2024-1374 IJOI
https://www.ijoi-online.org/

International Journal of Organizational Innovation

EXPLORE FACTORS INFLUENCING THE INTENTION TO USE MOBILE PAYMENTS IN TAIWAN DURING THE PANDEMIC

Jyi-Chang Tsai
Department of Information Management, I-Shou University, Kaohsiung, Taiwan
tjc@isu.edu.tw

Lisa Y. Chen*
Department of Information Management, I-Shou University, Kaohsiung, Taiwan
*Corresponding Author: lisachen@isu.edu.tw

Yan-Ssiang Tang
Department of Information Management, I-Shou University, Kaohsiung, Taiwan
brianmin831@gmail.com

Abstract

Amid the COVID-19 pandemic, significant changes have unfolded in people's lives. Growing concerns over infection risks have shifted consumer habits, increasingly drawing them towards mobile payments and other contactless payment methods. This study employs the Technology Acceptance Model (TAM), supplemented by variables such as perceived epidemic risk, social influence, and convenience, to explore factors influencing the intention to use mobile payments in Taiwan during the pandemic. Utilizing an online survey method, this study collected 302 responses, and after filtering out invalid ones, 274 valid questionnaires were analyzed with SPSS software. The findings reveal that social influences positively affect perceived epidemic risk and perceived usefulness; convenience enhances perceived usefulness and ease of use; perceived ease of use boosts perceived usefulness; and perceived epidemic risk, usefulness, and ease of use collectively foster a stronger intention to utilize mobile payments. This study presents recommendations to promote the adoption of mobile payments, aiming to contribute to their widespread acceptance. It concludes with a discussion on research limitations and suggestions for future inquiry, providing a reference for researchers interested in similar topics.

Key words: COVID-19, Technology Acceptance Model, Mobile Payment, Convenience, Perceived Epidemic Risk, Social Influence, Intention to Use

Introduction

The widespread adoption of mobile devices and the internet has revolutionized consumer transaction patterns. Beyond physical cash and cards, consumers can now link various cards to their smartphones for direct payments. Mobile payments offer consumers the convenience of not carrying cash or worrying about change, enhancing checkout efficiency. They also allow for the immediate review of transaction histories, helping users manage their finances (Liu, 2019). For businesses, mobile payments eliminate the risks associated with counterfeit cash, address hygiene concerns related to handling money post-transaction, save on card reader rental fees, and enable the aggregation of consumer shopping habits and transaction data for better sales and marketing strategies (Wu, 2022).

Triggered by the COVID-19 outbreak, countries worldwide implemented quarantine and lockdown measures to curb the spread, prompting people to minimize physical interactions to reduce infection risks. This led to the prevalence of contactless services and a boom in the home economy. The catering industry, for instance, saw an increase in establishments offering delivery or takeaway services to accommodate homebound consumers (Poon & Tung, 2024). Amidst the ongoing pandemic, consumer concerns about infection risks have spurred the demand for contactless services, with over 70% of physical transactions in Taiwan are conducted through contactless payments (Wen, 2021).

A survey by MasterCard News Center in 2021 highlighted the pandemic's role in elevating health awareness, with over 70% of participants reporting an increase in mobile payment usage (Business Times, 2021). The survey also noted a significant rise in "heavy users" who use mobile payments daily, indicating a growing preference to minimize the use of physical currency. It's clear that with the enhancement of Taiwan's internet infrastructure and the rapid proliferation of mobile devices, the obstacles presented by hardware are becoming obsolete. The government's vigorous promotion of mobile payments, through the formulation of relevant regulations, expansion of usage areas, and improvement of consumer experiences, aims to boost usage rates.

Furthermore, the pandemic has encouraged consumers to limit physical contact and reduce the frequency of using tangible currencies like cash, making mobile payments an increasingly attractive option. This shift in consumer behavior has led to a swift increase in the number of mobile payment users and transaction volumes, alongside a significant rise in daily and heavy users. While numerous studies have explored factors affecting consumers' intentions to use mobile payments, research specifically linking mobile payments with the pandemic is relatively scarce.

Based on the research background and motivation, the study used Technology Acceptance Model as theoretical basis and incorporating external variables like perceived epidemic risk, convenience, and social influence. This study targets consumers who have util-

ized mobile payments during the pandemic in order to examine which factors influence the intention to use mobile payments.

Literature Review

Mobile Payment

Mobile payments can be categorized into proximity payments and remote payments based on the payment methods utilized. Proximity payments rely on technologies such as Wireless Application Protocol (WAP), QR codes, and Near Field Communication (NFC). These transactions require the mobile device to be close to a merchant's sensing equipment. Conversely, remote payments are typically used for online shopping where the transaction can be completed without physical contact by connecting to the internet and using pre-registered electronic wallets or credit cards for payment. Examples include SMS payments and online payments on shopping websites.

