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Exploring the impact of online payment methods on consumer behavior: A study of Generation X in Thailand using structural equation modeling

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ABSTRACT

This research investigates how different online payment methods impact the behavior of consumers, the efficiency of banking services, and the overall economic growth of the e-commerce industry. The study focuses on how Generation X online shoppers in Thailand perceive and use online financial services. A survey conducted between January and April 2023 gathered data from 400 participants. By using statistical methods like mean rating, standard deviation, and structural equation modeling (SEM), the study revealed important insights. While the ease of using online services did not directly affect transaction behavior, the study found that the perceived usefulness indirectly influenced behavior through ease of use, highlighting the importance of usefulness as a mediator. By enhancing the perceived usefulness of online financial services, businesses can strengthen this mediating role between ease of use and service usage. This strategic approach can enhance user engagement, foster loyalty, and promote early adoption of online financial services.

1. Introduction

Electronic commerce (e-commerce) is continuously growing due to the advancement of the Internet network and information technology, which has led to a change in people's way of life. Additionally, the occurrence of the coronavirus (COVID-19) pandemic has further accelerated this growth. The explosive growth of e-commerce in recent years has led to the emergence of numerous new online payment systems and methods of online banking (Hiep et al., 2023). The pandemic was one reason why many nations immediately embraced digital technologies and financial technology (FinTech). Today's innovations in financial technology have caused tremendous evolution in the global economy, particularly in the financial sector. Several rising economies are on the verge of huge revolutions in digital financial transactions and payment systems because of increased automation, network proliferation, and the Internet. The FinTech sector is expanding, and with it, the use of digital payment methods has become more common and accepted. As payment systems increasingly go digital, people are moving away from traditional cash-based methods towards cashless and contactless technologies (Patil et al., 2020)

Thailand is gradually progressing towards a cashless society through various means. This includes the support of legal frameworks that simplify operations for the ever-evolving technology in the banking and financial sectors. Social factors also play a crucial role in ensuring that the public accepts and trusts the existing financial systems, which is vital for achieving growth and meeting set goals. The Central Bank Digital Currency (CBDC), developed by the Bank of Thailand with backing from the government and the Ministry of Finance, represents a significant step in this direction. This initiative, first proposed in 2008 and now being piloted in the private sector, aims to establish a robust financial infrastructure in Thailand (Munikrishnan et al., 2024). These developments have significantly altered how people transact, moving from traditional bartering to modern payment methods. The transition to a cashless society is primarily supported by three key elements: legal, technological, and social factors (Van Someren, 2002). Engaging in e-commerce requires increasingly competitive strategies, notably through the adoption of innovative tools and new payment technologies. The use of diverse online payment systems not only improves the efficiency of the banking sector but also boosts consumer purchasing

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behaviors and contributes to economic growth. Cashless transactions reduce costs and simplify interactions between business owners and banks, employees, suppliers, and new market audiences. In the realm of e-commerce, these transactions enhance financial inclusion and flexibility. This approach benefits those without bank accounts by enabling peer-to-peer transactions and allowing for purchases at any time. Additionally, it allows users to spend more time on value-added activities, which is particularly beneficial during health emergencies (Taskinsoy, 2020).

The research subjects not only shed light on the implementation and use of online financial services but also have wider implications for economic growth, financial inclusion, and policy development. They address current challenges and opportunities in the financial sector as technology continues to play a crucial role in shaping financial services globally. The impact of academic research in these areas extends beyond academia and has practical effects on businesses, governments, and the general public. It helps to drive innovation, enhance economic growth, improve access to financial services, and support the development of policies that promote a thriving and inclusive financial sector in the constantly evolving digital age. Objectives of this research are as follows:

1) To study the level of technology acceptance on online financial services usage.
2) To investigate the influence of perceived ease of use on online financial service usage through perceived usefulness.
3) To provide information that will be useful to private entrepreneurs and the government in planning, supporting, and enhancing online financial service usage in Thailand.

