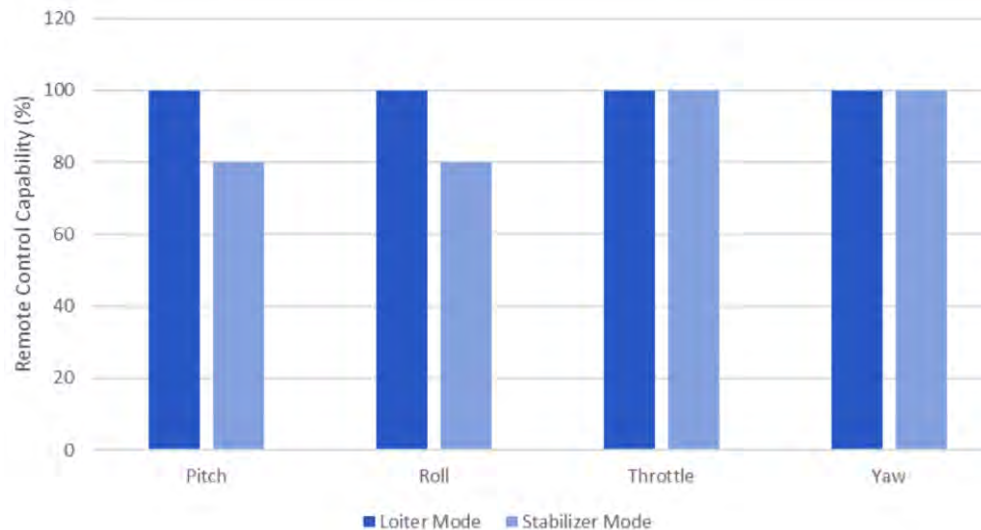


Figure 10: Results of testing manual flight in Stabilizer and Loiter modes

The test results showed that manual flight in Stabilizer mode had a remote-control capability of 90.00%, and manual flight in Loiter mode had a remote-control capability of 100.00%.

The third test involved auto flight mode using Mission Planner software to set routes and commands for each flight segment according to the defined flight plan. The flight test was conducted along a route from point A to point B, with 5 commands or reference points defined. Command 1 (WP1) was Takeoff to a height of 5 meters, Command 2 (WP2) was hovering for 3 seconds, Command 3 (WP3) was moving forward in a straight line for 100 meters at a height of 5 meters, Command 4 (WP4) was hovering for 3 seconds, and Command 5 (WP5) was Landing. The test was conducted 5 times to find the average capability in auto flight mode along the route from point A to point B. The results of testing auto flight along the route from point A to point B are shown in Figure 11.

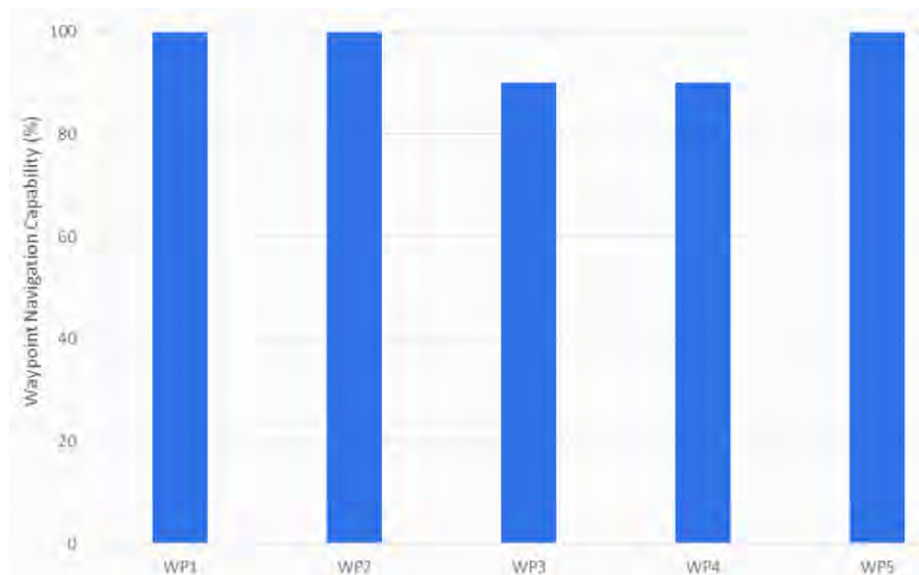


Figure 11: Results of testing auto flight along the route from point A to point B

The test results showed that WP1 had a flight capability of 100.00%, WP2 had a flight capability of 100.00%, WP3 had a flight capability of 90.00%, WP4 had a flight capability of 90.00%, and WP5 had a flight capability of 100.00%.

The fourth test involved testing the payload capacity of the semi-autonomous UAV using 70% of the propulsion system's power, increasing the payload by 1.00 kilogram increments up to 5.00 kilograms. The semi-autonomous UAV could carry payloads according to the test format. The test format was designed to have the semi-autonomous UAV lift off with the payload using Auto mode, with 3 commands or reference points. Command 1 (WP1) was Takeoff to a height of 5 meters, Command 2 (WP2) was hovering for 5 seconds, and Command 3 (WP3) was Landing. For each 1.00 kilogram increment in payload, the test was conducted 5 times to find the average payload capacity of the semi-autonomous UAV. The results of testing the payload capacity of the semi-autonomous UAV are shown in Figure 12.

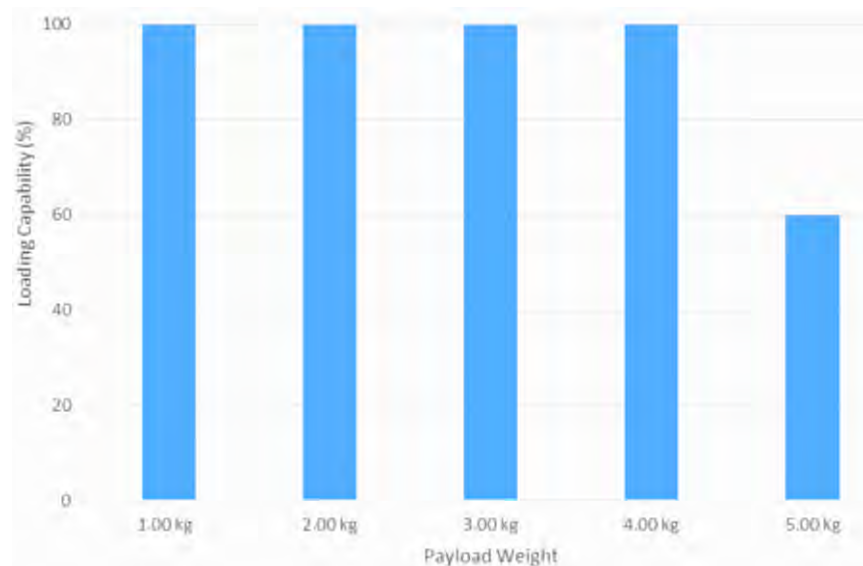


Figure 12: Results of testing the payload capacity of the semi-autonomous UAV

The test results of the semi-autonomous UAV's payload capacity showed that with a 1.00 kilogram payload, the semi-autonomous UAV could carry 100.00% of the time; with a 2.00 kilogram payload, it could carry 100.00% of the time; with a 3.00 kilogram payload, it could carry 100.00% of the time; with a 4.00 kilogram payload, it could carry 100.00% of the time; and with a 5.00 kilogram payload, it could carry 60.00% of the time.

Comparative Analysis with Commercial UAVs

The development of a semi-autonomous 3D-printed UAV for emergency medical supply delivery requires a careful comparison with commercially available UAVs to assess cost-effectiveness and suitability for real-world application. The production cost of the semi-autonomous 3D-printed UAV developed in this project is approximately 32,000 THB. This figure includes the costs of 3D printing materials (PLA filament), electronic components (motors, ESCs, flight controller, GPS module), batteries, and assembly labor, but excludes the depreciation of 3D printing equipment and other indirect overhead costs. In contrast, commercial UAVs with similar capabilities, such as the T-DRONES M1200 (approximately 120,000 THB) and the Aurelia X6 Standard (approximately 100,000 THB), are significantly more expensive. However, it should be noted that the prices of commercial UAVs reflect not only production costs but also research and development, certification, after-sales service, and profit margins, making direct cost comparisons challenging. In terms of value and benefits, the key advantage of developing a semi-autonomous 3D-printed UAV for emergency medical supply delivery lies in its ability to be manufactured and maintained locally. This capability reduces mission downtime in the event of structural or component damage. The use of 3D printing technology also enables rapid and flexible customization of the UAV to suit specific mission requirements or local constraints, such as designing specialized cargo compartments or reinforcing critical structural areas. Furthermore, the lower production cost allows for wider deployment of UAVs in high-risk or remote areas, increasing the accessibility and timeliness of emergency medical supplies. This approach also reduces reliance on imported components, which often face long lead times and high costs during emergencies. Additionally, it empowers local communities to produce and maintain UAVs independently, aligning with the principles of self-reliance and sustainable development. Although 3D-printed UAVs may have lower payload capacity and flight duration compared to some commercial

models, their lower production and maintenance costs, as well as their adaptability, make them a promising solution for emergency medical logistics in resource-limited and disaster-prone environments.

Conclusion and Discussion

In the development of a semi-autonomous 3D-printed UAV for emergency medical supply delivery in disaster-affected and hard-to-reach areas, the testing of structure installation and component assembly found that most structures could be correctly installed according to the design. However, issues were encountered in the central structure due to the thrust force from the propulsion system during testing, resulting in the central structure having the lowest assembly and installation capability at 80.00%. This resulted in the semi-autonomous UAV structure having an overall average assembly and installation capability of 86.67%. In testing manual flight mode, Loiter mode had a remote control capability of 100.00%, and Stabilizer mode had a remote control capability of 90.00%, giving the semi-autonomous UAV an overall average manual flight capability of 95.00%. In testing auto flight mode using Mission Planner software to set routes and flight commands, flying along 5 waypoints from point A to point B in a straight line, the test found that the semi-autonomous UAV had the highest flight capability for WP1, WP2, and WP5 at 100.00%, while WP3 and WP4 had the lowest flight capability at 90.00%. Issues encountered in testing auto flight mode included slow GPS module signal detection due to the module type and rainy weather conditions in the test area, requiring the test to be paused until weather conditions normalized. Flight required fine-tuning of movement parameters to ensure more accurate automatic mode movement testing. In testing the payload capacity of the semi-autonomous UAV, it could carry a maximum payload of 4.00 kg with 100.00% success in the test rounds. From the issues encountered in developing the semi-autonomous 3D-printed UAV for emergency medical supply delivery in disaster-affected and hard-to-reach areas, the developer has identified solutions and improvement approaches to make the semi-autonomous 3D-printed UAV practical for real-world use. The developer is currently implementing improvements in various areas to enhance functionality, as well as design approaches for rapid maintenance and problem assessment, with the goal of creating an innovative technology that can be used to assist disaster victims in emergency situations safely.

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Predicting Consumer Behavior in Purchasing Health and Beauty Products By Using AI

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Abstract

The purpose of this study was to investigate the factors that influence the prediction of shopping behavior of health and beauty groups. By using AI to analyze and evaluate factors influencing consumers' purchasing decisions in the digital era. In an era where consumers are searching for information, analyzing and comparing it from sharing the experience of consumers who have used it, and consumers in the modern era have choices and purchasing power. Therefore, businesses need to find answers that can accurately meet the needs of consumers. This study used the UTAUT model to study the variables Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions, Product related, and Merchant characteristics to influence the intention to use AI tools, and the variables to control Gender, Age, and Experience.

Keywords: Predicting, behavior purchasing, health and beauty, AI., UTAUT

Introduction

Thailand is experiencing rapid growth in AI technology, and the use of AI to predict consumer behavior is increasing. This makes it possible to predict consumer behavior more accurately by analyzing data from multiple sources such as online purchases, social media data, website searches, and application usage, which helps to effectively predict future behavior and plays an important role in the decision-making of entrepreneurs in Thailand. at the same time Consumer behavior in Thailand has changed rapidly. This is due to the increase in the use of the internet and smartphones. The use of AI in behavioral forecasting studies is therefore an appropriate tool to help businesses respond to changes in a timely manner and help them adjust their marketing strategies and develop products or services that meet consumer needs. Changes in the socio-economic environment, new disease outbreaks and trade wars. It also changes consumer buying behavior. Especially in the field of online shopping and the use of various digital platforms. This change has created both new challenges and opportunities for businesses to adapt. Domestic Health and Beauty Market. Assess the global healthcare market situation It is likely to expand at a high rate of 8.6% per year with a market capitalization of more than 8.5 trillion US dollars. Expected in 2025 The global health economy will be worth at least 7 trillion US dollars or 230 trillion baht (Global Wellness Institute, GWI: 2024). According to KResearch, in 2025, businesses with five attractive growth rates are: 1. Healthy food and beverages; Growth rate is expected to be 5-7% from health trends and elderly consumers. Forecast growth rate of 4-6% Health care trend 3. Growth rate is expected to be 10-15% 4. Growth rate is expected to be 4% 5. Green and low-carbon business 58% (KResearch : 2024) The use of AI to predict consumer behavior It allows businesses to develop products or services that meet consumer needs faster and more accurately. so Therefore, the researcher is interested in studying the prediction of consumer behavior in purchasing consumer health and beauty products using the AI to create models that can predict future consumer behavior. The use of this data in Thailand is still new, but it is becoming popular in many business sectors and will help to meet the needs of consumers in the future.

Research Objectives

This study studies the factors that influence the buying behavior of the health and beauty group. and study the factors that affect the prediction of consumer shopping behavior for politeness and beauty in Thailand. It also studies the forecast of the purchasing behavior of consumers in the health and beauty group in Thailand, which affects the intention to use AI tools and the factors of health and beauty product characteristics that affect consumer buying behavior. The expected benefits of this time provide in-depth information on the factors that affect consumer buying behavior. Factors that will make forecasts that meet the actual needs and obtain in-depth information on the characteristics of health and beauty products to be used in planning strategies for business operations.

Literature Review

The unified theory on acceptance and use of technology (UTAUT)

Unified Theory on Acceptance and Use of Technology: UTAUT) was developed by Venkatesh, Davis and Morris (2003), which evolved from A study of the combination of 8 behavioral theorists consisting of: Theory of Principled Action Theory of Reasoned action (TRA) Theory of Planned Behavior (Theory of Planned Behavior: TPB) Innovation and Technology Acceptance Model Technology Acceptance Model (TAM). The Model of PC Utilization (MPCU), The Diffusion of Innovation Theory (DOI), The Motivational Model (MM), The Social Cognitive Theory (SCT), and the Combined Tam TPB (C-TAM-TAB) theory.