In Taiwan, the rise of mobile payments has been accelerated in recent years due to the ongoing pandemic and the surge in contactless services. During the pandemic, there was a significant increase in the use of online channels, and the trend of consumers engaging in online shopping through internet platforms is expected to continue evolving. According to a report by Ji (2020), the number of monthly transactions using credit cards on catering delivery platforms saw a dramatic increase from less than 250,000 transactions in October 2018, with expenditures below one hundred million, to over 2 million transactions per month by September 2019, with expenditures exceeding five hundred million. This indicates that consumers, aiming to reduce infection risks, have shown a preference for contactless shopping and payment methods during the pandemic. The growing concerns about transmission risks have fueled the expansion of food delivery platforms and led to the widespread adoption of digital payments and e-wallets (CIO Taiwan, 2022).

Furthermore, a 2021 survey by MIC, the institute of industrial intelligence revealed that during the latter half of 2020, amidst the pandemic, 25.1% of users who used mobile payments more than 11 times a month were considered "active users," a figure that rose by 11.2% compared to 2019. For the first time, "daily users" were identified, indicating a steady increase in the frequency of mobile payment usage among consumers due to the pandemic's impact. The 2021 survey by the GSMA, is a global organization also showed that the average daily transaction volume of global mobile payments continues to rise. Influenced by the pandemic and changes in consumer habits, the use of mobile payments, both in terms of consumer numbers and transaction volumes, is expected to significantly increase in the next two years.

Technology Acceptance Model

The Technology Acceptance Model (TAM), proposed by Davis (1989), evolves from the "Theory of Reasoned Action" (TRA) by Fishbein and Ajzen (1975) and the "Theory of Planned Behaviour" (TPB) by Ajzen

(1985). The structure of the TAM is depicted in Figure 1. The dimensions of the TAM are described as follows.

External Variables:

These include external factors that could potentially influence users' perceptions of system usefulness and ease of use, encompassing the user's external environment and personal characteristics (Davis & Venkatesh, 1996). There is no fixed model for external variables, and researchers can select appropriate variables based on different topics. Perceived Usefulness: This refers to the degree to which a user believes that using a particular technology or system will enhance their job performance and reduce effort (Liu, 2019). If users perceive the system or technology as easy to use, they are likely to believe it will improve their current or future job performance and allow them to accomplish more work with the same effort (Davis, 1989).

Perceived Ease of Use:

This represents users' perception of how easy a technology or system is to use (Davis, 1989). The simpler the operation of new technology or system, the more confident and positively users feel about using the system. Attitude toward Using: Attitude refers to an individual's feeling based on their subjective beliefs that influence their performance of specific behaviours (Fishbein and Ajzen, 1975). Attitudes are simultaneously influenced by perceived usefulness and perceived ease of use. Behavioural Intention to Use: This indicates the level of willingness of users to engage with new technologies or systems (Fishbein and Ajzen, 1975; Peng& Yan, 2022). It represents the strength of users' intention towards new technology or systems, determining the actual extent of use. Behavioural intention is usually influenced by users' attitudes and perceived usefulness. Actual System Use: This refers to the actual actions undertaken by users as influenced by the aforementioned dimensions. Actual behaviour is directly impacted by the intention to use, where the stronger the user's intention to perform a specific action, the higher the likelihood of its execution (Fishbein and Ajzen, 1975; Taylor & Todd, 1995).

Social Influence

According to Venkatesh et al. (2003) in the Unified Theory of Acceptance and Use of Technology (UTAUT), social influence encompasses subdimensions such as 'subjective norms", "social factors", and "public image". It refers to the perceived pressure from the social environment that potentially influences an individual's decision to engage or not engage in a specific behaviour. Kelly and Palaniappan (2023) consider social influence as the extent to which the user perceives that people important to them believe they should use the new technology or system. Lopez-Nicolas et al. (2008) have highlighted that the significance of social influence in the adoption of advanced mobile services has been underestimated in past research.

Koenig-Lewis (2015) also emphasizes the critical role of a user's social environment in the adoption process of mobile payments, making the promotion of mobile payment services through word-of-mouth by opinion leaders essential for faster dissemination among youth.

Studies by Xie et al. (2023) demonstrate that individual behaviour is influenced by the social environment under risky situations like SARS. Zhao and Bacao (2021) argue that during the COVID-19 pandemic, the advice of significant others gain more importance in personal decision-making and actions. Daragmeh et al. (2021) point out that news about COVID-19, safety measures, and concerns generally spread through traditional media, social media, or other means, significantly altering the way consumers perform daily activities. This study adopts Daragmeh et al. (2021)'s research, defining social influence as the degree to which significant others affect consumers' decision-making process regarding adopting mobile payments during the pandemic.