2. Literature review

The Technology Acceptance Model (TAM) is a widely used theoretical framework for understanding and predicting users' acceptance and adoption of new technology. Developed by Davis (1987), TAM focuses on the cognitive processes that influence individuals' decision-making regarding technology adoption. The explanation of the TAM model is as follows:

- Key concepts
  - Perceived usefulness (PU): This is the user's subjective judgment of how much a technology is projected to improve their performance or productivity.
  - Perceived ease of use (PEOU): This shows the user's view of how simple it is to understand and utilize a technology.

- Basic assumptions
  - PU and PEOU positively influence users' attitudes towards using technology.
  - Users' attitude towards using a technology influences their intention to adopt it.
  - The actual usage of a technology is influenced by users' intention to adopt it.

- Relationships within TAM
  - According to TAM, PU, and PEOU directly influence the attitude of users toward technology and determine their desire to embrace it. User intention, in turn, predicts actual usage of the technology.

TAM has been widely used to study the acceptance and adoption of cashless payment technologies. Researchers have explored the factors that influence users' intentions and behaviors related to cashless payment systems using the TAM framework. The model has been extended to include variables specific to cashless payments, such as perceived security, trust, perceived financial risk, and social influence. Technological breakthroughs have made it possible for Thailand to become a cashless society. This study investigates how widely accepted cashless transactions—which include electronic sales, purchases, and a range of financial services—are in Thailand. This study evaluates the possible acceptability of a cashless society in Thailand by applying the UTAUT2 theory and adding service quality elements like trust and application design as supplements. The financial sector will find great benefit from the study's conclusions as they work to encourage more people to transact online, especially in Thailand (Chaveesuk et al., 2019).

TAM studies on cashless payments have discovered that perceived utility and perceived ease of use are important drivers of user attitudes regarding cashless payment technology. These attitudes, in turn, significantly influence users' intentions to adopt and use cashless payment systems (Srivastava and Singh, 2020).

Before the occurrence of the COVID-19 pandemic, the endorsement of technology had a noteworthy influence on the way financial transactions were conducted online (Iskandar and Alim., 2023; Setiawan et al., 2023). Various factors, such as knowledge, security, convenience, trust, perceived usefulness, perceived ease of use, user innovativeness, attitude, and brand image, played a pivotal role in shaping the inclination to adopt FinTech and digital payment systems (Ahmad et al., 2022; Shahzad et al., 2022; Raj et al., 2023)

Moreover, the support received from the government and the level of financial literacy indirectly affected the inclination to adopt FinTech. In addition, the implementation of precautionary measures during the COVID-19 period further bolstered the adoption of cashless transactions, with these measures emerging as a potent predictor of the inclination to engage in such transactions. Overall, the acceptance of technology and its associated factors had a substantial impact on the behavior of online financial transactions before the COVID-19

pandemic, and the pandemic itself served to expedite the adoption of digital payment systems.

The impact of the acceptance of technology on the behavior of online financial transactions after the occurrence of the COVID-19 pandemic has been the subject of examination in numerous academic papers. For example, Iskandar and Alim (2023) conducted research that demonstrated how knowledge, security, convenience, and trust affect the use of FinTech systems for online payments.

Similarly, Setiawan et al. (2023) explored the various factors that shape the behavioral intention to adopt FinTech among Indonesian women, and their findings indicated that perceived usefulness, ease of use, user innovativeness, attitude, trust, and brand image exert a positive influence on such behavioral intention. Furthermore, Raj et al. (2023) expanded the unified theory of acceptance and use of technology (UTAUT) model by considering the integration of pandemic precautionary measures, and their research demonstrated that performance expectations and pandemic precautionary measures serve as predictors for individuals' intentions to partake in cashless transactions during the pandemic. These studies do not explore the indirect effect of perceived ease of use on online financial transaction behavior through perceived usefulness. In the hypotheses presented below, we will investigate perceived usefulness as a mediating variable between perceived ease of use and online financial transaction behavior.