Tabel 1: UTAUT Constructs, Sub-Constructs, Models, and References

UTAUT constructs	Sub-construct	Model	Reference
Performance expectancy	Perceived usefulness	THERE	Venkatesh, Davis and Morris (2003)
	Extrinsic motivation	MM	
	Job-fit	MPCU	
	Relative advantage	IDT	
	Outcome expectations	SCT	
Effort Expectancy	Perceived ease of use	THERE	
	Complexity	MPCU	
	Ease of use	IDT	
Social Influence	Subjective norm	TRA, TPB, C-TAM-TPB	
	Social factors	MPCU	
	Image	IDT	
Facilitating Condition	Perceived behavioral control	TPB, C-TAM-TPB	
	Facilitating conditions	MPCU	
	Compatibility	IDT	

By the model of UTAUT obtained from the combination of the 8 behavioral theories. The 4 principles are performance expectations. In addition, there are 4 secondary variables that affect the main factors: gender, age, experience, and voluntariness of use (Figure 1). The details of each factor are as follows:

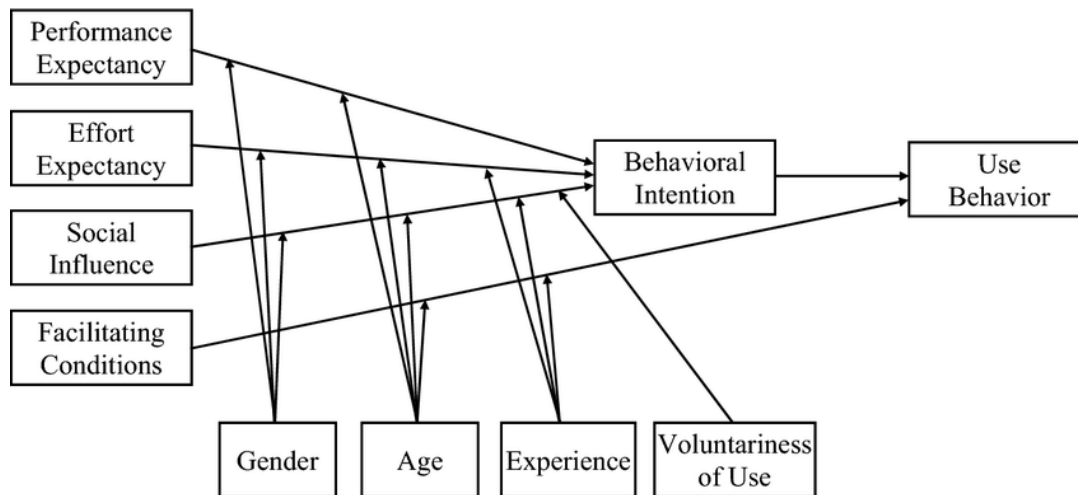


Figure 1: Unified theory on acceptance and use of technology (UTAUT)

1. Performance Expectations (Performance Expectancy) refers to the level of a person believes that using the system will give him the opportunity to increase his or her performance efficiency, which consists of factors obtained from the development and integration of various theories as follows:

1.1 Perceived Usefulness is the level of user belief that the use of the system will improve operational efficiency (TAM Model).

1.2 Extrinsic Motivation is that those who use the system in their work will lead to valuable results and achieve better than others. (MM Model)

1.3 Job-fit is the ability of a system to increase the performance of an individual. (MPCU Model)

1.4 Relative Advantage is the level of use of the system that is applied. Understand that it is better than the past (DOI Model)

1.5 Outcome Expectations are expectations of behavior-related outcomes, which can be divided into performance expectations and personal expectations (SCT Model).

2. Effort Expectancy refers to the level of difficulty in using a technology system consisting of 3 main factors as follows:

2.1 Perceived Ease of Use is the level of belief of a person that the use of technology systems does not require high effort to use (TAM Model).

2.2 Complexity is the difficulty or ease of understanding and using the system (MPCU Model).

2.3 Ease of Use is the level of use of a system that is understood to be difficult to use (IDT Model).

3. Social Influence refers to the level of understanding of the importance of believing that new systems should be used. In the operation of the There are 3 types of behavior as follows:

3.1 Subjective Norm is a person's perception of each person and expressive behavior. of influence on oneself (TRA Model)

3.2 Social Factors are interpersonal relationships that express the culture and agreements between individuals that exist in that social situation (MPCU Model).

3.3 Image is the level of use of innovation that makes it understood that it improves the image or social image status (DOI Model).

4. Facilitating Condition refers to the personal belief that the organization and its existing facilities or technological equipment contribute to the use of the system, consisting of the following 3 factors:

4.1 Perceived Behavioral Control is the understanding of the perception of power to control any behavior (TPB Model).

4.2 Facilitating Conditions are factors related to the environment to facilitate operation including the preparation of a computer equipment support system (MPCU Model).

4.3 Compatibility is the consistency or suitability of the user to meet the needs or experience of the group of potential participants to accept innovation. (DOI Model)

Performance Expectancy

Performance expectations refer to the level of awareness of the use of technology to increase productivity, which is considered an important factor in determining the intention to use AI tools (Jang, 2024) (Sánchez-Holgado & Calderón, 2024) (Xu et al., 2024). Evidence from various studies: in the field of health care It was found that performance expectations were strongly correlated ($r=0.66$) with the intention to use AI-based clinical decision support systems (Dingel et al., 2024). Business experts report that AI tools like ChatGPT have significantly improved performance (Emon, 2023).

Effort Expectancy

Role in implementation: The expectation of effort or perceived ease of use has a wide range of effects. Although it does affect intentions indirectly, the overall effect is often insignificant (Sánchez-Holgado & Calderón, 2024) (Xu et al., 2024). Contextual Changes: In Educational Contexts Expectations towards efforts have been identified as a key predictor of the adoption of AI tools among university instructors (Xu et al., 2024).

Social Influence

Social influence: The impact of social influence, or the degree to which a person perceives that a significant person believes that a new technology should be used is important in various contexts (Dingel et al., 2024) (Xu et al., 2024). Trust: Trust in AI tools has become a key factor, especially in healthcare, predicting the intention to use the most influential AI systems (Dingel et al., 2024). On the other hand, while performance expectations and trust are important, some research studies suggest that factors such as anxiety and perceived risk can negatively impact the intention to use AI tools (Dingel et al., 2024), highlighting the complexity of user adoption and the need to use specific strategies to improve AI adoption in different sectors.

Facilitating Conditions

Availability of resources: Access to the necessary technology and support systems will enhance users' ability to use AI tools effectively (Gayashan & Samarasinghe, 2024). Training and support: Providing proper training increases user confidence and ability to use AI tools, thereby improving their willingness to adopt these technologies (Emon, 2023). Environmental factors: Organizational culture and infrastructure play a key role in determining the conditions conducive to AI adoption (Nascimento & Meirelles, n.d.).

Product-Related Factors

Economic factors are considered the core, especially in sectors such as agriculture, where economic discouraging factors account for 31.5% of the barriers to AI adoption (Georgopoulos et al., 2023). Product-related factors, such as perceived benefits and ease of use. It is important to promote the adoption of AI, with an emphasis on performance expectations as predictors of usage intent (Georgopoulos et al., 2023) (Sánchez-Holgado & Calderón, 2024).

Seller credibility and intention to use AI tools

The perception of the seller's credibility affects the consumer's intention to use the tool. Seller-offered AI, such as chatbots or product recommendation systems. If the consumer believes that the seller is trustworthy and provides accurate information, they will be able to do so. They will be more likely to use the AI tools offered by the sellers. Research has shown that trust in sellers affects the adoption and use of technology related to purchasing goods (Dai and Liu, 2024).

Merchant characteristics

1. Website quality and user experience. Website design plays an important role in attracting and retaining consumers. Traits such as security, reliability, page loading speed, and easy navigation are recognized as important factors affecting user satisfaction and purchase intentions. (Choudhury, M. M., & Choudhury, A. M. 2010)

2. Quality of information and customer service. Accurate and complete information about the product, as well as responsive customer service that responds quickly and efficiently, are characteristics of merchants that help build trust and satisfaction with consumers. This affects the intention to shop online.

3. Traders' Strategies and Behaviors. Characteristics of the merchant, such as marketing strategies and responses to customer needs. It can be divided into different types, for example,

"Prospector", which focuses on finding new opportunities and quickly responding to customer needs. Studies have shown that traders with this trait are more likely to adopt new technologies and have a high degree of flexibility in their business operations (Ofori-Amanfo, J., Newman, F., Konlan, P., & Siaw, J. 2024).

4. Technological and environmental factors. Technological factors such as the ability to use information technology and environmental factors such as the availability of digital infrastructure play an important role in merchants' decisions to adopt e-commerce systems

Based on the theory and research in the past. It shows that the theory of acceptance and use of the above technology It is a kind of tool that executives in organizations will use to analyze, evaluate, and predict the likelihood of success in studying the factors that affect consumers' purchasing decisions in the future for organizations. There are two additional main factors, namely product related and merchant characteristics (as shown in Figure 2).

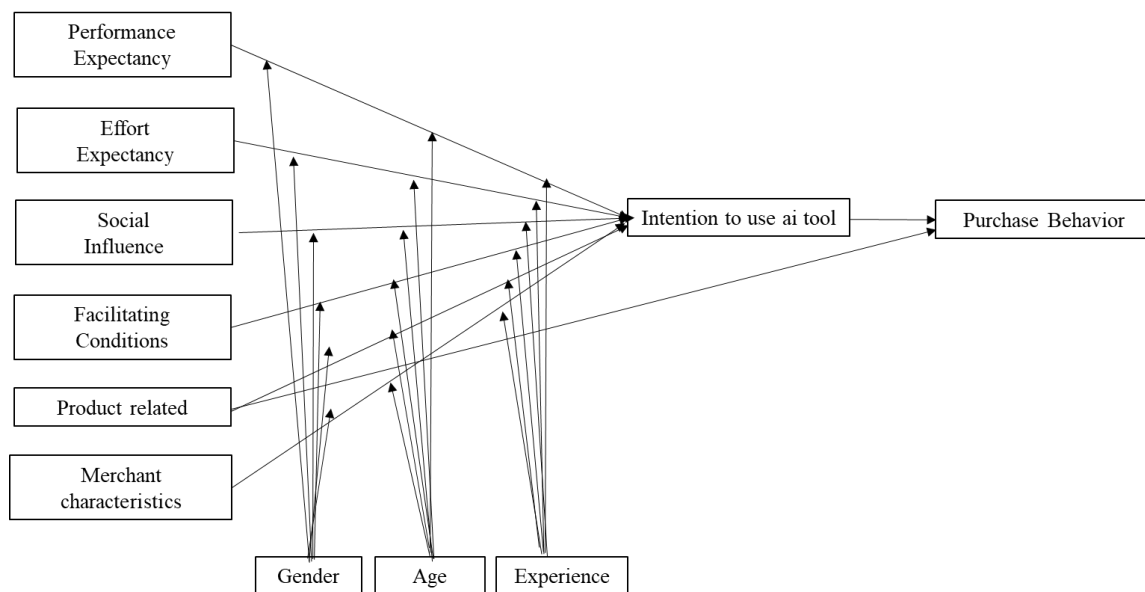


Figure 2. Extended UTAUT Model

Research Methodology

This research study is a quantitative research study which uses research in the form of a survey method. In order to study the topic "Forecasting Consumer Behavior in Consumer Health and Beauty Shopping in Thailand Using AI", which was obtained from the synthesis of theoretical conceptual frameworks and tested with empirical data by analyzing Structural Equation Modeling (SEM).

Population and sample

The population used in this study is the target population of both males and females living in Thailand. A total of 65,932,105 people (using data from the Official Registration System of the Department of Administration, Ministry of Home Affairs, The size of the sample was determined by representing the values in the sample calculation formula of (Yamane, 1973), the researcher determined the confidence level of 95 % and the tolerance level of no more than 5% from the calculation of the sample size of 400 people.

Research Tools

The tool used in the research is a questionnaire created within the conceptual framework of the research. To be used as a tool to collect data to be analyzed and processed. Instrument Quality Development and Monitoring The researcher developed and monitored the quality of the research tool by following the following steps: 1. The researcher studied the principles, concepts, and concepts. Theories and literature related to the research issues for the purpose of defining variables and measures and then developing tools used in research. 2. Checking the quality of the tools used in the research by submitting a

questionnaire to 3 experts. You should consider checking the content validity of the questions in the questionnaire by determining the Index of Congruence (IOC) and then selecting the questions with a consistency index value of .60 or higher. (Rovinelli and Hambleton, 1977). The questionnaire obtained after the content accuracy check (Content Validity) to test on a population that is not a sample of the research but has the same qualifications. (Pilot Test) of 30 samples to check whether the respondents understood the questions in the questionnaire. At the same time, the reliability of the questionnaire was analyzed by analyzing the alpha coefficient using Cronbach's method to select questions with an alpha coefficient of .70 or higher, which indicates high confidence (Zikmund et al., 2010).

How we collect information

In this study, the researcher used both primary and secondary data sources as follows:

1. Secondary data is information related to research that the researcher does not collect directly by himself, but is obtained from research from books, theses, research reports, etc.
2. Primary data is information directly related to the research, in which the researcher uses a questionnaire as a tool to collect data from a total of 400 people living in Thailand.

Data Analysis

Data analysis to test the relationship between factors influencing consumers' purchasing decisions for health and beauty products in Thailand. Use statistical data analysis. The types are as follows: 1. Data analysis with descriptive statistics, frequency distribution, and percentage. 3. Inference Statistic Data analysis by inferential statistics by analyzing the Structural Equation Modeling (SEM) consists of two stages of analysis (Hair et al., 2010; Kline, 2010): 1. Measurement Model analysis, which is a technique to analyze the relationship between Observe Variable and latent factors. Latent Variable, which is an analysis of confirmatory elements. (CFA) to find the relationship between observable variables and latent factors whether the model variables are suitable or not, along with grouping variables with similar characteristics into the same latent factor. For this research, the researcher chose to use a statistical ready-made computer program with IBM SPSS AMOS with the following analysis steps: 1. Specification of the Model, in which the researcher was interested in studying causal variables that directly and indirectly affect behavioral intentions. It is observed by the preliminary agreement of the model that all relationships are linear relationships, positive relationships, and all relationships are one-way relationships between external variables. 2. Parameter Estimation from The Model The researcher used the Maximum Likelihood (ML) method, which is the most widespread method because it is consistent, efficient, and independent of the measure. The results show 1. the component weight value between the latent variable and the observed variable. (ϕ) the correlation coefficient between the external and internal latent variables (γ) and the correlation coefficient between the internal latent variables (β) and the forecast coefficient (R^2) of the structural and measurement models. (Kline, 2010). The researchers used statistical values to check the consistency of the model. 1. Chi-square statistics or χ^2 value is a statistical value used to test statistical hypotheses. Hair et al. (2010) have stated that chisquare statistics tend to be high and statistically significant if there are large sample sizes and complex models. Most of the research using structural equation analysis uses proportional values. χ^2/df comes into play to determine the consistency of the model.