Convenience

Brown (1989) and Dai et al. (2008) view convenience as the energy and time expended by consumers in conducting transactions, not as a characteristic or attribute of the product. Berry (2002) identifies the core of convenience as the non-monetary costs to consumers, defining it as "the consumer's perception of time and effort savings when purchasing or using services". Brown (1989) suggests that adding more convenience to providers' products and services can enhance consumers' willingness to utilize them. As life's pace accelerates, the demand for convenience also grows. Traditional payment methods can cause consumers to waste time on meaningless activities like waiting for change or queuing, leading to unnecessary consumption of time and energy. Therefore, if mobile payments offer significant convenience and faster transaction completion, consumers are more inclined to adopt them. Wijaya et al. (2021) note that convenience is a crucial aspect of mobile payments, is affecting the frequency and volume of consumer transactions. Their findings indicate that mobile payments positively impact payment convenience and positively influence consumers' willingness to use them. This study, referencing Berry (2002), defines convenience as consumers' perception of the effort and time involved when using or purchasing services.

Perceived Epidemic Risk

Aji et al. (2020) observe that perceptions of COVID-19 risk and perceived usefulness directly influence the intention to use e-wallets. Following the outbreak of COVID-19, reports suggested that cash might carry the virus; many merchants and institutions encouraged using e-wallets for payments, leading to a perceived risk associated with cash usage and an increased willingness to employ contactless payment methods like e-wallets. Research by Sreelakshmi and Prathap (2020) found that perceived severity, susceptibility, and self-efficacy significantly impact the intention to use mobile payment services. The COVID-19 pandemic has heightened public concerns about virus transmission through cash and plastic currency (e.g., credit cards). In such circumstances, using contactless payments, including mobile payment systems, helps prevent the spread of the epidemic, thus adopting mobile payment is considered a preventative behaviour.

Synthesizing findings from scholars, it's evident that consumer concerns about the pandemic positively influence the intention to use mobile payments (Aji et al., 2020; Daragmeh et al., 2021; Zhao and Bacao, 2021; Sreelakshmi and Prathap, 2020). Some scholars also believe that consumers, influenced by the risk of infection and concerns about the potential virus on physical currency, are more inclined to use mobile payments (Deloitte, 2020). In conclusion, the primary reasons consumers opt for mobile payments during the pandemic are twofold: 1. Concern over the virus on physical currency, leading to a preference for contactless payment methods. 2. The belief that using mobile payments during the pandemic is convenient and safe, effectively reducing the risk of infection and maintaining social distance. This study further hypothesizes that if mobile payments satisfy the need to minimize contact and infection risk, consumers will regard mobile payment as a more useful and reliable payment method than traditional payments during the pandemic.

Research Methodology

Research Framework, Hypotheses and Operational Definitions

Informed by the research objectives and the literature review, this study develops a research framework as depicted in Figure 1, alongside formulating research hypotheses. Employing the Technology Acceptance Model (TAM) proposed by Davis (1989) as the foundational structure, this study incorporates three external variables: perceived epidemic risk, social influence, and convenience. The aim is to identify factors influencing consumers' intention to use mobile payments during the pandemic.

Building on the aforementioned literature, this study synthesizes scholarly findings to propose the following hypotheses:

H1: Perceived epidemic risk positively influences the intention to use.

H2: Social influence positively affects the perceived epidemic risk.

H3: Social influence positively affects perceived usefulness.

H4: Convenience positively affects perceived usefulness.

H5: Convenience positively affects perceived ease of use.

H6: Perceived usefulness positively influences the intention to use.

H7: Perceived ease of use positively affects perceived usefulness.

H8: Perceived ease of use positively influences the intention to use.

This study builds its operational definitions of variables on previous research and literature, ensuring that the original meaning is preserved while aligning with the study's objectives. The operational definitions as follows:

Perceived epidemic risk refers to consumers' perceived susceptibility to infection through the use of physical currencies and cards during the pandemic

(Sreelakshmi & Prathap, 2023). Social influence is the degree to which consumers, during the pandemic, are influenced by others (e.g., media, relatives, experts, or celebrities) in their decision-making regarding the adoption of mobile payments. Convenience is consumers' perception of the effort and time savings when using or purchasing services. Perceived usefulness is the extent to which consumers believe using mobile payments during the pandemic is beneficial. Perceived ease of use is how easy consumers believe it is to operate mobile payment applications. Intention to use is the consumers' willingness to use mobile payments during the pandemic (Daragmeh et al., 2021).

Convenience refers to the perception of energy and time when consumers use or purchase services (Berry, 2002). Perceived utility refers to the extent to which consumers feel that using mobile payments during an outbreak is useful (Zhao & Bacao, 2021). Perceived ease of use refers to the degree to which consumers feel that mobile payment applications are easy to operate (Haritha, 2023). Intention to use refers to the will of consumers to use mobile payments during the epidemic (Zhao & Bacao, 2021).