3. Hypothesis

3.1. Perceived usefulness

In the TAM model, perceived usefulness (PU) is defined as the extent to which a person believes that using a system would help him or her achieve advancements in work performance (Alqudah et al., 2023). Depending on the context, this concept might alternatively be characterized as an individual's belief that using online financial transactions would be advantageous to him or her and superior to traditional financial services. According to Chen and Aklikokou (2020), perceived usefulness has a direct effect on behavioral intention to utilize electronic services, such as e-government services. Iriani and Andjarwati (2020) investigated the perceived usefulness influence on the internet buying decision in Indonesia during the COVID-19 epidemic. The finding revealed that perceived usefulness affected online purchasing decisions.

Alqudah et al. (2023), on the other hand, evaluated the influence of performance expectations, effort expectations, and perceived utility on Jordanian bank customers' adoption of electronic banking services. The biggest association appears to exist between performance expectation and the use of electronic banking services, followed by effort expectation and the use of electronic banking services, while the weakest relationship appears to exist between perceived usefulness and the use of electronic banking services. However, the public's approval of the perceived usefulness of online financial transactions remains in doubt. As a result, the initial hypothesis under consideration is as follows:

H1: Perceived usefulness has a positive and significant influence on online financial transaction behavior.

3.2. Perceived ease of use

Financial activities, such as online payments and purchasing, are examples of modern platforms that are completely reliant on digital technology.

As a result, these services must have a strategic plan in place to promote changes in client behavior. Prastiawan et al. (2021) investigated the impact of perceived ease of use on mobile banking usage. According to the findings, perceived ease of use has a significant direct impact on bank customers adoption of mobile banking. As a result, the hypothesis under consideration is as follows:

H2a: Perceived ease of use has a positive and significant influence on online financial transaction behavior.
H2b: Perceived ease of use has a positive and significant indirect effect on online financial transaction behavior through perceived usefulness.

The conceptual framework for our study, illustrated in Fig. 1, provides a structured representation of the hypothesized relationships between the variables under investigation (H1, H2a, and H2b). This framework is crucial for guiding the empirical analysis and understanding the dynamic interactions within the constructs.

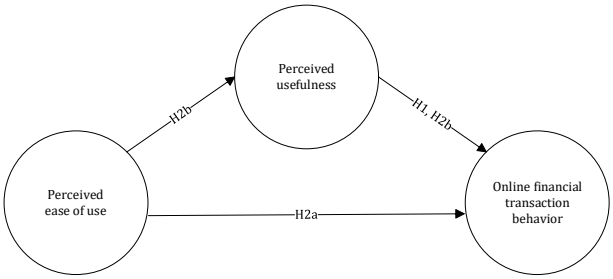

Fig. 1: Conceptual framework

4. Data and method

4.1. Population and sample

The population of this research was Generation X, aged between 38 and 53, and ever online shopping in the Bangkok Metropolitan Region and its surrounding provinces, including Nakhon Pathom, Nonthaburi, Pathum Thani, Samut Prakan, and Samut Sakhon provinces. To determine the sample size for data analysis, the general rule of thumb was used by referencing Hair et al. (2011), according to the general rule of thumb cited in Hair et al. (2011).

In this preliminary study, it is expected that there will be no more than 11 latent variables, each of which can be measured by less than 3 observed variables with communality values less than 0.45. Hence, an appropriate and sufficient sample size range would fall between 15×11=165 and 20×11=220. Therefore, the minimum sample size required to collect is 220 samples. However, in this study, 400 samples were collected to prevent errors. The questionnaire survey was carried out from January to April 2023.

4.2. Data collection

This research used the quantitative method of research and collected data using a questionnaire. This method was utilized to determine the influence of the technology acceptance model on online consumer shopping behavior in Thailand.