Therefore, in this research, which has a large sample and a complex model, Therefore, the researcher considers the consistency of the model from the χ^2/df proportional value, where the χ^2/df value should not exceed 3.00, or in the case of the model complexity, the χ^2/df value should not exceed 5.00, which indicates that the model is consistent with the empirical data. 2. The Goodness of Fit Index (GFI) or GFI is similar to the Squared Multiple Correlation (R^2), which is a value that shows the proportion of the covariance of the Grace of Fit (2010). Observed Covariance can be explained by the covariance of the model (Kline, 2010) or as a partial measure of the difference between the coherence function from the model before and after the model adaptation and the coherence function before the model is adjusted, where the GFI value should be between 0 and 1, where the value of 1 refers to the metric that shows that the model is the most suitable model, so if the GFI value is very high, 0.95 is considered very good, and if the GFI value is between 0.90 – 0.95, it is considered to be in good condition, which indicates that the model is consistent with the empirical data. (Byrne, 2010). 3. The Comparative Fit Index (CFI) is used to compare hypothetical models to see how much more consistency is higher than empirical data. If the CFI value is greater than 0.95, it is considered very good, and if the CFI value is between 0.90 – 0.95, it is considered good, indicating

that the theoretical model is consistent with the empirical data. 4. The root value of the Root Mean Square Error of proximation (RMSEA) or RMSRA value is a value that indicates the inconsistency of the model created with the covariance matrix of the value population. RMSEA should approach 0 if the value is between 0.05 and 0.08, which is considered very good, and if the value is between 0.08 - 0.09, it is considered good, indicating that the model is consistent with the empirical data. 5. The root value of the Standardized Root Mean Squared Residual (SRMR) or SRMR value is the gradient value of the model, the SRMR value should be close to 0, if the value is less than 0.05, it is considered very good, and if the value is between 0.05-0.08, it is considered to be in the good condition, indicating that the theoretical model is consistent with the empirical data (Byrne, 2010).

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Effect of Interpersonal Relational Value and Pet Affectional Value on Purchase Intention of Premium Cat Food in Thailand

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Abstract

The rapid growth of Thailand's pet industry, along with shifting pet ownership trends, has led to a transformation in how pets are perceived. They are no longer regarded simply as animals but increasingly as integral members of the household. This study investigates the influence of interpersonal relational value and pet affectional value on the purchase intention of premium cat food in Thailand. A qualitative research approach was employed, utilizing in-depth interviews with 21 cat owners who were either current buyers or had expressed interest in premium cat food. Participants were selected via purposive and snowball sampling. The findings confirmed the proposed conceptual framework, revealing that both interpersonal relational value and pet affectional value significantly influence purchase intention, with pet affectional value being particularly impactful. This study analyzes traditional perceived values namely, functional value, emotional value, and social value alongside two additional values proposed by the researcher interpersonal relational value, which reflects relationships among individuals, and pet affectional value, which captures the emotional bond between humans and their pets. All of these values were found to influence the purchase intention of premium cat food in Thailand. From the interviews with the participants, it shows the influence on the purchasing interest of premium cat food in Thailand by ranking as follows pet affectional value, functional value, interpersonal relational value, emotional value, social value, with six primary ranking patterns identified. Notably, all patterns began with pet affectional value as the most influential, while social value consistently ranked lowest. Non-verbal cues and response behaviors were also analyzed to support the interpretation of word frequency, perceived importance of each value, and the levels of impact on purchase intention. These findings provide strategic insights for pet food marketers seeking to align with consumer values in the premium segment.

Keywords: Purchase Intention, Perceived Value, Interpersonal Relational Value, Pet Affectional Value, Premium Cat food.

Introduction

The global pet food industry has grown substantially over recent years, with the premium segment experiencing notable expansion due to evolving consumer preferences toward pet health and nutrition. The premium pet food market was valued at approximately USD 83.02 billion in 2024 and is expected to reach USD 105.10 billion by 2026, with an annual growth rate of 4.8% (Marketeer Team, 2021). In Thailand, the industry continues to grow, spurred by increasing pet ownership and the humanization of pets, where they are treated as family members. The Thai pet food market reached THB 41.7 billion in 2024, with a growth rate of 15.8% (Kasikorn Research Center, 2024). Among these trends, premium cat food stands out, driven by owners' desire to provide better nutrition and care. The market can be categorized into regular cat food and premium cat food, with at least 12 well known brands available in Thailand. This study proposes integrating two novel dimensions interpersonal relational value and pet affectional value into the traditional framework of perceived value, which includes functional, emotional, and social values. These relationship based values have yet to be sufficiently explored in the context of premium pet food. The research aims to address this

gap by examining their influence on purchase intention among Thai consumers, Those who intend to purchase premium cat food often have factors that influence their decision to purchase cat food, so should studied various values to develop effective marketing strategies, it is essential to incorporate various dimensions of perceived value into the strategic.

Research Objectives

This study aims to examine the influence of five perceived value dimensions namely, functional value, emotional value, social value and new dimension additional values proposed by the researcher interpersonal relational value, which reflects relationships among individuals, and pet affectional value, which captures the emotional bond between humans and their pets. influence purchase intention of premium cat food in Thailand by propose marketing strategies that integrate dimensions of values to effectively enhance consumer purchase intention premium cat food products in Thailand.

Literature Review

Pet Market Dynamics

In the Asian market, the growth of the pet food industry has surpassed the global average, particularly in India and China, which are rapidly emerging as new hubs for this sector. Both countries are experiencing annual market growth rates of 10 - 15%, reflecting a significant shift in consumer behavior toward greater emphasis on pet nutrition (Kumar et al., 2024). This growth trend is not limited to India and China; Thailand is also becoming an important player in the industry, especially in the premium pet food segment.

Changing societal structures, such as smaller households and aging populations, have led to a rise in pet ownership. These demographic trends, along with shifting lifestyles, have positioned pets as emotional companions. As a result, there is a global trend toward viewing pets as family members, leading to increased spending on their well-being (Crowdabout, 2023; Prachachart Turakij, 2024).

Thailand's pet industry has experienced significant growth, especially post-COVID-19, when birth rates declined but pet product sales surged (Mitihoon, 2024). Consumers increasingly demand pet food that reflects human-grade standards organic, GMO-free, and freshly sourced (Money Buffalo, 2024). This demand has also elevated interest in premium products, including nutritional supplements and customized pet meals. Cats are becoming increasingly popular due to urban living constraints, shifting the pet ratio in Thailand from 80:20 (dogs:cats) to 60:40 (Thonglor Pet Hospital, 2024).

Premium Cat Food Characteristics

Premium cat food is defined by its high-quality ingredients, natural additives, and targeted health benefits. It addresses digestive health, coat condition, weight management, and other specialized needs. These foods avoid harmful additives such as synthetic coloring and preservatives, offering a tailored nutritional profile (Smith & Jones, 2021). As consumer awareness increases, owners are more selective, and premium products that reflect values of health and care gain greater traction (Euromonitor International, 2023).

Purchase Intention

Purchase intention regarding pet food is influenced by various factors (Kwak & Cha, 2021). These include recommendations from others, whereby consumers are more likely to purchase based on suggestions from close individuals such as family members or friends. The more frequently a brand is recommended, the greater the likelihood that consumers will choose to purchase it. Another key factor is the consumer's attitude; when consumers have a positive perception of a product such as viewing it as high-quality or beneficial to pet health they are more inclined to buy it.

Brand reputation also plays a significant role. Brands that are well-known and recognized in the market tend to instill trust among consumers. Additionally, perceptions of product healthiness have become increasingly important, as consumers prioritize their pets' health by selecting nutritionally beneficial food options. Price fairness is another contributing factor products that are reasonably priced and perceived as offering good value for quality are more likely to lead to purchase decisions.

Purchase intention is a measurable construct that connects consumer perceptions with marketing strategies. Therefore, it is highly relevant to the current study, which explores how various perceived values influence purchase intention in the context of premium cat food in Thailand.

Perceived value plays a crucial role in shaping consumer purchase intentions, especially in emotionally involved categories like premium pet food. Defined as the consumer's evaluation of a product's benefits relative to its costs (Payne & Holt, 2001), perceived value includes both functional aspects, such as product quality and packaging, and emotional satisfaction gained from fulfilling the pet's needs (Snoj, Korda, & Mumel, 2004). Studies have shown a strong link between perceived value and purchase intention. Tung-Zong and Albert (1994) found that higher perceived value leads to a greater likelihood of purchase. Similarly, James (2002) noted that enhanced value perception increases consumer confidence and loyalty. In a related study, Younus, Rasheed, and Zia (2015) reported a positive correlation ($\beta = .208, p < .05$) between perceived value and purchase intention, suggesting that value remains influential even in developing markets.

In Thailand's premium cat food market, where consumers increasingly humanize their pets, perceived value both functional and emotional serves as a key motivator in purchasing decisions.

Theory of Reasoned Action (TRA)

Fishbein and Ajzen (1975) introduced the Theory of Reasoned Action (TRA) in their seminal work *Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research*. The TRA has played a pivotal role in understanding human behavior, especially in the fields of social psychology, consumer behavior, and health-related decision-making. According to the theory, an individual's behavioral intention is the most immediate determinant of actual behavior, and this intention is shaped by two main factors: attitude toward the behavior and subjective norms. The strength of the TRA lies in its ability to integrate individual beliefs, personal attitudes, and perceived social pressures into a coherent and logically structured model. This has made the theory especially valuable in explaining and predicting behaviors where volitional control is present, such as purchase decisions, health behavior changes, and voting behavior.

Perceived Value Dimensions

Ledden et al. (2007) explored five dimensions of perceived value: functional, epistemic, emotional, social, and conditional. Their study found that all dimensions had a positive impact on consumer satisfaction when using blog websites (Cheng & Lin, 2015). However, in the context of social media platforms such as Facebook, most studies tend to emphasize only three dimensions: functional, emotional, and social values (Klepek et al., 2018). Supporting this view, Gan and Wang (2017) revealed that these three value dimensions significantly influenced customer satisfaction in social commerce environments.

Sheth et al. (1991) provided a foundational definition of perceived value through five distinct categories that influence consumer decision-making: functional value, social value, emotional value, epistemic value, and conditional value.

Functional value refers to the perceived utility derived from the product's performance or physical characteristics, emphasizing efficiency, convenience, and practical benefits. Social value is the perceived utility derived from a product's image or symbolic meaning, which contributes to social identity and affiliation with certain demographic or cultural groups. Emotional value reflects the perceived utility derived from the product's ability to arouse feelings or affective states such as comfort, safety, excitement, romance, passion, fear, or guilt. Epistemic value relates to the perceived utility obtained through curiosity, novelty, or a desire for knowledge and new experiences. Conditional value refers to the perceived utility arising from specific situations or contexts that temporarily influence consumer preferences.

Sweeney and Soutar (2001) later developed the PERVAL scale to measure perceived value. They conceptualized: functional value in terms of performance/quality defined as the utility obtained from the perceived quality and expected performance of a product. emotional value the utility derived from the affective states or feelings evoked by the product, such as happiness, satisfaction, or pride. social value the utility derived from a product's ability to enhance the consumer's social self-concept and gain social approval.

From the literature review, Perceived Value is important in marketing. The study of perceived value or perceived value is an important element in marketing because consumers' perception of value is a major factor influencing their decision to purchase products and services in the current market,

especially in the premium pet food industry, which is one of the interesting industries to study. Creating differences and increasing perceived value is an important factor that helps brands attract and retain their customer base. In addition, there are points that researchers are interested has not been clearly specified, namely the study of the interpersonal relationships and the human pet relational bond, which are increasingly relevant to understanding purchase intention of consumer. The researcher is interested in and proposes 2 new values related to these dimensions interpersonal relational value and pet affectional value.

Interpersonal Relational Value

Kamali et al. (2021) highlighted the significant role of interpersonal relationships between service providers and customers in the service sector. These relationships contribute meaningfully to fostering both customer loyalty and relationship satisfaction, largely driven by ongoing interactions, mutual trust, and shared experiences. When individuals feel recognized and valued within a relationship, they are more likely to exhibit behaviors that support the continuity of that relationship. This sense of belonging not only strengthens interpersonal bonds but also enhances mutual appreciation between parties.

Morgan and Hunt (1994) introduced the Commitment Trust Theory of Relationship Marketing, which posits that commitment and trust are the two fundamental components influencing consumer behavior in establishing long-term relationships with brands or businesses. Utilizing Structural Equation Modeling (SEM), they tested the statistical relationships among commitment, trust, and other relational constructs. The study, based on empirical data from companies engaged in relationship marketing, found that commitment and trust are key determinants of successful relationship marketing. Consumers who exhibit high levels of trust and commitment toward a brand are more likely to maintain long-term relationships. Positive brand relationships foster a sense of care and attentiveness, which in turn promotes brand loyalty. Moreover, interpersonal communication, such as sincere product recommendations or post-sale support, further enhances consumers' perceived relational value with the brand.

Trabelsi (2020) investigated the consumer-brand relationship in the context of private label brands sold by retail stores. The study analyzed factors such as customer satisfaction, brand trust, and brand attachment using SEM to determine their impact on customer loyalty. The findings revealed that customer satisfaction significantly influences loyalty toward the retail store, resulting in increased repeat purchases and word-of-mouth referrals.

Shen, Chen, and Luo (2019) examined the Prosumption Logic within the sharing economy, which describes the integration of producers and consumers in co-creating brand value. In this framework, consumers are not merely passive recipients of marketing messages but actively contribute to brand development through shared experiences, knowledge exchange, and two-way communication. Key variables in their study included brand attachment, brand trust, and prosumption engagement. Analyzing customer reviews from 23 sharing economy platforms (e.g., Airbnb, Uber, WeChat, Zhihu), using user comments from Baidu Reputation and grounded theory methodology, the study revealed that building consumer trust and satisfaction on platforms that encourage user participation can strengthen brand relationships. Positive brand experiences foster brand evangelism, where consumers voluntarily promote the brand. Brands that invite customer engagement, such as feedback and user-generated content, are more likely to cultivate lasting relationships.

These findings collectively emphasize the importance of interpersonal relationships and trust in establishing brand loyalty, especially in service and digital platform contexts. Kamali et al. (2021) emphasize that strong customer-provider relationships are built through continuous interaction and co-created experiences, which enhance loyalty. Morgan and Hunt (1994) support this view by affirming that commitment and trust are essential to long-term brand relationships. In retail contexts, Trabelsi (2020) confirms that customer satisfaction directly affects loyalty and word-of-mouth advocacy. Similarly, Shen et al. (2019) demonstrate that consumer engagement in co-creation activities enhances trust, attachment, and long-term advocacy, aligning with Pimentel and Heckler (2003), who found that consumers who feel emotionally connected to a brand are more likely to promote it without expecting a return.

Despite its relevance, interpersonal relational value has not been explicitly addressed as a formal dimension within the framework of perceived value. Therefore, this study proposes a new construct: interpersonal relational value, defined as the perceived value derived from social relationships that individuals maintain with others. These relationships may occur in personal contexts such as with family, friends, colleagues, veterinarians or in commercial contexts such as between customers and

service providers. This value arises from ongoing interaction, trust, mutual understanding, and shared dialogue. In the context of pet ownership, consumers often receive advice or exchange opinions about the best products for their pets. Such interpersonal exchanges may influence the decision to purchase premium cat food.

This construct extends beyond traditional social value, which primarily concerns the symbolic or image-based benefits of consumption, such as social status or group belonging. Unlike social value, interpersonal relational value is a new dimension to emphasizes trust-based, emotionally grounded influence within personal networks, reflecting how relational closeness shapes purchase intention, particularly in emotionally sensitive product categories like pet food.