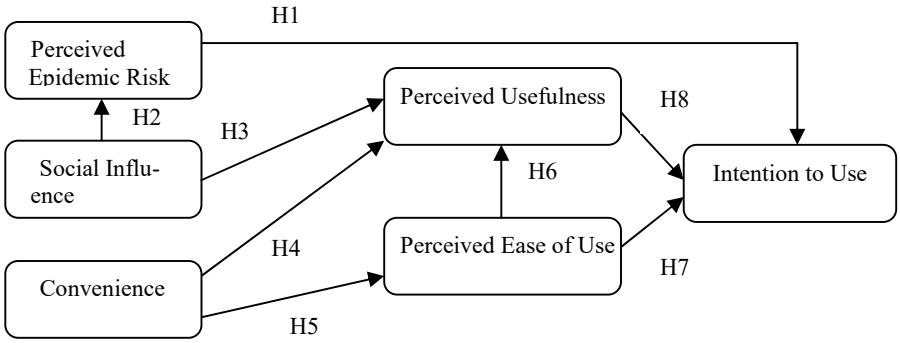

Figure 1. Research framework

Research Design

This study aims to explore the impact of various factors on the intention to use mobile payments, targeting consumers who have used mobile payment during the pandemic. An anonymous survey is conducted to minimize cognitive discrepancies, allowing respondents to select the most appropriate answers based on their actual usage and perceptions. The survey, distributed via Google Forms through platforms such as Facebook and Dcard, aims for a sample size of at least 200 but not more than 500, aligning with recommendations by Schumacker and Lomax (2004) and Anderson and Gerbing (1988) on sample stability and model fit. The questionnaire comprises two parts: the first part collects basic personal information from respondents to understand how individual backgrounds and characteristics might affect their intention to use mobile

payments during the pandemic. The second part measures the study's variables: perceived epidemic risk, social influence, convenience, perceived usefulness, perceived ease of use, and intention to use. This section employs a Likert five-point scale ranging from "strongly disagree (1)" to "strongly agree (5)", drawing on scales developed by past scholars and adapted to the study's purposes without altering their original intent.

The study employs a questionnaire survey for sample collection, using SPSS for data analysis post-elimination of invalid responses. The statistical analysis includes descriptive statistics, reliability analysis, validity analysis, correlation analysis, and regression analysis to interpret the results and validate the research hypotheses.

Data Analysis Results

This study targeted consumers who utilized mobile payments during the pandemic, employing an anonymous response format and disseminating the survey via social networks and platforms like Dcard and Facebook groups. The collection takes in 1 week, which yields 302 responses. After excluding 28 invalid responses, 274 valid questionnaires remained, marking an effective response rate of 91%.

Descriptive Statistical Analysis

Analysis of the 274 questionnaires revealed the following demographic breakdowns: Gender: The majority of respondents were female, accounting for 71.9% (197 individuals), while male respondents made up 28.1% (77 individuals). Age: The most populous age group was 21 to 30 years, representing 60.6% (166 individuals) of respondents. Education Level: A significant majority of respondents had university-level education, comprising 71.9% (197 individuals), followed by 19.7% (54 individuals) with postgraduate (Masters or PhD) qualifications. Occupation: Students formed the largest occupational group at 43% (117 individuals). In terms of monthly disposable income, the largest group had less than NT$19,999, representing 44.5% (122 individuals), followed by those earning NT$30,000 to NT$39,999 at 17.5% (48 individuals).

Reliability and Validity Analysis

In this study, the consistency of items within the same construct was measured using Cronbach's α coefficient. The alpha values for the constructs are 0.844, 0.844, 0.777, 0.823, 0.889, and 0.910, all exceeding the 0.7 threshold, in line with Nunnally's (1994) standards. This indicates a high degree of reliability and internal consistency within the constructs. Furthermore, the Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO MSA) values for all constructs exceeded 0.5, and Bartlett's Test of Sphericity was significant ($P<0.001$) for each, suggesting that the scales are valid and suitable for factor analysis.

The study evaluated convergent validity using factor loadings, composite reliability (CR), and average variance extracted (AVE). Before assessing convergent validity, a cross-loading matrix was used to verify if the factor loadings of cross-corresponding constructs were higher than those of other items. It was

found that the factor loading for the perceived epidemic risk item A3 was lower than for other items, indicating lower internal consistency and distinctiveness from other items within the same construct. Hence, this item was removed from the study. After deletion, the factor loadings for each construct as indicated in Table 1, showed that all construct cross-loadings were higher than those for other items, indicating better internal consistency within the study's constructs and clear differentiation from other constructs.

Table 1. Factor loadings after item deletion

Research Variable	Item	Factor Loadings				
Perceived Epidemic Risk	A1	0.197	0.263	0.101	0.149	0.864
	A2	0.238	0.300	0.133	0.137	0.844
Social Influence	B1	0.072	0.795	0.123	0.107	0.289
	B2	0.123	0.757	0.073	0.244	0.203
	B3	0.201	0.822	0.093	0.079	-0.031
	B4	0.285	0.696	0.148	0.068	0.256
Convenience	C1	0.326	0.059	0.671	0.208	0.021
	C2	0.365	0.069	0.752	0.212	0.040
	C3	0.342	0.074	0.775	0.268	0.045
	C4	0.103	0.257	0.649	-0.026	0.241
Perceived Usefulness	D1	0.336	0.109	0.324	0.578	0.191
	D2	0.214	0.188	0.201	0.839	0.084
	D3	0.272	0.170	0.124	0.825	0.114
Perceived Ease of Use	E1	0.766	0.144	0.166	0.133	0.039
	E2	0.596	0.271	0.354	0.231	0.069
	E3	0.821	0.135	0.273	0.129	0.029
	E4	0.794	0.177	0.244	0.154	0.067
Intention to Use	F1	0.742	0.148	0.145	0.237	0.309
	F2	0.787	0.147	0.209	0.209	0.217
	F3	0.688	0.107	0.238	0.188	0.256