Data collection employed a probability sampling method, considering the proportional representation of each province within the Bangkok Metropolitan Region and its adjacent areas. Approximately 67 samples were drawn from each province. Subsequently, a simple random sampling technique was utilized to gather data comprehensively across all six provinces, ensuring the desired sample size of 400.

The data collection for the questionnaire was conducted using a combination of online and in-person methods. The researcher initiated a recruitment announcement for volunteer participants to respond to the questionnaire via Line and Facebook. Individuals not directly associated with the research project were designated as liaisons or invited to encourage specific sample groups to participate in the survey. The recruitment process included an explanation of the study's benefits, a notification of the right to refuse or abstain from participating, and an assurance that respondent identities would remain confidential. During the survey response, no personal information, such as names, would be collected, and the researcher would be unaware of the respondent's identity. If participants agreed to take part in the survey, the researcher would inquire about their preferred mode of response, whether through a paper-based questionnaire or an online submission via Google Form, with the researcher delivering the questionnaire in the chosen format for data collection. The research utilized a questionnaire collection method to gather data in two key areas:

1. The opinion level of technology acceptance (TAM) includes perceived ease of use and perceived usefulness.
2. The behavior level of onlinefinancial transaction behavior.

4.3. Data analysis

To get the intended outcomes of the research project, the following statistical treatment of data is required for quantitative data analysis: (1) Mean rating and Standard Deviation. Mean rating will be used to calculate the average responses to the various options supplied in the survey questionnaire, and (2) Structural Equation Modeling (SEM) will be used to investigate the effect between the variables for testing the hypothesis. The data set collected was statistically analyzed using the Statistical Package for Social Sciences (SPSS).

5. Results and discussion

5.1. Measurement validity and reliability

Cronbach's alpha and composite dependability were the suggested internal quality measures. Cronbach's alpha and composite reliability standard metrics are used in internal coherence tests. Additionally, it makes more sense to assess internal correctness using composite reliability as opposed to individual dependability. According to Hair et al. (2021), the commonly expected reliability is between 0.6 and 0.9, and 0.7 is satisfactory. Table 1 also shows that Cronbach's alpha was found to be acceptable in this investigation, meaning they were above the 0.7 threshold established.

Convergent validity requires the verification of three criteria: To be statistically significant, indicator factor loadings must be greater than 0.5; composite reliabilities (CR) must be greater than 0.7; and average variance extracted (AVE) must be greater than 0.5 (Fornell and Bookstein, 1982).

Table 1 shows that all factor loadings were higher than 0.50. CR were greater than 0.70 and found values ranging from 0.761 to 0.889. AVE is similarly greater than 0.5, ranging from 0.523 to 0.733.

Additionally, it was discovered that for every element, CR scores were greater than AVE ratings. Results from Table 1, therefore, indicate that there was no problem with the validity and reliability of the data in the specified manner.

5.2. Results of technology acceptance and online financial transaction behavior analysis using mean and standard deviation

The analysis of perceived ease of use reveals that respondents generally rated it very highly, with an average score of 4.31. They believed they could independently understand and learn to use various online platforms, such as mobile banking, scoring 4.44 on average. They also quickly learned to proficiently use these platforms, scoring 4.26 and found them easy to teach to others, scoring 4.24. These findings are summarized in Table 2. Regarding perceived usefulness, the overall score was also high, at 4.35. Respondents felt that using online platforms like mobile banking reduced their handling of cash, thereby lowering the risk of COVID-19 transmission, scoring 4.42 on this aspect. They also noted that a cashless society, facilitated by online platforms, would eliminate the need to withdraw cash and save

ATM fees, scoring 4.36. Furthermore, the availability of online payment options for various products and services was crucial in their purchasing decisions, scoring 4.27. These results are shown in Table 2.