Understanding this factor can offer deeper insight into how support from one's personal circle affects consumer purchase intention, where trust and relational influence are paramount. In the context of premium cat food, which often involves higher costs and perceived risks, consumers frequently seek reassurance or recommendations from trusted individuals before making a purchase. personal endorsement or shared experiences serve to enhance consumer confidence and can act as a catalyst for purchase intention. This is especially relevant in cultures with strong interpersonal networks and collectivist tendencies.

Pet Affectional Value

Pets hold deep emotional and psychological significance in human life. They provide stable and reliable companionship, offering emotional support, comfort, and a sense of security particularly during periods of life transition or stressful circumstances (Walsh, 2009). When it comes to purchasing decisions for premium pet food, consumers often prioritize product quality as a primary factor. In recent years, shifts in social dynamics and lifestyle such as a decline in marriage rates and childbirth, and an increase in single-person households have contributed to pet ownership becoming a means of emotional fulfillment and happiness. Consequently, many consumers express love and care for their pets as though they were family members, and are willing to invest in high-quality products and services to ensure their pets receive the best care (Mondi, 2019).

This behavior reflects a strong emotional bond between pet owners and their pets. The deeper the attachment, the more likely owners are to invest in products that promote their pets' health and well-being, even at premium prices. Such emotional commitment significantly influences purchasing behavior, particularly in the selection of premium pet food. Understanding this phenomenon helps clarify how affectional value toward pets influences consumers' purchase intentions.

Curated offerings, unique experiences, and quality time shared between owners and their pets also contribute to strengthening the human–animal bond. Premium pet experiences not only fulfill owners' desires to give the best to their pets, but also deepen emotional connections (Euromonitor International, 2023). The data suggests that pets play a vital role in owners' emotional lives, offering comfort, security, and companionship. In response to evolving consumer behavior, particularly among those living alone, pets are increasingly seen as sources of emotional fulfillment. This leads owners to treat pets as integral family members, showing profound affection and care.

Pet affectional value is defined as the emotional bond and sense of responsibility a consumer feels toward their pet, particularly when the pet is regarded as a family member. This construct builds upon and differentiates itself from emotional value, which typically captures feelings evoked by the product itself. Pet affectional value is a new dimension to in captures the consumer's motivation to provide the best for their pet out of love, care, and attachment, thus serving as a unique driver of behavior in pet related consumption. Together, these constructs address relational and affective dynamics not fully captured by existing perceived value frameworks, offering new insights into consumer motivation within purchase intention.

Based on these insights, the researcher identified a perceived value dimension that remains underexplored in existing literature: the value arising from the emotional bond between humans and pets. Thus, a new variable is proposed pet affectional value defined as the emotional attachment between the owner and their cat, characterized by love, attentiveness, and a strong desire to provide the best for their pet. This construct is introduced to study its influence on purchase intention, in conjunction with other dimensions of perceived value.

Following an extensive literature review, the study incorporates three core dimensions of perceived value: Functional value refers to the utility consumers derive from the product's attributes, such as quality, performance, and effectiveness in meeting practical needs., Emotional value Captures

the emotional benefits or affective experiences associated with a product or service., Social value Reflects the social utility derived from a product, such as status enhancement, group belonging, or social recognition.

While these three dimensions have been widely validated as influential to consumer satisfaction and brand attachment, existing research has not yet examined their application within the context of premium cat food in Thailand. Moreover, interpersonal bonds particularly emotional relationships between humans and their pets have not been clearly defined within any single value dimension. In response, the researcher introduces two novel constructs: interpersonal relational value: The perceived value stemming from social relationships, including family, colleagues, and close friends, who may influence purchase decisions through shared insights, recommendations, or joint decision-making., Pet affectional value: The emotional bond with a pet, especially a cat, that motivates consumers to provide the best possible care. This includes treating the cat as a family member or child, deriving joy from the pet's satisfaction with high quality food, and being willing to spend more to ensure the pet's health and happiness demonstrating concern through the purchase of premium grade pet food.

Through analytical review and theoretical reasoning, the researcher argues that these two constructs are critical in explaining consumer behavior in the premium pet food market. Incorporating pet affectional value into the perceived value framework may offer valuable insights into purchase intention and enrich the understanding of relational and emotional factors in consumer decision making.

Based on a review of relevant literature, the researcher developed the conceptual framework for this study using the Theory of Reasoned Action (TRA) as the theoretical foundation. Within this framework, five independent variables were identified to represent the dimensions of perceived value: functional value, emotional value, social value, interpersonal relational value , and. pet affectional value. These variables were selected to examine and analyze their influence on consumers' purchase intention regarding premium cat food. The goal of this study is to gain a deeper understanding of how different value perceptions impact consumers behavioral intentions in this specific product category.

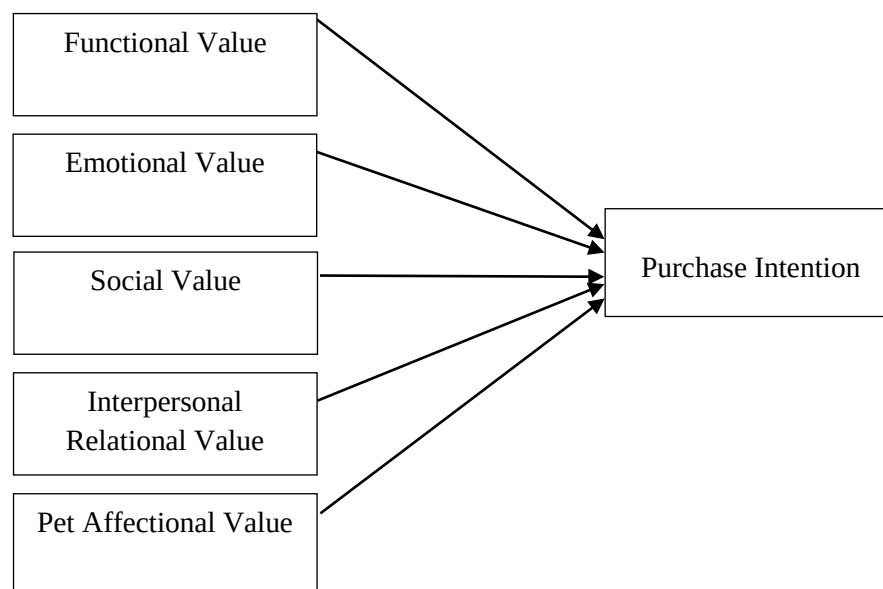


Figure 1: Conceptual Framework

Research Methodology

This study represents the initial phase of a mixed-methods research project, with an emphasis on a qualitative approach to validate the proposed conceptual framework. It also aims to refine the structural understanding of purchase intention for premium cat food in Thailand and to develop appropriate measurement scales in preparation for a subsequent quantitative phase.

A qualitative data collection method was selected due to its capacity to explore complex and context-specific constructs, including five key variables: functional value, emotional value, social value, interpersonal relational value, and pet affectional value. This approach enables the gathering of rich, in-depth narratives that are essential for understanding the underlying psychological mechanisms influencing consumer behavior and purchase intention. Participants were recruited through purposive and snowball sampling techniques, targeting individuals who currently own cats and express interest in purchasing premium cat food in Thailand. The interviews were conducted using a hybrid approach, including both face to face interviews held at locations convenient for the participants, such as cafes and restaurants and online interviews, conducted in quiet environments. All interviews were recorded, and for the online sessions, video cameras were turned on to observe the participants' context, body language, and willingness to respond, which are crucial elements in qualitative data collection. Prior to each interview, informed consent was obtained from the participants. At the beginning of each session, participants were asked to introduce themselves and share their personal experiences of raising cats. The interviewer then followed up with additional questions if key topics related to the research objectives such as value dimensions were not mentioned, ensuring that all necessary data were collected in alignment with the study's goals. The interview transcripts were analyzed using content analysis, conducted by researcher with expertise in the subject area to ensure consistency in identifying emerging patterns and themes

In examining each dimension, the researcher assessed the frequency of keywords mentioned by the interviewees, along with behavioral cues and expressions, to evaluate the Perceived Importance of Value and the Analyzed Levels of Impact on Purchase Intention. Following the interviews, participants were also asked to rank the value dimensions in order of influence from most to least impactful based on their personal perceptions of purchase intention. For enhance the reliability and credibility of the findings, a second researcher conducted a cross-validation of the results. This methodological approach supports the validation of the proposed framework while also identifying opportunities to refine key constructs, thereby establishing a solid foundation for the study's future quantitative investigation.

A total of 25 participants were initially contacted, of which 21 completed the in-depth interviews. This number aligns with Guest, Bunce, and Johnson (2006), who suggested that data saturation in qualitative studies is typically achieved with 12 to 20 interviews when the participant group is relatively homogeneous and the research scope is narrow. The obtained sample size was therefore deemed sufficient to ensure thematic richness and depth in the qualitative data.

Research Findings

Descriptive statistics were employed to summarize the basic characteristics of the data collected through the in-depth interview process. A total of 21 out of 25 participants were successfully interviewed; the remaining four could not be included due to logistical constraints. The interviews explored perceptions related to five key value dimensions functional value, emotional value, social value, interpersonal relational value, and pet affectional value and their influence on purchase intention toward premium cat food in Thailand.

Table 1: Factors Influencing Purchase Intention of Premium Cat Food in Thailand

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Interview	Functional Value (F)			Emotional Value (E)			Social Value (S)			Interpersonal Relational Value (I)			Pet Affectional Value (P)			Pattern
	Words Count Mention	Perceived Importance of Value	Analyzed Levels of Impact on Purchase	Words Count Mention	Perceived Importance of Value	Analyzed Levels of Impact on Purchase	Words Count Mention	Perceived Importance of Value	Analyzed Levels of Impact on Purchase	Words Count Mention	Perceived Importance of Value	Analyzed Levels of Impact on Purchase	Words Count Mention	Perceived Importance of Value	Analyzed Levels of Impact on Purchase	
1	11	High	High	2	Moderate	Moderate	5	High	High	4	High	High	3	High	High	PFIS
2	5	High	High	2	Moderate	Moderate	5	High	High	3	Moderate	Moderate	4	High	High	PFIS
3	9	High	High	4	High	High	2	High	High	5	High	High	3	High	High	PFIS
4	8	High	High	3	High	High	2	Moderate	Moderate	5	High	High	4	High	High	PFIS
5	8	High	High	2	High	High	3	Moderate	Moderate	5	High	High	4	High	High	PFIS
6	10	High	High	2	High	High	3	High	High	4	High	High	3	High	High	PFIS
7	4	High	High	4	High	High	3	Moderate	Moderate	5	High	High	2	High	High	PFIS
8	7	High	High	2	High	High	4	High	High	5	High	High	1	High	High	PFIS
9	4	High	High	3	High	High	4	High	High	5	High	High	2	High	High	PFIS
10	8	High	High	2	High	High	4	Moderate	Moderate	5	High	High	3	High	High	PFIS
11	6	High	High	1	Moderate	Moderate	5	High	High	5	High	High	2	High	High	PFIS
12	9	High	High	1	High	High	4	High	High	5	High	High	3	High	High	PFIS
13	5	High	High	1	High	High	3	High	High	5	High	High	4	High	High	PFIS
14	6	High	High	3	High	High	4	Moderate	Moderate	5	High	High	2	High	High	PFIS
15	4	Moderate	Moderate	5	High	High	4	High	High	5	High	High	3	High	High	PFIS
16	6	High	High	3	Moderate	Moderate	5	High	High	4	High	High	2	High	High	PFIS
17	8	High	High	3	High	High	2	High	High	5	High	Moderate	4	High	High	PFIS
18	6	High	High	1	High	High	3	High	High	5	High	High	4	High	High	PFIS
19	12	High	High	1	High	High	2	High	High	5	High	High	4	High	High	PFIS
20	8	High	High	3	High	Moderate	4	Moderate	Moderate	5	High	High	3	High	High	PFIS
21	6	High	High	2	High	High	5	High	High	5	High	High	4	High	High	PFIS

In-depth interviews were conducted with 21 individuals residing in Thailand who were responsible for purchasing cat food and expressed interest in buying premium cat food and participants consisted of 18 females and 4 males, ranging in age from 19 to 43 years old. Their monthly income ranged between 15,000 and 100,000 THB, and all participants had an educational background of at least upper secondary school. The interviews focused on five value dimensions functional value, emotional value, social value, interpersonal relational value, and pet affectional value to explore their influence on purchase intention. The responses were analyzed and categorized according to varying levels of impact, ranging from low to high, to assess the influence of each value on consumer behavior.

Overall Findings: The analysis revealed that all five value dimensions had some level of influence on purchase intention, though the degree of impact varied slightly across participants. This confirms that each perceived value dimension contributes meaningfully to the decision-making process when it comes to purchasing premium cat food. based on the participants' responses as dimension follows:

Functional Value: Out of the 21 participants, 20 demonstrated a high level of interest in functional value, indicating it had a strong influence on their purchase intention. Only one participant expressed a moderate influence, which was also reflected in a moderate level of purchase intention. Nonetheless, Interviewee 15 acknowledged that functional value did impact their decision, though to a lesser extent. Furthermore, 6 participants ranked functional value as the most influential factor second only to pet affectional value underscoring its importance. Interviewee 18 mentioned, "I want my cat to be healthy by consuming premium cat food made from high-quality ingredients and free from meat by-products or scraps", Interviewee 12 said the product's functional attributes are considered essential, particularly in premium cat food that supports the elimination of ingested hair (hairball control). Participants frequently cited product quality, nutritional benefits, and suitability for their cats' breed, age, preferences, and behavior as key determinants of purchase.

Emotional Value: Among the 6 from 21 interviewee expressions indicated a moderate level of purchase intention, but when asked directly about the influence of specific values, all acknowledged their relevance. For instance, interviewee 11 mentioned that they had certain expectations when using premium cat food from a particular brand and felt satisfied giving it to their cat. However, they still regarded other value dimensions as more influential in their decision-making process. All participants acknowledged this influence, with as many as 16 stating a high level of influence. Emotional value was most frequently ranked fourth, by 7 out of 21 participants. Several interviewees described positive emotional experiences related to providing premium food for their pets. For instance, Interviewee 3 mentioned "felt satisfied purchasing high-priced cat food, believing it would offer long-term health benefits for their cat." Interviewee 19 mentioned "I feel comfortable sticking with this premium brand since my cat eats it well."

Social Value refers to a product's ability to enhance social image or social acceptance. Among the 21 participants, 15 exhibited a high level of social value perception, which significantly influenced their purchase intention toward premium cat food. For example, Interviewee 15 mentioned that "social groups influenced their decision to purchase premium cat food". Similarly, Interviewee 8 mentioned that "such influence is particularly strong within communities of cat owners, Community who feed their cats high quality premium food encouraged me to consider changing their own purchasing." Also 6 from 21 interviewee expressions indicated a moderate level of social value but they said influence but lower than other dimension, Interviewee 15 mentioned that "Purchasing premium cat food gives me a sense of belonging to the cat owner community, as we are all providing quality food for our pets. Nevertheless, I still take other factors into account before deciding." From 15 out of 21 interviewees ranked social value rank 5 affecting their purchase intention. While most participants acknowledged that social value plays a role in shaping their decision to purchase premium cat food, many also emphasized that other factors tend to be considered more prominently during the decision making process.