After the deletion process, the standardized factor loadings for each construct ranged from 0.578 to 0.864, all above the threshold of 0.5. This demonstrates that the observed variables adequately reflect their corresponding latent constructs. Additionally, the composite reliability values ranged between 0.784 and 0.852, all surpassing the threshold of 0.6; and the AVEs ranged between 0.509 and 0.591, exceeding the 0.5 threshold, indicating a significant contribution from observed variables over error (Fornell & Larcker, 1981). These findings suggest good internal consistency across the study's constructs and adequate measurement of variable performance. Moreover, the square roots of the AVE for each construct (as seen in Table 3) are 0.757, 0.769, 0.713, 0.757, 0.750, and 0.742, all exceeding the correlation coefficients with other constructs. This demonstrates a degree of discriminant validity, indicating that the constructs are

Table 2. Square root of AVE correlation matrix

	PER	SI	C	PU	PEU	IOU
Perceived Epidemic Risk (PER)	**0.757**					
Social Influence (SI)	0.541	**0.769**				
Convenience (C)	0.364	0.390	**0.713**			
Perceived Usefulness (PU)	0.411	0.424	0.538	**0.757**		
Perceived Ease of Use (PEU)	0.405	0.428	0.619	0.562	**0.750**	
Intention to Use (IOU)	0.478	0.438	0.578	0.564	0.725	**0.742**

sufficiently distinct from one another, confirming the study's scales possess good discriminant validity.

Correlation Analysis

For correlation analysis, this study employed Pearson's correlation coefficient. The correlation matrix for the constructs of the study is presented in Table 4-7, where all constructs show significant relationships, indicating co-variance and positive relations between them. With all coefficients not exceeding 0.9, the constructs demonstrate a degree of distinctiveness and independence from one another. Thus, there is no need for further collinearity analysis within this study.

Table 3. Correlation matrix of constructs

	PER	SI	C	PU	PEU	IOU
PER	**1**					
SI	0.541**	**1**				
C	0.364**	0.390**	**1**			
PU	0.411**	0.424**	0.538**	**1**		
PEU	0.405**	0.428**	0.619**	0.562**	**1**	
IOU	0.478**	0.438**	0.578**	0.564**	0.725**	**1**

**. Correlation is significant at the 0.01 level (2-tailed).

Regression Analysis

The study utilized linear regression analysis to examine the causal relationships between independent (predictor) variables and the dependent (outcome) variable, verifying the existence of significant correlations and testing the validity of the research hypotheses. The results are presented in Table 4.

The perceptual risk of an epidemic explanation variable R^2 for the use of an intentional regression model is 0.229, indicating that the inclusion of this variable has an additional explanatory value of 22.9 per cent for the intentional variation of the use, reaching a significant level after the F assessment ($F=80.770$, $P<0.001$), representing the higher risk of the respondent's perception of the epidemics, the higher the

willingness to pay for their actions by using it, and the perceptive risk of a disease to influence the intention of behavior (β=0.478, P<0,001), the study assumption H1 is established.

Table 4. Regression Analysis of Constructs

Constructs	β	R^2	Adj.R^2	t value	F value	P value
Perceived Epidemic Risk -Intention to Use	0.478	0.229	0.226	8.987	80.770	0.000
Social Influence-Perceived Epidemic Risk	0.541	0.293	0.290	10.605	112.469	0.000
Social Influence- Perceived Usefulness	0.424	0.180	0.177	7.730	59.752	0.000
Convenience-Perceived Usefulness	0.538	0.290	0.287	10.530	110.877	0.000
Convenience-Perceived Ease of Use	0.619	0.383	0.380	12.986	168.639	0.000
Perceived Usefulness-Intention to Use	0.564	0.318	0.316	11.274	127.093	0.000
Perceived Ease of Use-Perceived Usefulness	0.562	0.316	0.314	11.213	125.739	0.000
Perceived Ease of Use-Intention to Use	0.725	0.525	0.524	17.353	301.137	0.000

The social influence interpretation variable R^2 for the perceived risk regression model is 0.293, indicating that adding this variable to the perception risk variable has an additional explanation of 29.3%, after the F assessment result (F=112.469, P<0.001) reached a significant level, representing the influence of important people, increased perception of risk of the epidemic, social influence is in the direction of influencing the risk of perceiving epidemics (β=0.541P <0.001), the study hypothesis H2 was established.

The social influence interpretation variable R^2 for the perceptual usefulness regression model is 0.180, indicating that adding this variable to the perceptive usefulness variation has an added explanation of 18%, after the F evaluation result (F=59.752, P<0.001) reached a significant level, representing the respondent being influenced by important others, believing that action payment is useful for reducing the risk of infection, social impact is on the influence of perceptive utility (β=0.424, P <0.001), the study assumption H3 is established.