Table 1: Results of factor loadings, validity, and reliability

Variables	Item	Factor loading	Cronbach's alpha	CR	AVE
Perceived ease of use (PE)	PE1	.881	0.740	0.871	0.587
	PE2	.572			
	PE3	.683			
Perceived usefulness (PU)	PU1	.896	0.889	0.761	0.523
	PU2	.659			
	PU3	.981			
Online financial transaction behavior (OFTB)	OFTB 1	.982	0.875	0.889	0.733
	OFTB 2	.773			
	OFTB 3	.880			
	OFTB 4	.555			
	OFTB 5	.538			

Additionally, the overall behavior regarding online financial transactions was rated highly, at 4.16. The most common activity was online shopping, scoring 4.35. Other frequent activities included paying for services like electricity at 4.25, selling or exchanging products online at 4.17, booking accommodations or travel tickets at 4.07, and engaging in online banking or stock trading at 3.94. These behaviors are also detailed in Table 2.

Table 2: Descriptive statistics of variable

Construct variable	Item description	Mean	S.D.	Result
Perceived ease of use (PE)	PE1: You can understand and learn how to use various online systems, such as mobile banking, by yourself	4.44	0.646	Very high
	PE2: Do you think that online systems in various forms, such as mobile banking, are easy to use and can be taught to others	4.24	0.693	Very high
	PE3: You quickly took the time to study the use of various forms of online systems, such as mobile banking, until it can be used proficiently	4.26	0.706	Very high
	Overall	4.31		Very high
Perceived usefulness (PU)	PU1: Using various forms of online systems, such as mobile banking, helps you reduce exposure to cash, which reduces the risk of being infected with COVID-19	4.42	0.674	Very high
	PU2: Having a variety of online systems, such as mobile banking in paying for various products or services, is an important part that helps you decide to buy that product or service	4.27	0.742	Very high
	PU3: Creating a cashless society and enabling every store to have online systems in various forms will cause you to no longer have to withdraw cash and help you save on cash withdrawal fees from ATMs	4.36	0.725	Very high
	Overall	4.35		Very high
Online financial transaction behavior (OFTB)	OFTB1: Purchase products or services online	4.35	0.720	Very high
	OFTB2: Sell or exchange products online	4.17	0.832	High
	OFTB3: Pay various services online, such as electricity fee	4.25	0.803	Very high
	OFTB4: Conduct financial transactions with online bank or online stock trading	3.94	0.899	High
	OFTB5: Book an accommodation, airplane ticket, or train ticket online	4.07	1.018	High
	Overall	4.16		High

5.3. Structural model evaluation and hypotheses testing

The measurement model's findings demonstrated that the data were extremely valid and dependable, described excellent overall model fitness, and could be applied to route analysis. Values in path analysis are CMIN/df=2.937, RMSEA=0.070 with a PCLOSE value of 0.027, GFI=0.961, NFI=0.978, CFI=0.985, and TLI=0.973, providing adequate evidence regarding that the overall model is a good fit.

Path analysis was applied, and Fig. 2 represents a standardized estimate of the regression weights using SEM. The values of path coefficients are positive and significant, describing a positive relationship between dependent and independent variables. The values of the Beta coefficient (β) in path analysis are revealed in Fig. 2, which shows that perceived ease of use does not have a positive influence on online financial transaction behavior (β=0.03). Therefore, the H1 hypothesis was not supported. For the direct effect of perceived usefulness and online financial transaction behavior (H2a), the result found a positive influence between them (β=1.16) at the 0.001 level of significance. Therefore, the H2a hypothesis was supported.

While perceived usefulness mediates the influence of perceived ease of use on online financial transaction behavior (β=0.23) at the 0.001 level of significance. As a result, perceived usefulness mediates the influence of perceived ease of use on online financial transaction behavior; therefore, the H2b hypothesis was supported, as shown in Table 3.