Interpersonal Relational Value: Out of the 21 participants, 19 demonstrated a high level of interest in interpersonal relational value, All interview participants acknowledged that this particular value had an influence on their purchase decisions. For instance, Interviewee 8 expressed that "It feels trustworthy because someone I trust has already tried feeding it to their cat." and Interviewee 10 expressed that "When i buying cat food, I usually ask for advice from my family first and also trust

the veterinarian because they take care of my cat and know which premium cat food is best for them.” while 2 interviewees participants reported a moderate level, the interviewees 2 give a comments were as follow “I prefer to make the final decision on which cat food to buy, I still consider the opinions of those around me.” Many respondents referenced recommendations from trusted individuals, especially veterinarians, whom they viewed as key advisors due to their role as personal health professionals for their pets. The overall rankings, Interpersonal relational value was most frequently identified as the fourth most influential factor in the decision to purchase premium cat food, with 8 participants indicating its significance at this level. but all of interviewees affecting their purchase intention indicating a strong belief in word-of-mouth influence on premium cat food purchasing.

Pet Affectional Value: All of participants reported a high level of influence from pet affectional value, and expressed enthusiasm and willingness to provide the best for their cats. Notably, none of the participants referred to their cats as mere pets. Instead, they described them as family members, such as children, siblings, or core household members. By interviewees 8 expressed that “When I love someone, I will naturally want to give them the best thing.” And interviewees 14 expressed “I love my cat, so I want to provide them with the best possible food to ensure their good health.” This dimension was ranked as the most influential factor by 14 participants, making it the top factor overall. The strong emotional bond between pet owners and their cats significantly influenced their willingness to purchase high-quality, premium products.

In the table, 6 recurring patterns were identified. Of these, 4 out of 6 involved pet affectional value, indicating that this dimension had the highest frequency of repetition, thereby reinforcing its significant influence on purchase intention. In contrast, social value appeared in all 6 repeated patterns but consistently ranked lowest in influence, suggesting that it is perceived as the least impactful factor in the decision to purchase premium cat food.

These findings confirm that all 5 value dimensions functional value, emotional value, social value, interpersonal relational value, and pet affectional value have an influence on purchase intention for premium cat food in Thailand. These insights will be incorporated into the upcoming quantitative phase of the research, which aims to further explore the strategic implications of each value dimension on consumer behavior in the premium cat food market in Thailand.

Conclusion and Discussion

A total of 21 individuals residing in Thailand who personally purchase cat food and express an interest in premium cat food were interviewed. The cumulative interview duration amounted to 10 hours, 23 minutes, and 35 seconds. Participants discussed their experiences as cat owners, including various aspects of cat care and their associated value perceptions. The analysis revealed that all 5 value dimensions functional value, emotional value, social value, interpersonal relational value, and pet affectional value influenced participants’ purchase intention for premium cat food.

Among these, Pet affectional value emerged as the most influential factor, as evidenced by the priority rankings given by the interviewees. Specifically, 14 out of 21 participants ranked pet affectional value as the most important influence on their purchase intention. This finding validates the conceptual framework, confirming that the five proposed value constructs meaningfully contribute to the purchase intention for premium cat food in the Thai context.

Functional Value was ranked as the top influence by 6 participants, placing it in second position overall. This suggests that while the emotional bond with the pet drives the strongest intention to purchase, considerations related to product quality, nutrition, and functionality are also highly valued reflecting a commitment among cat owners to provide the best possible care for their pets. These owners no longer view their cats merely as pets but rather as children, family members, or siblings.

In contrast, Social Value, while still relevant, was consistently ranked lowest in terms of impact. Only 2 participants rated its importance as moderate in the Perceived Importance of value analysis, and 5 participants exhibited moderate levels of impact based on behavioral cues observed during the interviews. Although social value still holds influence, it is perceived as less critical compared to the other value dimensions. This is consistent with the overall ranking of the influence of the various value dimensions on the cumulative ranking data provided by the interviewees, the order

of influence from highest to lowest in relation to purchase intention is as follows: pet affectional value, functional value, interpersonal relational value, emotional value, and social value.

From the findings result underscore the importance of prioritizing emotional and relational marketing strategies, particularly those that appeal to the deep affection pet owners feel for their animals. Marketing messages emphasizing love, care, and the pet's role as a family member are likely to resonate most with target consumers. At the same time, product attributes tied to functionality and nutrition should be emphasized to reinforce the rationale for premium purchases. These factors are among the most influential in shaping purchase intention for premium cat food; however, it remains essential to consider the other value dimensions as well, as all of them collectively contribute to consumers' purchase intention to purchase premium cat food in Thailand.

Also, The findings of this study offer important implications for marketers in the premium pet food industry, especially in Thailand and similar emerging pet care markets, when compared with the limited prior studies, indicate that perceived value continues to influence purchase intention in the current Thai context. However, it is also necessary to consider newly proposed values is interpersonal relational value, which reflects relationships among individuals and pet affectional value, which captures the emotional bond between humans and their pets, which were found to exert a greater influence than traditional perceived values remains an important factor in the context of pet food purchase. And from interview participants strong influence of interpersonal relational value suggests that marketing strategies should actively leverage word-of-mouth channels, community based recommendations, and influencer partnerships, particularly those involving veterinarians, pet care professionals, or trusted peer groups. Marketers can enhance credibility and trust by showcasing endorsements or testimonials from such sources and encouraging consumers to share their experiences within their social circles.

Simultaneously, pet affectional value highlights the need for emotionally resonant campaigns that position pets as beloved family members rather than just animals. Messaging should emphasize love, care, and emotional connection, reinforcing the owner's role in ensuring their pet's well being and storytelling because it is what consumers are looking for. User generated content, and campaigns featuring real pet owner relationships can deepen this emotional appeal. Premiumization strategies should not only focus on nutrition and functionality but also frame the product as a gesture of love or a means of nurturing the pet's health and happiness.

Looking forward, the study recommends expanding the sample size to include a more diverse population and employing quantitative methods to test the generalizability and applicability of the proposed framework across different contexts and demographic groups.

Suggestions

As this study was conducted within a narrow scope, focusing specifically on premium cat food in Thailand, it is recommended that the validated value constructs interpersonal relational value and pet affectional value be further explored in broader contexts, including the general cat food market and other types of pet food categories, to assess their influence on purchase intention beyond the premium segment. The findings may not be generalizable to non-premium cat food or to premium cat food markets in other countries, where consumer behavior and value perceptions may difference.

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Factors Affecting the Use of Golf Courses in the Central Region of Thailand

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Abstract

This research studies the factors affecting the use of golf course services in the Central region of Thailand. The objectives are to (1) study the factors in the marketing mix that affect the use of golf course services in the Central region of Thailand, and (2) study the differences in golf course service usage behavior of users in the Central region of Thailand, classified by demographic characteristics, including gender, age, education level, occupation, average monthly income, and marital status. The sample consisted of 400 golf course users in the Central region of Thailand. Questionnaires were used as data collection instruments. The statistics used for data analysis included descriptive statistics consisting of frequency, percentage, mean, and standard deviation; and inferential statistics consisting of independent samples t-tests, one-way analysis of variance, and multiple linear regression analysis.

The research results revealed that the marketing mix factor that had the greatest effect on the use of golf course services was the physical environment, followed by price and product, respectively. The hypothesis testing results found that gender significantly affected the average expenditure, reasons for using the service, and the influential person for service usage. Age, education level, occupation, average monthly income, and marital status significantly affected golf course service usage behavior in some variables. It was also found that the factors of price, physical environment, and personnel had a statistically significant influence on the decision to use golf course services at the 0.05 level.

From these research results, entrepreneurs should prioritize the marketing mix factors of physical environment, personnel, product, and price, taking into account demographic characteristics such as age, education level, occupation, average monthly income, and marital status, to strengthen marketing strategies, expand access, and increase the acceptance of golf course users in the Central region of Thailand.

Keywords: Golf Course, Consumer Behavior, Marketing Mix, Central Region of Thailand

Introduction

Thailand's tourism industry is a key driver of economic growth, contributing over 2.3 trillion baht in revenue in 2024—1.2 trillion from international tourists and 1.1 trillion from domestic travelers (Tourism Authority of Thailand, 2024). Despite the disruptions caused by the COVID-19 pandemic, the sector has recovered quickly and remains vital to the country's economic future. Among the emerging trends, sports tourism—particularly golf—has gained steady popularity. Golf serves both recreational and business purposes, attracting high-spending travelers such as executives and investors from Japan, South Korea, China, Singapore, and Europe. These visitors are drawn to Thailand's internationally recognized golf courses, comprehensive facilities, and competitive service pricing (Golf Business Report, 2023). Thailand hosts over 250 golf courses, with the Central region accounting for 69, or around 34% of the total (Birdie.in.th, 2024). Key provinces like Bangkok, Nakhon Pathom, Pathum Thani, and Ayutthaya offer strong infrastructure and customer access, making them prime locations for golf-related businesses. The golf industry generates over 12 billion baht annually through services such as green fees, caddy fees, cart rentals, equipment sales, and event

hosting (Department of Business Development, 2023; Golf Business Report, 2023). Moreover, golf courses often serve as informal venues for business meetings and networking, reinforcing their role in both micro and macroeconomic development. However, increasing competition and evolving consumer preferences pose challenges for operators. To stay relevant, golf businesses must understand customer needs and apply modern marketing strategies. Emphasizing the 7Ps of the marketing mix—product, price, place, promotion, people, process, and physical evidence—is essential for creating services that align with market expectations. Understanding the factors that influence golf course service usage in the Central region is therefore crucial. These insights support more effective business planning and contribute to the long-term sustainability of the golf tourism sector.

Research Objectives

1. To study the differences in the use of golf course services in the Central region of Thailand, classified by demographic factors.
2. To study the marketing mix factors affecting the use of golf course services in the Central region of Thailand.

Research Hypotheses

1. Users with different demographic factors have different uses of golf course services in the Central region of Thailand.
2. The marketing mix factors affect the use of golf course services in the Central region of Thailand.

Research Framework

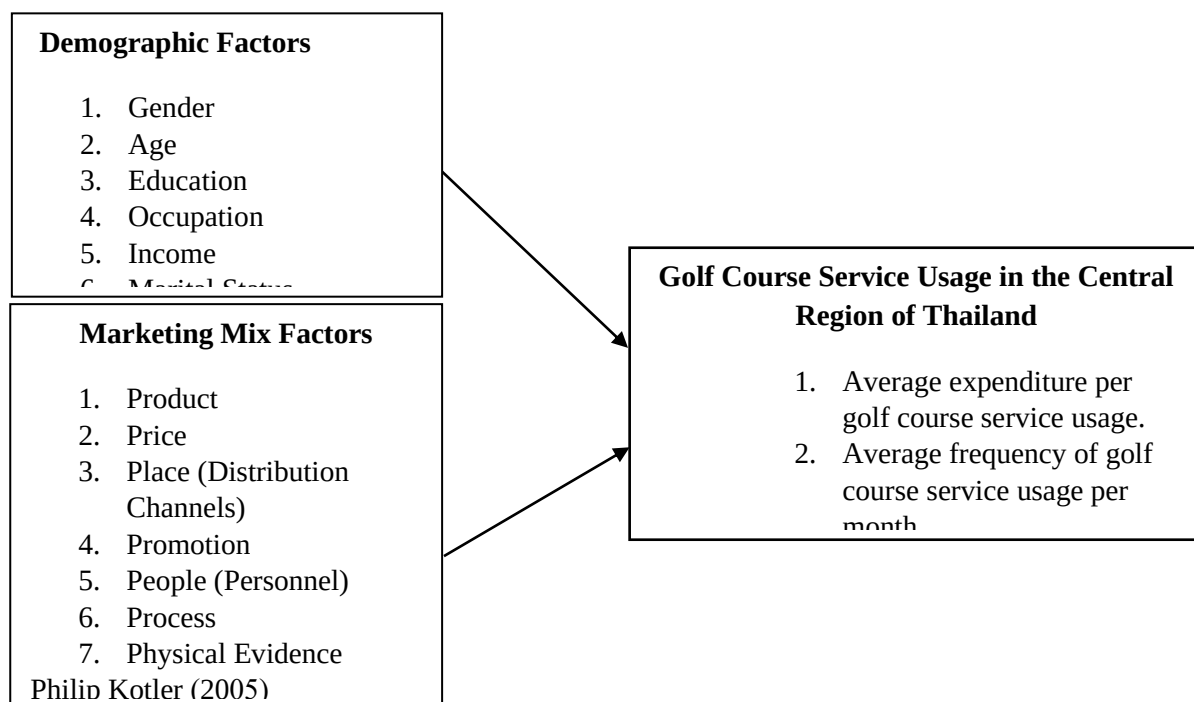


Figure 1: Research Framework

Literature Review

Concepts Regarding Demographic Characteristics: Sumaiya Naknawa (2021) defined demographics as personal characteristic data of consumers comprising gender, age, religion, marital status, education level, occupation, and income. These serve as tools to define target customer groups and structure marketing mixes to best meet the needs of the target group. Thitirat Phonphikul (2017) stated that demographic characteristics refer to the diversity and differences of the population, used to explain the behavior of the population, such as differences in gender, age, family size, education, marital status, experience, occupation, and monthly income. These elements are often used as criteria to define target groups and measure population needs, therefore dividing groups according to different demographic characteristics. Phrairwan Rattana (2023) stated that demographic characteristics—including age, gender, family life cycle, education, income, and others—play a significant role in public satisfaction with services. Changes in demographics may indicate emerging or declining importance of certain satisfaction factors, as individuals with different demographic profiles tend to have different preferences or interests in activities based on their unique characteristics. Similarly, Kotler (2013) defined demographic factors as personal attributes that influence individual behavior and decision-making. These are categorized by key demographic variables such as gender, age, family size, income, occupation, education level, religion, and ethnicity.

Concepts and Theories Regarding the Marketing Mix: Kotler (1997) stated that the marketing mix refers to controllable marketing variables or tools that companies commonly use together to satisfy the needs and wants of targeted customers. Originally, the marketing mix only consisted of four variables (4Ps): Product, Price, Place (distribution channels), and Promotion. Subsequently, three additional variables were conceived: People, Physical Evidence, and Process, to align with modern marketing concepts, particularly in service businesses. Therefore, this is collectively referred to as the 7Ps marketing mix. Anthika Kaewsiri (2017) stated that the meaning of the marketing mix is a marketing tool for service businesses, where the product is non-storable and quality cannot be controlled to be exactly the same. Therefore, it is necessary to use the marketing tools for services (7Ps), taking into account customer satisfaction, emphasizing employees, service processes, and the physical environment.

Concepts and Theories Regarding Consumer Behavior: Jarusnan Sitticharoen (2008) stated that consumer buying behavior is the study of consumer actions to understand the needs of buying or using, expressed in the form of behavior. This allows marketers to plan and strategize to target customer groups in order to meet consumer satisfaction. Chatayaporn Samerjai (2007) stated that consumer behavior refers to the behavioral or decision-making processes for purchasing, using, and evaluating the use of goods and services, which is very important for purchasing goods and services behaviorally, both in the present and in the future.