The interpretation variable R^2 for the perceptual utility regression model is 0.290, indicating that adding this variable has an added explanation of the perceptive utility variation of 29%, after the F evaluation result (F=110.877, P value <0.001) all reached a significant level, representing the more convenient action is paid, the respondents will find it more useful to reduce the risk of infection, the convenience will be in the direction of influencing perceptive usefulness (β=0.538,P<0.001), the study assumption H4 established.

The interpretation variable R^2 for the perceptual usability regression model is 0.383, indicating that adding this variable has an additional explanation of the perceptive usability variation of 38.3%, after the F evaluation result (F=168.639, P value <0.001) are all significant levels, representing the more convenient action is paid, the respondents will also think of its higher usability, the convenience will

be influencing the perception usability (β=0.619, P<0.001), the study assumption H5 is established.

The interpretation variable R^2 of the perceptual utility regression model is 0.316, which indicates that the addition of perceptive utility has an additional explanation of perceptional utility variation of 31.6%, after the F test result (F=125.739, P value <0.001) reaches a significant level, representing the lower the learning difficulty of behavioral pay, the respondent will think that its utility is higher, the perceptive usability will be in the direction of influencing the use intention (β=0.562, P<0.001), the study assumption H6 is established.

Perceptive utility, perceived ease of use for the use of intent regression model interpretation variable R2 is 0.318, 0.725, indicating the addition of perceptive usefulness, perceptive ease is increased interpretation of the use intention variable 31.8%, 72.5%, F value is 127.093, 301.137, P values are less than 0.001, all are significant levels, representing that if the respondents believe that action payment is effective for reducing the risk of infection, and learning is not difficult, will increase the use will, perceptual utility and sensory ease will all be affecting the use intent (β = 0.564, 0.725, P value is less than 0,001), the study hypothesis H7 and H8 established.

Conclusion

Based on the results of this study, it has been determined that the perception of epidemic risk positively influences the intention to use mobile payments. This is attributed to consumers' concerns about the potential of physical currency to carry the COVID-19 virus, thus, showing a preference for mobile payments during the pandemic. Similar findings have been echoed in previous studies by scholars such as Dewi and Immanuel (2020), Daragmeh et al. (2021), and Sreelakshmi and Prathap (2020), who all noted the positive impact of the COVID-19 pandemic on the intention to use mobile payments.

Additionally, this study found that social influence positively affects both the perception of epidemic risk and the perceived usefulness of mobile payments. This suggests that during the pandemic, consumers are influenced by significant others, enhancing their awareness of epidemic risk and the belief that using mobile payments can reduce the risk of infection. This finding is consistent with previous research, such as Zhao and Bacao (2021), which highlighted the significant impact of social influence on perceived benefits, where consumers are influenced by friends and family to believe in the efficacy of mobile payments in reducing infection risk.

The research also revealed that convenience positively impacts both perceived usefulness and ease of use, indicating that consumers find mobile payments to be very convenient for simplifying and speeding up the payment process. During the pandemic, the fast and convenient process provided by mobile payments made consumers view it as a useful and reliable payment method, supporting the hypotheses H4 and H5.

Moreover, the study demonstrated that perceived usefulness signifi-

cantly influences the intention to use, suggesting that consumers recognize the utility of mobile payments in minimizing direct contact and maintaining social distance to mitigate COVID-19 transmission risk, thereby increasing their willingness to adopt mobile payments. This aligns with the research by Daragmeh et al. (2021) and Zhao and Bacao (2021), which identified the positive significant effect of the usefulness of mobile payments on the intention to use.

Furthermore, perceived ease of use was found to have a positive impact on both perceived usefulness and the intention to use, indicating that consumers do not find it overly difficult to learn and set up mobile payments. This suggests that the higher the ease of use of mobile payments, the higher the consumers' perception of its usefulness and their willingness to use it, aligning with the original assumptions of TAM by Davis (1989).

Contributions and practical implications

The pandemic has led to changes in consumer behavior towards mobile payment adoption. However, previous studies seldom explored the impact of epidemic risk on the intention to use mobile payments. This study's primary contribution lies in its use of the Technology Acceptance Model (TAM) proposed by Davis (1986), incorporating perceived epidemic risk, social influence, and convenience to understand the key factors affecting mobile payment use during the pandemic. It aims to provide a foundation for future research and guide decisions for businesses and government agencies related to mobile payment technologies.

This study highlights the opportunity for businesses to attract new users by enhancing the user-friendliness of mobile payments through instructional materials and simplified interfaces. Furthermore, it suggests that governments promote mobile payment adoption through policy incentives, such as tax reductions and subsidies, to encourage a wider range of merchants, including small businesses, to adopt mobile payments, thereby expanding its application and increasing its convenience.