In summary, the work has given important new understandings of the complex dynamics of online financial transaction behavior. The discovery that perceived usefulness mediates the impact of perceived ease of use on the behavior of online financial transactions highlights the crucial role that utility plays in determining user behavior. The outcome is in line with research by Chen and Aklikokou (2020), which found that the adoption of e-government is mediated by perceived utility. This finding implies that people evaluate the usefulness and applicability of online financial services in their daily lives rather than simply being influenced by the interface's simplicity.

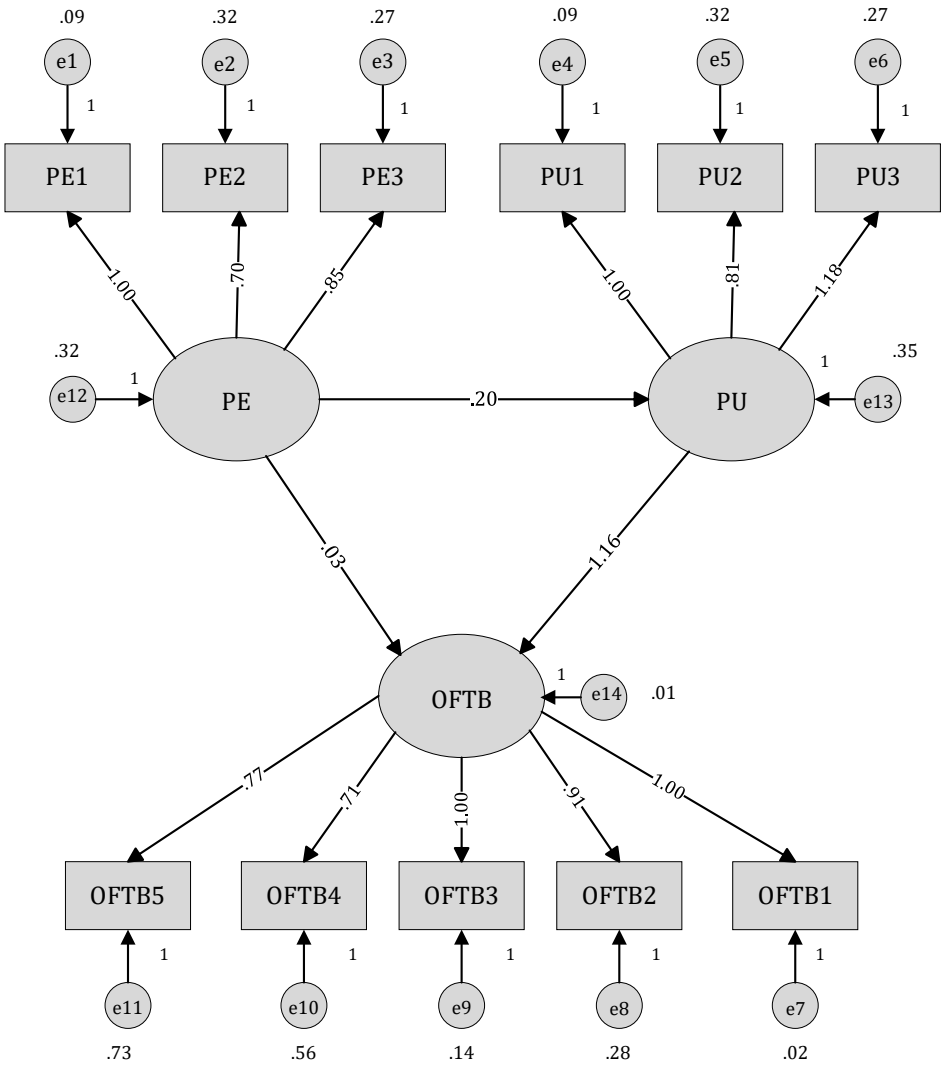

Fig. 2: SEM path analysis results for testing hypothesis

Table 3: Hypotheses relationship

Hypothesis	Model relationship	β	P	Results
		Main effect		
H1	PE→OFTB	.03	.346	Not support
H2a	PU→OFTB	1.16	.000**	Support
		Mediating effect		
H2b	PE→PU→OFTB	.23	.000**	Support (full mediation effect)