Thananyakorn Nuimuang (2023) researched the satisfaction in using golf driving range services: A case study of Baan Son golf driving range, Surat Thani Province. The study found that users of the Baan Son golf driving range with different genders and education levels had significantly different levels of satisfaction in using the golf driving range at a statistical significance level of 0.05. However, for consumers with different ages, occupations, and average monthly incomes, there was no difference in their satisfaction in using the Baan Son golf driving range. Regarding service usage behavior factors, differences in the time of day they came to use the Baan Son golf driving range and the number of golf balls used for practice resulted in significantly different satisfaction in using the Baan Son golf driving range in terms of product, promotion, personnel, and service process at a statistical significance level of 0.05.

Chotinthorn Arunothai (2023) studied the opinions of users on the marketing factors used in deciding to use the services of the Parichat International Golf Links golf course in Chonburi Province. The results of the research found that: (1) The opinions of users on the marketing factors used in deciding to use the services of the Parichat International Golf Links golf course in Chonburi Province generally placed importance at a high level. When considering each aspect, they were all at a high level. The aspect with the highest average was success in meeting needs (service process), and the aspect with the lowest average was communication (promotion), respectively. (2) The comparison of users found that users with different personal factors and different golf playing experiences had no different opinions on the importance of marketing factors in deciding to use the services of the Parichat International Golf Links golf course in Chonburi Province.

Dennapa Karaket and Supachai Supphapol (2023) studied government policies to promote sports tourism and golf businesses in Thailand 2007-2022. The research results found that: 1) Thailand has applied foreign policies regarding standards for managing golf competitions to comply with international standards. There are very few government policies to promote golf sports tourism due to limited budgets. 2) The actors in the golf course business that must cooperate in promoting golf sports tourism include the government and the private sector. Tourists choose to travel and play golf because Thailand has different prices and services from other parts of the world. 3) The golf course business helps to develop land in the area, increasing its value. The management of golf courses by the public and private sectors differs significantly in terms of marketing strategies and service prices. Most tourists choose to use the golf courses of the private sector. The demands of the golf course business operator group to the government are regarding overlapping taxes. Operators are satisfied with government policies to help support the golf course business operator group during the COVID-19 pandemic, such as the Golf Quarantine policy.

From all the concepts and theories mentioned above, including the concept of demographic characteristics, the concepts and theories regarding the marketing mix, and the concepts and theories regarding consumer behavior, the researcher used them to test the hypotheses of the research on factors affecting the use of golf course services in the Central region of Thailand.

Table 1: Summary of Related Research Studies on Factors Affecting Golf Course Service Usage

No.	Researcher / Year	Main Focus	Methodology / Sample	Key Findings Relevant to This Study
1	Sumaiya Naknawa (2021)	Definition of demographic characteristics	Documentary research	Personal attributes such as gender, age, and income are essential for identifying target markets and forming marketing strategies.
2	Thitirat Phonphikul (2017)	Demographics for market segmentation	Documentary research	Demographic factors explain population behavior and help define target groups clearly.
3	Phraiwan Rattanama (2023)	Service satisfaction related to demographics	Documentary research	Different demographic groups show varying levels of service satisfaction.
4	Kotler (2013)	Demographics and consumer behavior	Documentary research	Demographic factors significantly influence consumer decision-making.
5	Kotler (1997)	4Ps and evolution to 7Ps in service business	Documentary research	The 7Ps framework is essential for creating marketing strategies, especially in service sectors such as golf courses.
6	Anthika Kaewsiri (2017)	Marketing tools in service businesses	Documentary research	The 7Ps focus on personnel, service processes, and the physical environment to meet customer expectations.
7	Jarusnan Sitticharoen (2008)	Consumer buying behavior	Documentary research	Understanding consumer behavior helps marketers develop effective strategies to meet customer needs.
8	Chatayaporn Samerjai (2007)	Decision-making in consumer behavior	Documentary research	Studying consumer behavior enhances precision in targeting and planning.
9	Thananyakorn Nuimuang (2023)	Satisfaction with golf driving range services (Baan Son, Surat Thani)	Quantitative / Users at Baan Son driving range	Significant differences in satisfaction were found by gender and education. Time of day and number of golf balls used influenced satisfaction in product, promotion, personnel, and process dimensions.

No.	Researcher / Year	Main Focus	Methodology / Sample	Key Findings Relevant to This Study
10	Chotinthorn Arunothai (2023)	Marketing factors affecting service usage decision (Parichat International Golf Links, Chonburi)	Quantitative / Golf course users	Service process was rated highest; promotion was lowest. No significant differences were found based on personal factors.
11	Dennapa Karaket & Supachai Supphapol (2023)	Government policy for promoting golf tourism (2007–2022)	Qualitative / Policy analysis	Limited government support; private sector plays a larger role. Golf courses attract tourists with competitive pricing and quality. Golf businesses help develop land value and differ in pricing and strategies across sectors.

Research Methodology

The population and sample used in this research were individuals who had used full-service golf course facilities for playing golf rounds in the Central region of Thailand, including five provinces: Bangkok, Samut Prakan, Pathum Thani, Nakhon Pathom, and Ayutthaya. Participants were required to have used the golf course services at least once in the past six months. Since the exact population size was unknown, the sample size was calculated using the unknown population formula, with a confidence level of 95%, resulting in a total of 400 samples.

Purposive Sampling was applied to select individuals who used golf courses specifically for playing rounds. Data were collected offline through field surveys, targeting the top five provinces with the highest number of golf courses in the Central region of Thailand, totaling 58 golf courses (Birdie Golf Blog, 2024), including: (1) Bangkok: 18 courses, (2) Samut Prakan: 12 courses, (3) Pathum Thani: 11 courses, (4) Nakhon Pathom: 10 courses, and (5) Ayutthaya: 7 courses. A total of 400 samples were distributed proportionally based on the number of golf courses in each province to ensure alignment with the course density in those areas. The number of questionnaires allocated per province was calculated using the following formula:

$$\text{Number of questionnaires per province} = \frac{(\text{Total number of golf courses}) \times 400}{\text{Number of golf courses in the province}}$$

The data collection instrument used in this research was a questionnaire, consisting of 400 sets. The questionnaire was divided into 5 parts: Part 1: Preliminary screening questions for respondents. Part 2: Questions about the general information of respondents. Part 3: Questions about golf course service usage behavior in the Central region of Thailand. Part 4: Questions about marketing mix factors. Part 5: A section for respondents to express their opinions and suggestions.

The quality of the questionnaire was verified by testing for validity. The questionnaire was given to 3 experts, and the validity value had to be greater than 0.50 for the question to be considered aligned with the objectives of the research. Subsequently, the questionnaire was piloted with a sample of 30 people to determine reliability. The reliability value had to be 0.70 or higher to be acceptable, indicating a high level of reliability. The questionnaire on factors affecting the use of golf course services in the Central region of Thailand had a reliability value of 0.967.

Data analysis involved descriptive statistics for demographic characteristics, including gender, age, occupation, education level, average monthly income, and marital status, by calculating frequency and percentage. The marketing mix factors consisted of: 1) Product, 2) Price, 3) Place (Distribution Channels), 4) Promotion, 5) People (Personnel), 6) Process, 7) Physical Evidence, by calculating the mean and standard deviation. Inferential statistics involved hypothesis testing of demographic characteristics using independent samples t-tests and one-way analysis of variance. Marketing mix factors were analyzed using multiple linear regression analysis.

Research Findings

The study found that the majority of golf course users in the Central region of Thailand were male, with 264 people (66.26%). 104 were in the age range of 18–40 years (26.00%) and 104 were over 60 years old (26.00%). 224 had marital status married (56.00%), 103 were business owners (25.75%), 208 had an education level higher than or equivalent to a master's degree (52.00%), and 88 had an average monthly income between 60,001 – 80,000 baht (22.00%).

The study of the service usage behavior of golf course users in the Central region of Thailand found that most had an average expenditure on golf course services of 2,000 baht per round, with 80 people (20.00%). The average frequency of use was 2 times per month, with 179 people (44.75%). The reasons for using golf course services were to meet, build relationships, and socialize, with 128 people (32%). The person influencing the use of golf course services was a friend/colleague, with 168 people (42%). The time of day for using the golf course was morning (06:00-10:00 AM), with 192 people (48%). The area selected for using the golf course was a course recommended by a friend, with 144 people (36%). The reason for choosing a golf course was that the price was appropriate for the quality, with 168 people (42%). The channel for booking to use the golf course was direct phone booking, with 280 people (70%).

The marketing mix factors, Product overall had the highest mean ($= 4.33$, S.D. = 0.56), with the issue of the equipment and facilities of golf courses in the Central region of Thailand being ready and complete having the highest mean ($= 4.34$, S.D. = 0.65) and the issue of golf courses in the Central region of Thailand being of standard quality and well maintained having the lowest mean ($= 4.32$, S.D. = 0.65).

Price, overall had the highest mean ($= 4.16$, S.D. = 0.78), with the issue of the green fee and other expenses of golf courses in the Central region of Thailand being appropriate compared to the quality received having the highest mean ($= 4.18$, S.D. = 0.71) and the issue of golf courses in the Central region of Thailand being of standard quality and well maintained having the lowest mean ($= 4.32$, S.D. = 0.65).

Place, overall had the highest mean ($= 4.19$, S.D. = 0.86), with the issue of golf courses in the Central region of Thailand being easily accessible and convenient to travel to having the highest mean ($= 4.38$, S.D. = 0.66) and the issue of having agents or networks providing golf course booking services in the Central region of Thailand comprehensively having the lowest mean ($= 4.02$, S.D. = 1.01).

Promotion, overall had the highest mean ($= 4.00$, S.D. = 0.89), with the issue of organizing sales promotion activities such as golf competitions or special packages helping to attract customers to choose to use golf courses in the Central region of Thailand having the highest mean ($= 4.06$, S.D. = 0.84) and the issue of promotions or privileges from credit cards or memberships helping customers decide to choose golf courses in the Central region of Thailand having the lowest mean ($= 3.94$, S.D. = 1.05).

People, overall had the highest mean ($= 4.27$, S.D. = 0.73), with the issue of staff and caddies of golf courses in the Central region of Thailand being professional and providing polite service having the highest mean ($= 4.34$, S.D. = 0.71) and the issue of personnel of golf courses in the Central region of Thailand being able to solve problems and provide services efficiently having the lowest mean ($= 4.22$, S.D. = 0.81).

Process, overall had the highest mean ($= 4.33$, S.D. = 0.72), with the issue of the service process of golf courses in the Central region of Thailand having good and consistent standards having the highest mean ($= 4.38$, S.D. = 0.72) and the issue of the process of booking and using the services of golf courses in the Central region of Thailand being convenient and uncomplicated having the lowest mean ($= 4.26$, S.D. = 0.72).

Physical Evidence, overall had the highest mean ($= 4.35$, S.D. = 0.71), with the issue of the facilities in golf courses in the Central region of Thailand, such as restaurants, locker rooms, being of good quality and sufficient having the highest mean ($= 4.46$, S.D. = 0.61) and the issue of golf courses in the Central region of Thailand having a beautiful and playable atmosphere and scenery having the lowest mean ($= 4.16$, S.D. = 0.78).

Table 2: Summary of Hypothesis Testing Results on Differences in Golf Course Service Usage in the Central Region of Thailand, Classified by Demographic Characteristics.

	Gender	Age	Education	Occupation	Avg. Monthly Income	Marital Status
Statistical Test	t-test	f-test	f-test	f-test	f-test	f-test
Level of Measurement	Nominal	Ordinal	Ordinal	Nominal	Ordinal	Nominal
Average Expenditure	0.004**	0.007**	0.000**	0.000**	0.000**	0.000**
Average Frequency	0.988	0.000**	0.238	0.000**	0.000**	0.041*

Remark: *Significant at the 0.05 level. **Significant at the 0.01 level.

Results of Hypothesis Testing on Differences in Golf Course Service Usage in the Central Region of Thailand, Classified by Demographic Characteristics:

The average expenditure per golf course service usage, it was found that golf course users in the Central region of Thailand with different demographic characteristics will have different patterns of service usage, including: gender, age, education level, occupation, average monthly income, and marital status. The average frequency of golf course service usage per month, it was found that golf course users in the Central region of Thailand with different demographic characteristics will have different patterns of service usage, including: age, occupation, average monthly income, and marital status. However, golf course users in the Central region of Thailand with different demographic characteristics will have similar patterns of service usage in terms of: gender and education level. The differences among the groups are summarized as follows.

Users with different genders showed a statistically significant difference in average spending per visit at the .01 level, with females spending more than males. However, no significant difference was found in monthly usage frequency.

Users of different age groups showed significant differences in both average spending per visit and monthly usage frequency at the .01 level. Those aged 60 and above had the lowest average spending, while the 51–60 age group had the lowest usage frequency.

Users with different education levels had significantly different average spending per visit at the .01 level, with those holding a master's degree or higher spending more. No significant difference was found in usage frequency.

Users with different occupations showed statistically significant differences at the .01 level in both spending and frequency, with business owners reporting the highest average spending and usage frequency.

Users with different income levels also showed significant differences at the .01 level in both average spending per visit and frequency of use. Those earning over 100,001 THB spent and used the services most frequently.

Users with different marital statuses exhibited significant differences in both spending and frequency. Married users spent more on average (significant at the .01 level), while single and divorced users reported higher usage frequency (significant at the .05 level).

Table 3: Multiple Linear Regression Analysis of Marketing Mix Factors Affecting Golf Course Service Usage in the Central Region of Thailand, Regarding Average Expenditure per Golf Course Service Usage.

Marketing Mix Factors	Unstandardized Coefficients		Standard Coefficients		t-test	p-value
	B	Std. Error	Beta	Relative Importance		
Constant	3047.178	518.854			5.873	0.000**
Physical Evidence	1027.704	209.705	0.477	Highest	4.901	0.000**
Product	-1071.876	210.503	-0.469	Highest(Negative)	-5.092	0.000**
Price	733.018	172.814	0.405	High	4.242	0.000**

Marketing Mix Factors	Unstandardized Coefficients		Standard Coefficients		t-test	p-value
	B	Std. Error	Beta	Relative Importance		
People (Personnel)	-687.803	188.609	-0.360	Moderate(Negative)	-3.647	0.000**
Process	-347.388	173.955	-0.169	Low(Negative)	-1.997	0.047*
Place	259.745	140.466	0.145		1.849	0.065
Promotion	170.618	133.640	0.106		1.277	0.202
R = 0.388, R ² = 0.150, Adjusted R ² = 0.135, F = 9.913, P = 0.000**						

Remark: *Significant at the 0.05 level. **Significant at the 0.01 level.

Results of Hypothesis Testing: Marketing Mix Factors Affecting Golf Course Service Usage in the Central Region of Thailand (Average Expenditure per Use)

The multiple regression analysis revealed that several marketing mix factors significantly influence the average expenditure per golf course service usage in the Central region of Thailand. These factors include Product, Price, People, Physical Evidence, and Process. The adjusted coefficient of determination (Adjusted R²) was 0.135, indicating that 13.5% of the variance in the dependent variable can be explained by these predictors.