Businesses can leverage advertising, promotional discounts, and various marketing activities to attract more consumers to their mobile payment solutions. Increasing user numbers not only enhances the visibility of the payment platform but also fosters new user acquisition through word-of-mouth. Governments should seize this opportunity to advocate for mobile payment systems by implementing incentive policies such as tax reductions and subsidies, encouraging a wide array of merchants to adopt mobile payments. This would be especially beneficial for smaller vendors like night markets and food stalls, broadening the application landscape and extending the utility of mobile payments for transactions such as paying fines or taxes, thereby enhancing their convenience.

Furthermore, governments can engage in awareness campaigns to inform the public that contactless payments like mobile payments can minimize the risk of infection during the

pandemic. This initiative aims to build a solid understanding of mobile payments among merchants and consumers, fostering a willingness to explore and adopt this technology. As the adoption rate of mobile payments steadily climbs, even traditional marketplaces and supermarkets are showing interest in adopting this technology. However, for many older individuals who infrequently use digital products, grasping and utilizing mobile payments may pose a challenge, leading them to prefer traditional payment methods. Thus, the government could consider utilizing television and radio commercials, preferably in local dialects, to advocate for mobile payments coupled with straightforward tutorials. Endorsements by authoritative figures (e.g., government representatives) could enhance the elderly population's comprehension and confidence in mobile payments, potentially increasing their willingness to use them.

With the plethora of mobile payment platforms available, consumers often face inconvenience when merchants support only a select few, preventing the use of alternative platforms. To alleviate consumer frustration and inconvenience, the government could introduce integration schemes and regulations to facilitate cross-platform payments. This initiative would eliminate the need for consumers to rely on multiple payment platforms simultaneously, significantly enhancing the convenience of mobile payments.

Limitations, recommendations and future suggestions

This study faced constraints due to limited time and the impact of the pandemic, relying primarily on distribution through social networks and online forums. Despite the anonymity among participants, the analysis revealed a high degree of similarity in the demographic data, with an overrepresentation of female and student respondents, affecting the diversity and representativeness of the sample.

Furthermore, the online survey format might not address respondents' queries or misconceptions in real-time, potentially skewing the results. Additionally, incorporating the perceived risk of the pandemic as an external variable presented challenges due to the scarcity of related studies, limiting the robustness of the questionnaire design. Although perceived pandemic risk significantly influenced usage intention, the survey questions offer considerable scope for refinement.

This study mainly explores the pandemic's impact on usage intention, acknowledging that usage intention is also affected by various other factors. Previous studies added trust and perceived security as well as habit, highlight the multifaceted influences on usage intention. It is recommended that future researchers broaden the research framework to incorporate diverse factors for a more comprehensive understanding of what influences usage intention.

Additionally, enriching the questionnaire design to include respondent's residential area preferred mobile payment brands, usage frequency, and average spending can offer a more detailed insight into the participants' backgrounds and mobile payment usage patterns. Moreover, it's advised to avoid limiting sample collection to specific communities or networks to ensure a broader demographic reach. Future studies could consider distributing paper-based surveys to provide immediate clarification on queries or misconceptions, minimizing the risk of data distortion due to cognitive biases.

References

Aji, H. M., Berakon, I., &, Izra & Husin, M. (2020). COVID-19 and e-wallet usage intention: A multigroup analysis between Indonesia and Malaysia. Cogent Business & Management, 7 (1), 1-16.

Ajzen, I. (1985). From intention to actions: A theory of planned behavior. Springer-Verlag, NY.

Anderson, J., & Gerbing, D. W. (1988). Structural Equation Modeling in Practice: a review and recommended two-step approach. Psychological Bulletin, 103(3), 411-423.

Berry, L. L., Seiders, K., & Grewal, D. (2002). Understanding service convenience. Journal of Marketing, 66 (3), 1-17.

Brown, L. G. (1989). The strategic and tactical implications of convenience in consumer product marketing. Journal of Consumer Marketing, 6 (3), 13-19.

Business Times (2021). Nearly 50% of people in Level 3 alert use mobile payment every day to fight against the epidemic [online] https://www.ctee.com.tw/news/20210624700686-439803 (accessed 10 March, 2024)

CIO Taiwan (2022). Report after the Spring Session of the 12th Financial Industry CIO Summit [online] https://www.cio.com.tw/spring-meeting-of-the-12th-financial-industry-cio-summit/ (accessed 5 March, 2024)

Dai, H., Salam, A. F., & King, R. (2008). Service convenience and relational exchange in electronic mediated environment: An empirical investigation. International Conference Information Systems, Paris.

Daragmeh, A., Lentner, C., & Sági, J. (2021),FinTech payments in the era of COVID-19: Factors influencing behavioral intentions of Generation X in Hungary to use mobile payment. Journal of Behavioral and Experimental Finance, 32, 1-13.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly, 13(3), 319-340.

Davis, F. D., & Venkatesh, V. (1996). A critical assessment of potential measurement biases in the technology acceptance model: Three experiments. International Journal of Human-Computer Studies, 45(1), 19-45.