**: Signifies that the p-value is less than 0.01

For companies and service providers looking to improve customer experiences, understanding this mediation effect is essential. Even if user-friendly interfaces are still crucial, the emphasis should also be on showcasing the real advantages and effectiveness of these services. Businesses can raise the perceived utility of online financial transactions, which in turn indirectly encourages higher usage, by highlighting how they streamline processes, save time, and improve overall financial management.

This realization has wider ramifications for the development and promotion of online financial services. It emphasizes the necessity of complete tactics that incorporate clear communication of the utility of the services with intuitive interfaces. In order to maintain user interest and promote the widespread adoption of online financial transactions, continual efforts to improve both usability and perceived utility will be essential.

5.4. Discussion

This study focused on the locus of a developing country, Thailand, and only included respondents from six provinces in Thailand, specifically the Bangkok Metropolitan Region and its neighboring provinces. As is generally known, the banking sector needs ongoing support and attention to expand and prosper. The banking industry is now one of the intriguing topics for developing information technology to deal with globalization and issues during the COVID-19 epidemic; it was highly crucial to employ mobile payments for transactions (Sunarjo et al., 2021).

The research's finding that perceived usefulness mediates the influence of perceived ease of use on online financial transaction behavior emphasizes the importance of utility in driving user behavior. According to McLean et al. (2018), customer engagement with m-commerce applications is influenced by their perceived ease of use. The banking industry should improve the features available to clients to make them more comfortable when doing necessary financial activities. They also improve services through conveniently available mobile applications and tailor the design of banking elements to fit user preferences (Fachreza and Besra, 2022).

5.5. Conclusion

Several recommendations can be made to improve the implementation and efficacy of online payment systems in light of the study done on online financial services and their effect on business in the e-commerce industry. Businesses should prioritize increasing how valuable consumers consider online financial services to be. This could be accomplished through education and awareness initiatives that show Generation X customers the useful advantages and convenience of these services. Businesses can promote broader adoption and usage by highlighting the value that these services provide to their regular transactions. Businesses should think about adjusting their online financial services to particular generation preferences and needs in light of the moderating effect of perceived usefulness. To grasp these intricacies, market research might offer insightful information. Customized services have a strong positive impact on consumer engagement and happiness.

This conclusion essentially highlights the significance of a holistic strategy, where user experience design seamlessly combines with the functional benefits provided by online financial services. Understanding and taking advantage of this mediating relationship will remain crucial for firms hoping to succeed in the cutthroat world of digital financial services as technology develops.

The panorama of financial services available online is constantly changing. As a result, organizations and decision-makers should spend money on continuing research and development. Businesses may efficiently change their services to meet shifting consumer needs by keeping up with new technology and trends. Online payment system innovation can be aided by cooperation between businesses, financial institutions, and technology providers. Collaboration can result in the creation of solutions that are more user-friendly, secure, and effective. Collaboration can also result in the development of interconnected ecosystems that provide users with a smooth experience across a variety of platforms and services. Businesses and governments should support the expansion of online financial services by concentrating on these recommendations, which will encourage cashless transactions, boost customer happiness, and promote economic growth in the e-commerce industry.

5.6. Limitation

The research is constrained to the Generation X population in Thailand, potentially limiting the applicability of the results to diverse demographic cohorts or varied geographic settings. Consequently, caution should be exercised when attempting to extrapolate these findings to other demographic groups or locations. This inquiry relies heavily on quantitative data, ignoring the addition of qualitative findings. As a result, the narrow scope of quantitative research may limit our entire understanding of the event under consideration, missing essential qualitative details that may contribute to a more nuanced and holistic interpretation.

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Compliance with ethical standards

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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