Among these, Physical Evidence exerted the strongest positive influence ($\beta = 0.477$), followed by Price ($\beta = 0.405$). Conversely, Process ($\beta = -0.169$), People (Personnel) ($\beta = -0.360$), and Product ($\beta = -0.469$) showed negative effects, with Product having the most substantial negative impact.

Based on the preliminary diagnostic tests for the multiple linear regression model, the Variance Inflation Factor (VIF) values of all independent variables ranged from 2.82 to 4.49, which are below the critical threshold of 5. Additionally, the Tolerance values were all above 0.1. These results indicate that multicollinearity is not present among the independent variables used in the analysis. Furthermore, the Durbin-Watson statistic was found to be 0.3286, suggesting a potential positive autocorrelation of the residuals. However, since the data used in this study are cross-sectional in nature, this autocorrelation is unlikely to significantly affect the interpretation of the regression results.

Table 4: Multiple Linear Regression Analysis of Marketing Mix Factors Affecting Golf Course Service Usage in the Central Region of Thailand, Regarding Average Frequency of Golf Course Service Usage per Month.

Marketing Mix Factors	Unstandardized Coefficients		Standard Coefficients		t-test	p-value
	B	Std. Error	Beta	Relative Importance		
Constant	3.171	0.425			7.470	0.000**
Price	0.965	0.141	0.649	Highest	6.827	0.000**
Process	-0.820	0.142	-0.484	High(Negative)	-5.763	0.000**
Product	-0.578	0.172	-0.307	Moderate(Negative)	-3.356	0.001**
Promotion	0.318	0.109	0.241	Low	2.911	0.004**
Place	-0.329	0.115	-0.223	Low(Negative)	-2.864	0.004**
People (Personnel)	0.114	0.154	0.072		0.736	0.462
Physical Evidence	0.126	0.172	0.071		0.736	0.462
R = 0.398, R ² = 0.159, Adjusted R ² = 0.144, F = 10.554, P = 0.000**						

Remark: *Significant at the 0.05 level. ** Significant at the 0.01 level.

Results of Hypothesis Testing: Marketing Mix Factors Affecting Golf Course Service Usage in the Central Region of Thailand (Average Frequency per Month)

The multiple regression analysis revealed that several marketing mix factors significantly influence the average frequency of golf course service usage per month in the Central region of Thailand. These include Product, Price, Place (Distribution Channels), Promotion, Process, and

Physical Evidence. The adjusted coefficient of determination (Adjusted R^2) was 0.144, indicating that 14.4% of the variance in the dependent variable can be explained by these predictors.

Among these, Price exerted the strongest positive influence ($\beta = 0.649$), followed by Promotion ($\beta = 0.241$) and Physical Evidence ($\beta = 0.071$). Conversely, Place ($\beta = -0.223$), Product ($\beta = -0.307$), and Process ($\beta = -0.484$) showed negative effects, with Process having the most substantial negative impact.

Based on the preliminary diagnostic tests for the multiple linear regression model used to analyze golf course service frequency, the Variance Inflation Factor (VIF) values of all independent variables ranged from 3.19 to 4.49, which are below the commonly accepted threshold of 5. Additionally, the Tolerance values were all above 0.1, indicating that multicollinearity was not present among the predictors. The Durbin-Watson statistic was found to be 0.2968, suggesting the presence of positive autocorrelation in the residuals. However, given that the data in this study are cross-sectional in nature, this autocorrelation is unlikely to significantly affect the interpretation or validity of the regression results.

Conclusion and Discussion

The study of the general information of golf course users in the Central region of Thailand found that most are male, aged between 18-40 years and over 60 years, are business owners, have an education level higher than or equivalent to a master's degree, have an average monthly income between 60,001 – 80,000 baht, and are married.

Discussing the analysis of the differences of golf course users in the Central region of Thailand, classified by demographic characteristics, it was found that users with different genders have different average expenditures for using golf course services per time, which is consistent with the research of Chakachat Sukphoepet (2022), who studied the factors affecting the decision to use the All Star Golf Complex golf driving range, finding that gender has an effect on the decision to use the golf driving range services differently.

age, it was found that users with different ages have different service usage patterns. Those aged 60 years and over have different expenditures for using golf course services in the Central region of Thailand compared to users aged 18 – 40 years and different from users aged 51 – 60 years, which is consistent with the research of Karan Panyo (2020), who studied the potential for health tourism of golf courses in the upper Northern region, finding that older adults tend to use golf course services in a way that focuses on health and relaxation more than other age groups.

Regarding education level, it was found that users with a postgraduate degree or higher have different average expenditures for using golf course services compared to those with a bachelor's degree or lower. This finding is consistent with the research of Boonyada Khleuabap (2015), who studied the marketing mix factors influencing the decision to use golf course services in Hua Hin District, and found that different education levels affect the importance placed on pricing factors when choosing golf course services.

Regarding occupation, it was found that users with different occupations have different average expenditures for using golf course services. This is consistent with the research of Chakachat Sukphoepet (2022), who studied the factors influencing the decision to use the All Star Golf Complex driving range. The study found that occupation and average monthly income affect the importance users place on selecting a golf driving range.

Regarding average monthly income, it was found that users with different average monthly incomes will have different service usage patterns. For example, users with an average monthly income of 40,001 - 60,000 baht have different expenditures for using the service than users with an average monthly income of 80,001 - 100,000 baht, which is consistent with the research of Chakachat Sukphoepet (2022), who studied the factors affecting the decision to use the All Star Golf Complex golf driving range, finding that occupation and average monthly income affect the importance of the decision to use the golf driving range services.

Regarding marital status, it was found that users with different marital statuses have different average expenditures for using golf course services. This finding is consistent with the research of Khanittha Wattanadilokkul (2014), who studied the factors influencing the decision to play golf

among potential users in Thailand. The study found that marital status affects the decision to play golf, which may reflect differences in spending behavior between married and single individuals.

Discussing the analysis of the marketing mix factors affecting average expenditure and frequency of golf course service in the central region of Thailand, Average Expenditure per Use: From the multiple linear regression results, Physical Evidence had the highest standardized coefficient ($\beta = 0.477$), indicating that the physical environment of the golf course—such as beauty, cleanliness, amenities, and atmosphere—strongly influences customer willingness to spend. This is consistent with the servicescape theory (Bitner, 1992), which asserts that well-designed physical environments can enhance perceived value and customer satisfaction, ultimately increasing spending. The next most influential factor was Price ($\beta = 0.405$), showing that when service prices are perceived as fair and aligned with service quality, users are more willing to pay. This aligns with perceived value theory (Zeithaml, 1988), emphasizing that pricing directly affects customers' cost-benefit judgment. In contrast, Product ($\beta = -0.469$), People ($\beta = -0.360$), and Process ($\beta = -0.169$) had negative beta coefficients. This inverse relationship suggests that users who perceive high quality in these areas might feel less compelled to spend more—possibly because they are satisfied with standard packages and feel no need for upgrades or additional purchases. This is supported by findings from Hasdee (2023) and Arunothai (2023), who noted that when customers' basic expectations are met, it does not necessarily lead to increased spending. Thus, while the physical and pricing aspects drive higher expenditure, improvements in core service quality (product, people, and process) should be strategically communicated to avoid undervaluation and ensure that customers recognize their added value.

Average Frequency of Use per Month: The most influential factor on usage frequency was Price ($\beta = 0.649$), confirming that affordable and value-based pricing encourages repeated visits. This supports the findings of Yiamboonya et al. (2021), who emphasized pricing as a key driver in service return rates. Promotion ($\beta = 0.241$) was the second strongest factor, indicating that targeted marketing campaigns, special deals, and loyalty programs can successfully stimulate usage. This is consistent with Kotler and Keller's (2012) view that promotion increases brand recall and influences consumer behavior. Physical Evidence had a smaller but positive influence ($\beta = 0.071$), suggesting that good ambiance contributes moderately to encouraging returns. On the other hand, Process ($\beta = -0.484$), Product ($\beta = -0.307$), and Place ($\beta = -0.223$) all showed negative effects. These findings imply that when these service elements are already perceived as efficient, high-quality, or conveniently located, users might be satisfied with infrequent visits or choose only essential services. This mirrors the logic found in service fatigue theory, where over-perfection may reduce the perceived need for frequent consumption. As noted by Yiamboonya et al. (2021), complex procedures and difficult contact channels reduce the likelihood of repeat visits. Therefore, simplifying service processes and creating seamless experiences could counteract this effect and boost engagement.

In both expenditure and frequency models, the results show a pattern where perceived quality in core services (product, process, people) does not always equate to increased usage or spending—in fact, it may lower them when baseline expectations are already satisfied. This underlines the importance of strategic service communication and value framing, ensuring that improvements are not just delivered, but also perceived as worth returning and paying for.

Suggestions

Regarding Demographic Factors: From the research results, it was found that the demographic characteristics of users, such as gender, age, income, and education level, have a clear influence on the behavior of using golf course services in terms of expenditure and frequency of use. Therefore, operators should use this information to design services and develop marketing strategies that are appropriate for each target group. For example, working-age groups want fast and worthwhile service, while the elderly prioritize convenience and health. A variety of packages and prices should be set, such as budget packages for low-income individuals and premium packages for high-income groups, to increase access and create higher satisfaction in each target group.

Regarding Marketing Mix Factors: From the research results, it was found that the physical characteristics of the golf course, such as beauty, cleanliness, and facilities, are factors that have a great impact on the expenditure of users. Therefore, operators should prioritize the development and

maintenance of the course in a good, clean, and safe environment, with clear information signs to create a good image and encourage customers to return to use the service repeatedly. Price is also another factor that affects both the frequency and decision to use the service. Operators should manage costs efficiently and set reasonable prices, reflecting the quality of service that customers receive.

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Evaluating the Reliability of a Questionnaire on Behavioral Intention towards Automated Parking Systems

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Abstract

This research investigates the primary elements that affect user acceptance of Automated Parking Systems (APS) in metropolitan environments, addressing gaps in prior research by applying UTAUT2 to this emerging technology. The conceptual model consists of ten latent variables and twenty-nine observed variables. A survey tool was created to evaluate these constructs and observed variables, with data gathered from 30 individuals. This research evaluates the instrument's reliability by employing Cronbach's alpha coefficient as a indicator of reliability assessment. This investigation enhances the comprehension of the elements influencing user adoption of APS technology in urban settings. The insights can help APS developers focus on enhancing user trust and minimizing perceived risks. Urban planners could leverage these findings to promote APS as a sustainable solution, reducing congestion and optimizing land use in dense urban environments. Data was collected through a survey questionnaire consisting of 79 items. The evaluation of the constructs' reliability employed Cronbach's alpha coefficient, indicating that all constructs exceeded the acceptable threshold of 0.732. This outcome validates the reliability of the instrument and the sufficiency of the findings. As a result, the study asserts that the conceptual framework serves as a reliable tool for understanding the factors that affect behavioral intentions concerning the use of automated parking systems. The conceptual framework along with the findings from the development and pilot testing of the instrument, with a particular emphasis on showcasing the reliability (Cronbach's alpha) of the survey tool intended for a more extensive forthcoming study on user acceptance of APS. This serves as an essential foundational step for executing the primary research utilizing SEM.

Keywords: Automated Parking System (APS), Extended Unified Theory of Acceptance and Use of Technology (UTAUT2), Trust in Technology (TT), Perceived Risk of Use (PR)

Introduction

The global population is witnessing steady annual growth. Forecasts suggest that the worldwide population is expected to increase in the next fifty to sixty years, potentially attaining approximately 10.3 billion by the mid-2080s, up from an estimated 8.2 billion in 2024. In that year, a total of 63 nations and regions, representing 28 percent of the global population, attained their population maximum prior to 2024. This cohort comprises nations such as the Russian Federation, China, Germany, and Japan (United Nations Department of Economic and Social Affairs, 2024).

The baseline forecast suggests that the worldwide economy is projected to maintain an upward trajectory rate of 3.2 percent for both 2024 and 2025, aligning with the rate recorded in 2023. Furthermore, the anticipated global growth rate for five years ahead is 3.1 percent, marking the lowest forecast in several decades (International Monetary Fund, 2024)

The rise in population and economic activity has resulted in a greater demand for transportation options. In 2023, global vehicle production exceeded the figures recorded in 2019. The COVID-19 global health crisis led to a notable decrease in vehicle manufacturing in 2020, decreasing from 91.8 million units in 2019 to 77.4 million units. Nevertheless, by 2023, vehicle production experienced a recovery, achieving a total of 93.5 million units (OICA, 2024).

As a result, parking availability has become a significant concern for many large urban areas. The limited availability of land for development in both rural and urban areas has become a precious and sought-after resource, particularly in recent years. With the growing global demand for transportation, this issue has become a pressing concern, contributing to increased traffic congestion and inadequate parking options. Ineffective management of parking facilities, encompassing on-street spaces, parking lots, and garages (both public and private) leads to an excessive number of vehicles parked in inappropriate areas. This misallocation contributes to significant traffic congestion as cars overflow into local street (Luyekela, 2016). The challenges posed by this growth are placing considerable strain on parking regulations and discipline within the cities. Numerous areas are experiencing a deficit in parking availability as a result of swift urban development and an increase in vehicle ownership, underscoring the importance of land use that enhances quality of life through creative and effective parking strategies.

The major purpose of this study is to investigate and assess the important determinants impacting the adoption of automated parking systems (APS) by vehicle users, with a particular focus on environments within Central Business Districts (CBD). The challenge of parking space is a widespread issue encountered by many residential and commercial areas, a situation prevalent in numerous countries today. Automated Parking Systems (APS) offer a viable solution to this problem. The advantage of APS are reducing traffic jam, saving time, enhancing parking safety, conserving fuel and reducing operation cost (Mikšíková et al., 2023; Mubashirin & Mahmud, 2017), making them increasingly popular as a sustainable and space-efficient option for urban settings.

A survey instrument, adapted from validated UTAUT2-related studies, was developed to assess 10 latent and 29 observed variables. The questionnaire's reliability was determined through the application of Cronbach's alpha; however, it is advisable to conduct further validation via factor analysis. Furthermore, this study seeks to enhance the comprehension of the diverse factors that affect the intention to utilize the Automated Parking System (APS) by employing the UTAUT2 framework.

Theoretical background

The investigation of behavioral intentions regarding technology usage has recently attracted considerable interest from researchers and professionals globally. This topic has witnessed a substantial increase in the associated literature concerning various technological products; however, there is a notable scarcity of literature specifically addressing automated parking systems. This segment outlines the theoretical frameworks and concepts related to the intention to utilize automated parking system (APS), specifically from the perspective of UTAUT2.

1. Automated Parking System (APS)

Automated parking systems are generally defined as parking facilities that utilize computer-controlled mechanisms for the automated loading and unloading of vehicles, employing advanced technological devices that operate independently of human involvement. A significant benefit of these systems is their ability to minimize the required floor space in comparison to conventional parking garages (Mikšíková et al., 2023). This automated system, characterized by minimal human involvement, is referred to as a fully automated parking system (APS) (Serpen & Debnath, 2019). APS is acknowledged for its efficient use of vertical space, a reduced physical footprint in comparison to conventional parking garages, and lower construction expenses (Sajeev et al., 2015).. Automated parking systems necessitate less area than traditional parking systems with equivalent capacity. Furthermore, automated parking systems provide the advantage of decreasing pollution (Khudhur et al., 2020). Certain Automated Parking Systems (APS) are appropriate for residential garages. This type of compact system is designed solely to elevate vehicles vertically. Unlike fully automated parking systems, which are primarily managed by programmable logic controllers (PLC), this smaller system operates through basic mechanical and straightforward electrical circuits.