Deloitte (2020),Impact of the COVID-19 crisis on short- and medium- term consumer Behavior [online] https://www2.deloitte.com/content/dam/Deloitte/sk/Documents/consumer-business/ Impact_of_the_COVID-19_crisis_on_consumer_behavior.pdf (accessed 3 March, 2024)

Fishbein, M., & Ajzen, I. (1975). Beliefs, attitude, intentions and behavior: an introduction to theory and research. Addition-Wesley, Boston, MA.

Fornell, C. & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. Journal of Marketing Research, 18 (1), 39-50.

GSMA (2021). State of the Industry Report on Mobile Money 2021 [online] https://www.gsma.com/solutions-and-impact/connectivity-for-good/mobile-for-development/wp-content/uploads/2021/03/GSMA_State-of-the-Industry-Report-on-Mobile-Money-2021_Full-report.pdf (accessed 3 February, 2024)

Haritha, P. H. (2023). Mobile payment service adoption: understanding customers for an application of emerging financial technology. Information and Computer Security, 31 (2). 145-171.

Immanuel, D., & Dewi, Y. (2020). Mobile payment adoption intention during pandemic covid-19 in Indonesia. Journal of Information System and Technology Management, 5, 60-76.

Ji, J. (2021). Food delivery for epidemic prevention! People swiped their cards to order food delivery more than 6 million times in one month, and their spending soared to 1.2 billion [online] https://finance.ettoday.net/news/1767957 (accessed11 March, 2024)

Kelly, A.E., & Palaniappan, S. (2023). Using a technology acceptance model to determine factors influencing continued usage of mobile money service transactions in Ghana. Journal of Innovation and Entrepreneurship, 12, 1-24.

Koenig-Lewis, N., Morgan, M., Palmer, A., & Zhao, A. (2015). Enjoyment and social influence: predicting mobile payment adoption. The Service Industries Journal 35(10), 537-554.

Liu, S. (2019). An analysis of the advantages and disadvantages of mobile payment. What are the issues that netizens are most concerned about? [online] https://www.nownews.com/news/3417178 (accessed 11 March, 2024)

Liu, Y. (2019), Using technology acceptance model to explore the impact

of mobile payment on consumer behavior. (Unpublished master's thesis). National Taiwan Normal University.

Lopez-Nicolas, C., Molina-Castillo, F. J., & Bouwman, H. (2008). An assessment of advanced mobile services acceptance: contributions from tam and diffusion theory models. Information & Management, 45, 359-364.

MIC. (2021). Mobile Payment Survey in the Second Half of 2020] 60% of consumers' commonly used mobile payments exceed electronic tickets for the first time [online] https://mic.iii.org.tw/news.aspx?id=593 (accessed 2 February, 2024)

Peng, M. Y., & Yan, X. (2022). Exploring the Influence of Determinants on Behavior Intention to Use of Multiple Media Kiosks through Technology Readiness and Acceptance Model. Frontiers in Psychology, 13, 1-11.

Poon, W.C., & Tung, S.E.H. (2024). The rise of online food delivery culture during the COVID-19 pandemic: an analysis of intention and its associated risk. European Journal of Management and Business Economics, 33 (1), 54-73.

Schumacker, R. E., & Lomax, R. G. (2004). A beginner's guide to structural equation modeling. Lawrence Erlbaum Associates: NJ.

Sreelakshmi, C. C, & Prathap, S. K. (2020). Continuance adoption of mobile-based payments in COVID-19 context: An integrated framework of health belief model and expectation confirmation model. International Journal of Pervasive Computing and Communications, 16 (4), 351–369.

Sreelakshmi, C. C., & Prathap, S. K. (2023). Effect of COVID-19 health threat on consumer's perceived value towards mobile payments in India: a means-end model. Journal of Financial Services Marketing, 1-25.

Taylor, S., & Todd, P. (1995). Assessing IT usage: the role of prior experience. MIS Quarterly, 19 (4), 561-570.

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. MIS Quarterly, 425-478.

Wen, Z. (2021). Demand for zero-contact transactions surges, LINE Pay targets new stores [online] https://www.cardu.com.tw/news/detail.php?43394 (accessed 6 March, 2024)

Wijaya, A., Turangan, J. A., & Ruslim, H. (2022). The effect of mobile payment on convenience and willingness to pay [online] https://www.atlantis-press.com/proceedings/ticash-21/125973114 (accessed 16 February, 2024)

Wu, J. (2022). Factors influencing consumers' use of mobile payment.

(Unpublished master's thesis). Feng Chia University.

Xie, Y., Boudouaia, A., Xu, J., AL-Qadri, A. H., Khattala, A., Li, Y., & Aung, Y. M. (2023). A study on teachers' continuance intention to use technology in English instruction in western China junior secondary schools. Sustainability, 15(5), 1-18.

Zhao, Y., & Bacao, F. (2021). How Does the pandemic facilitate mobile payment? An investigation on users' perspective under the COVID-19 pandemic. International Journal of Environmental Research and Public Health, 18 (3), 1-22.