There are several types of APS: Robotic APS, Pallet APS, AGV, Puzzle, Silo, Tower, Rotary, Warehouse-like, Stacker, Colossal and so on (Li & Miao, 2020; Mubashirin & Mahmud, 2017; Sebestyen & Fatu, 2014; Serpen & Debnath, 2019). Various types of systems are appropriate for distinct building designs and objectives. Some goals include compliance with local building regulations.

2. UTAUT2 and The Constructs

The literature on technology acceptance encompasses a rich array of theories and models, including the Theory of Reasoned Action (TRA), the Technology Acceptance Model (TAM), the Motivational Model (MM), the Theory of Planned Behavior (TPB), the Combined TAM and TPB (C-TAM-TPB), the Model of PC Utilization (MPCU), the Innovation Diffusion Theory (IDT), and the Social Cognitive Theory (SCT). These eight theoretical frameworks are recognized as foundational to the development of the UTAUT and UTAUT2.

UTAUT2 was created by Viswanath V., James Y. L. Th, and Xin Xu (Venkatesh et al., 2012). While the UTAUT model effectively accounts for the technology adoption by companies, it required modifications and enhancements to adequately address consumer technology adoption, leading to the development of UTAUT2 (Cabrera-Sánchez et al., 2021).

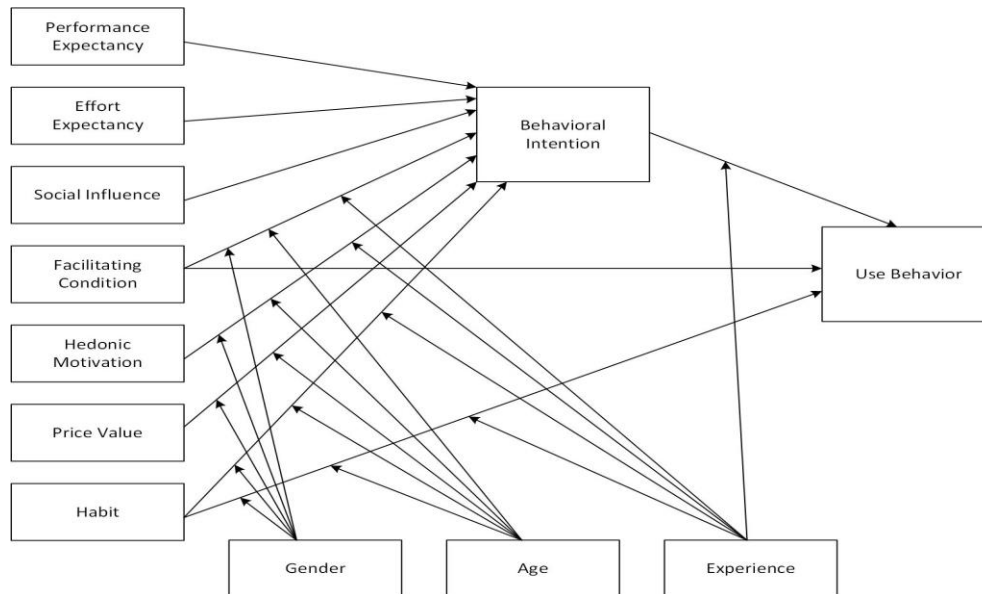


Figure 1: UTAUT2

The advancement of technology has spurred growth in various sectors, including the APS. Users can utilize technological innovations to enhance the quality of urban life. Therefore, this research incorporates an element of the UTAUT2 framework established by Venkatesh to investigate the factors that affect the acceptance of APS technology. Furthermore, this study introduces trust in technology, environmental consciousness and perceived risk as mediating variables. The model consists of 7 unique factors that impact the dependent variable of behavioral intention (BI), which are social influence (SI), performance expectancy (PE), effort expectancy (EE), hedonic motivation (HM), facilitating conditions (FC), price value (PV), and habit (HB).

2.1 Performance Expectancy (PE)

Users' beliefs regarding the influence of a specific system on their job performance.

2.2 Effort Expectancy (EE)

Effort expectancy is characterized as the level of simplicity related to utilizing the system.

2.3 Social Influence (SI)

Social influence is defined as the perception an individual has that significant others expect them to adopt the new system.

2.4 Facilitating Condition (FC)

Pertains to the extent to which an individual perceives that the necessary technical and organizational infrastructure exists to support the effective utilization of the system.

2.5 Price Value (PV)

Price value refers to the mental assessment an individual makes when weighing the perceived advantages of applications against the financial expenses associated with their use

2.6 Hedonic Motivation (HM)

Hedonic attributes are closely linked to family, home, and recreational activities, focusing on the enjoyment, happiness, and entertainment derived from utilizing information systems or applications (van der Heijden, 2004).

2.7 Habit (HB)

Habit is characterized by the degree to which individuals perform actions instinctively as a consequence of substantial learning experiences.

Exclusion

In this research, the constructs of hedonic motivation and habit from UTAUT2 will be excluded due to insights gained from previous studies. (Tamilmani, Rana, & Dwivedi, 2019; Tamilmani, Rana, Prakasam, et al., 2019).

This study will incorporate three additional variables to serve as mediators and one moderator.

2.8 Trust in Technology (TT)

Trust is essential for the successful completion of any transaction. In situations where users do not have direct support from employees, their trust in technology plays a crucial role, enabling them to co-create services.

2.9 Perceived Risk of Use Technology (PR)

Perceived risk of use technology is characterized as the consumer's awareness of potential adverse outcomes that could result from participating in online transactions (Kim et al., 2008).

2.10 Environmental Consciousness (EC)

Demonstrating a robust commitment to environmental stewardship, actively promoting initiatives aimed at safeguarding and conserving the environment and encouraging others to adopt similar practices.

2.11 Number of parking space and car (NC) as moderator

Recent parking space and the potential for vehicles within the property highlight the influence of the quantity of cars in an office on user acceptance. This suggests that an increased number of cars may promote adoption, given the constraints associated with conventional parking techniques.

Latent and Observed Variable

The UTAUT2 model serves as the primary theoretical framework for analyzing user acceptance of APS. To align more closely with the context of the study, an additional component has been incorporated into the framework, namely, the company factor, which pertains to the current and anticipated number of vehicles on the premises. All theoretical constructs were applied utilizing validated multi-item scales. The scales corresponding to the UTAUT2 constructs, including performance expectancy, effort expectancy, social influence, facilitating conditions, price value and behavioral intention, were derived from the previous scholars' works (Choi & Ji, 2015; Featherman & Pavlou, 2003; Macedo, 2017; Venkatesh et al., 2012), with minor modifications made. Special care was taken to maintain the original intent of the questions throughout the rephrasing process.

This study aims to create a tool that examines a conceptual framework for enhancing user acceptance of automated parking systems. The framework comprises 10 latent variables and 29 observed variables, as illustrated in Figure 2.

Core Construct of UTAUT2

- Performance Expectancy (PE) The extent to which an individual believes that the use of APS will improve their quality of life is captured by the idea that employing APS removes the need to spend time looking for parking spots, thereby saving valuable time.
- Effort expectancy (EE) The perceived simplicity of use and the general user-friendliness of the APS are significant
- Social influence (SI) The impact of social factors on an individual's decision to utilize APS is an important element to consider.

- Facilitating Condition (FC) Sufficient resources and support are crucial for the effective utilization of the APS, which encompasses access to user manuals, training programs, technical assistance, and the requisite infrastructure.
- Price Value (PV) The financial consequences and pricing structure can significantly affect an office owner's willingness to adopt APS.

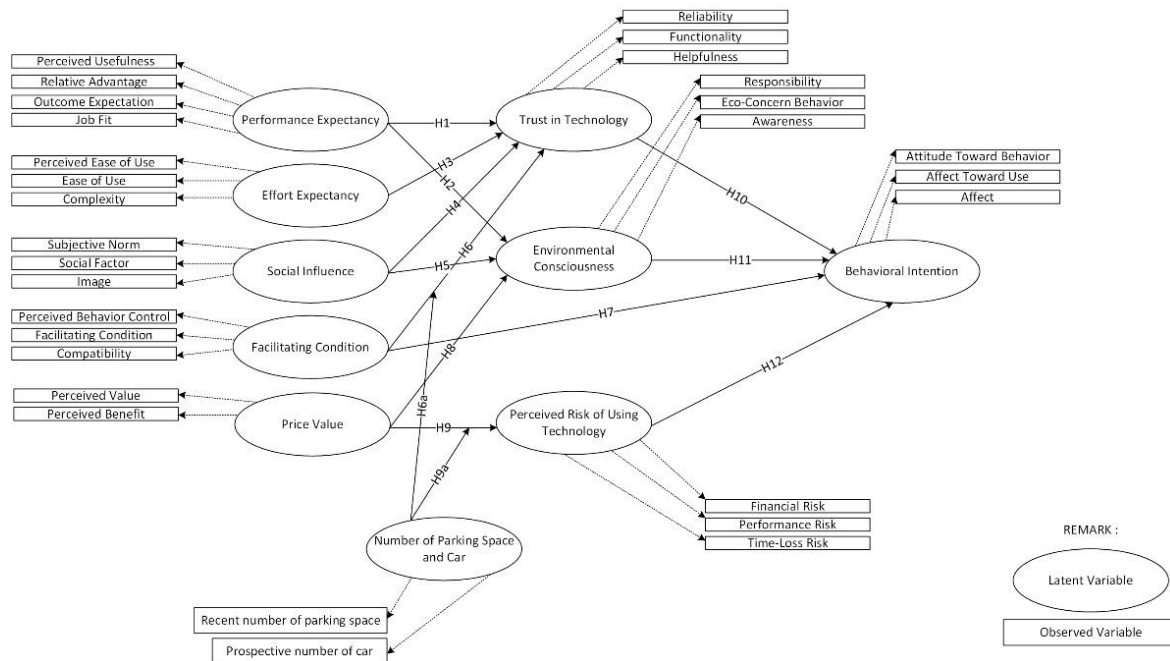


Figure 2: Conceptual Framework

The summary of latent and observed variable shown follow.

- Performance Expectancy (PE) associated with observed variable “Perceived Usefulness, Relative Advantage, Outcome Expectation and Job Fit”
- Effort Expectancy (EE) associated with observed variable “Perceived Ease of use, Ease of Use, and Complexity”
- Social Influence (SI) associated with observed variable “Social Factor, Subjective Norm and Image”
- Facilitating Condition (FC) associated with observed variable “Perceived Behavioral Control, Facilitating Condition and Compatibility”
- Price Value (PV) associated with observed variable “Perceived Value and Perceived Benefit”
- Trust in Technology (TT) associated with observed variable “Reliability, Functionality and Helpfulness”
- Perceived Risk of Use Technology (PR) associated with observed variable “Financial Risk, Performance Risk and Time-Loss Risk”
- Environmental Consciousness (EC) associated with observed variable “Responsibility, Eco-Concern Behavior and Awareness”
- Behavioral Intention (BI) associated with observed variable “Attitude Toward Behavior, Affect Toward Use and Affect”
- Number of parking space and car (NC) associated with observed variable “Recent number of parking space and Prospective number of car”

Data collection, Reliability, and Validity

This study investigated constructs and observed variables, focusing on their reliability and validity. Data were collected from 30 participants who have experience using APS. While this provides initial insights, future research should expand the sample size for more robust statistical analysis and generalizability. A survey questionnaire comprising 79 items employed a 5-point Likert scale, ranging from 5 ('strongly agree') to 1 ('strongly disagree'). The research aimed to identify participants who have previously utilized APS through random sampling in an online format. The target demographic consists of SME offices located in Bangkok, with a particular emphasis on owners and managers. The main study is designed to include a sample size of 435 participants, which is justified by the criteria established for Structural Equation Modeling (SEM). The sampling technique intended for the primary research is cluster sampling. Additionally, a pilot study will involve a sample of 30 participants, specifically aimed at testing the reliability of the instrument.

The structure of the questionnaire is outlined, comprising sections dedicated to demographics, fundamental knowledge of APS, latent variable inquiries, and suggestions, along with an assessment of the Quality of the Instrument. The Validity Measurement is specifically conducted through the Item of Congruence (IOC) evaluated by a panel of experts, with an acceptable threshold set at greater than 0.5. All questions successfully met the IOC criteria as determined by expert assessment. The statistical analyses planned for the main study encompass both descriptive and inferential statistics, specifically Structural Equation Modeling (SEM). SEM will facilitate hypothesis testing and the examination of relationships among latent variables, thereby further substantiating the conceptual framework and the instrument development efforts detailed in this paper.

This paper outlined the observed variables corresponding to each latent variable to enhance the accuracy of the conceptual framework. Reliability was assessed using Cronbach's alpha coefficient. As shown in Table 2, the constructs exceeded the minimum acceptable threshold of 0.732, indicating that the findings are satisfactory, as a Cronbach's alpha score of 0.7 or higher for the questionnaire is deemed to indicate adequate reliability (Pinitkit & Chakkavittumrong, 2021).

Table 1: Cronbach's Alpha Coefficient (George & Mallery, 1999)

Cronbach's Alpha (α)	Internal consistency
≥ 0.9	Excellent
0.8 – 0.9	Good
0.7 – 0.8	Acceptable
0.6 – 0.7	Questionable
0.5 – 0.6	Poor
≤ 0.5	Unacceptable

Table 2: Outlines of Latent Variables and Reliability Assessment

Construct	Cronbach's Alpha	Level
Performance Expectancy	0.791	Acceptable
Effort Expectancy	0.840	Good
Social Influence	0.902	Excellent
Facilitating Condition	0.836	Good
Price Value	0.832	Good
Trust in Technology	0.937	Excellent
Perceived Risk of Using Technology	0.732	Acceptable
Environmental Consciousness	0.773	Acceptable
Behavioral Intention	0.879	Good

Conclusion and Discussion

The research successfully created a tool to analyze the conceptual framework titled "Adopting Automated Parking Systems: User Acceptance in Bangkok's SME Office Context" while also evaluating its reliability. The findings indicate that effort expectancy and social influence significantly affect APS adoption, aligning with previous UTAUT2 studies. However, the unique role of trust in technology suggests additional factors specific to APS contexts require further exploration.

Data was gathered using a survey questionnaire of 79 items, which was distributed to 30 participants. The assessment of constructs' reliability was using Cronbach's alpha coefficient, revealing that all constructs surpassed the acceptable threshold of 0.732.

This finding confirms the reliability of the tool and the adequacy of the results. Consequently, the study establishes that the conceptual framework is a dependable resource to comprehend the elements that influence behavioral intentions regarding the utilization of automated parking systems. The insights gained from this research are significant for scholars and professionals engaged in urban planning, transportation, and parking management. Future research should include larger, diverse samples and apply Structural Equation Modeling (SEM) to explore mediating effects of trust and perceived risk. Additionally, comparative studies across different urban environments would enhance generalizability of the findings.

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