



Exploring the Factors Influencing the Intention to Adopt the Contactless Payments in Post-Covid 19 in Malaysia

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Abstract. After the Covid 19 pandemic, automation and digitization technologies have become widely accepted, particularly from millennials (Gen Y) and Gen Z. It is anticipated that Malaysia will transition to a cashless society by 2030, owing to its convenience and security. To achieve that goal, there is a need to rise the adoption rate among Malaysians. The aim of this study is to examine the factors that influence Malaysians' intention to adopt contactless payments. Specifically, the study emphasized on perceived ease of use, digital financial literacy, social influence, and perceived risk. A simple random sampling technique was employed to conduct a survey in Ipoh, Perak. A total of 400 respondents participated in the data collection process, which took place between June and July of 2023. Pearson correlation and multiple linear regression analyses were performed using IBM SPSS Statistics 26. The results demonstrated that respondents were more likely to choose contactless payments when they considered the process was simple, clear-cut, and flexible. The respondents' readiness to accept new technologies was also found to be influenced by their peers (i.e., family, relatives, or friends). However, digital financial literacy and perceived risk are not significant factors. This study showed that people prioritize convenience over concerns about potential risks. Nevertheless, the rising number of scams, fraud, and data breaches remains a concern for some Malaysians. Since contactless payments are susceptible to changes in consumer behavior and technology improvements, continuous research is necessary.

Keywords: Contactless Payments, Perceived Ease of Use, Digital Financial Literacy, Social Influence, Perceived Risk.

1 Introduction

During the Covid 19 pandemic, advance in digitalization received a lot of attention. This revolution is clearly going to continue. As contactless payments eliminate the necessity of in-person business meetings, they have emerged as a practical solution that can reduce the virus's transmission. According to YB Senator Tengku Datuk Seri Utama Zafrul Tengku Abdul Aziz's speech at the Malaysian Banking and Finance Summit 2021, in the year leading up to June 2021, e-wallet usage surged by 89%, reaching

468 million transactions. Merchant registrations for QR payments increased by 57%, hitting 1 million, while online banking transactions grew by 36%, totaling 12.1 billion [36]. In the interview with The Malaysian Reserve, Mr. Ignatius Ong, CEO of TNG Digital Sdn Bhd, stated that the growing popularity of e-wallets was due to its advanced security features (i.e., biometric authentication) and ease of use for making payments. As Malaysians grew accustomed to online purchasing, Boost CEO Mr. Sheyantha Abeykoon said that there was a desire to switch to cashless payment solutions. He underlined that Malaysians become more familiar to scanning QR codes as a result of having to do so in order to utilize the MySejahtera app to check in and out wherever they go [11].

The Visa Consumer Payment Attitudes study conducted in 2022 revealed that more than 90% of Malaysians were familiar with contactless payment systems, and almost 70% had used them. Furthermore, 74% of Malaysians reported attempting to go cashless in the past year. [52] Based on Visa's Malaysia Country Manager Mr. Ng Kong Boon, eight out of ten Visa transactions in Malaysia is contactless. Malaysia is among the most advanced contactless payment markets in Asia Pacific. Initiated by younger consumers like Gen Z and Millennials, Malaysia is predicted to become a cashless society by 2030 [50]. As stated in current data gathered by the Central Bank of Malaysia (BNM), the number of electronic payments (e-payments) made by Malaysians increased to 11.5 billion in 2023 from 9.3 billion in 2022, a 23.7% increase [Bernama, 2024]. Malaysia is on track to meet the new objective outlined in the Financial Sector Blueprint (FSBP) 2022-2026, which is to rise the volume of e-payments by at least 15% yearly by 2026 that is around 400 transactions per capita [14].

The central bank and Malaysian government are working to promote the cashless society. In October 2022, BNM and the financial sector joined forces to introduce e-Duit (Selamat, Senang, Segera), a five-year e-payment campaign. The goal of this campaign is to raise consumers' and small companies' knowledge of the many e-payment initiatives, payment product safety features, and user benefits. In addition, BNM has placed a strong emphasis on financial literacy and financial scam awareness campaigns, which continue to run across the country and aim to educate and strengthen public resistance against scams and fraud attempts. For instance, Amaran Scam Facebook page provides the public with the most recent information about financial concerns and criminal activity [18]. In order to coordinate prompt action for online financial scams, such as phishing scams, Macau scams, malware attack scams, package delivery or parcel scams, and love scams, the National Scam Response Centre (NSRC) was established as a command center. NSRC is a joint effort between the National Anti-Financial Crime Centre (NFCC), law enforcement, BNM, the Malaysian Communications and Multimedia Commission (MCMC), financial institutions, and the telecommunications industry [49].

However, contactless payments still posed certain shortcomings. It is intriguing that Malaysians are concerned about their safety on the internet despite all the efforts. According to a global survey, more than 70% of Malaysians believed that their loss of privacy was "inevitable" as technology advances [37]. This perception is reinforced by the rise in online scam cases. There was a huge increase from 13,703 scam cases (with losses of RM539 million) recorded in 2019 to 32,462 scam cases (with losses of RM1.3

billion) in 2023 [8; 42]. YB Madam Teo Nie Ching, the Deputy Communications Minister, said that the losses can be divided into six *modus operandi*. The largest loss amounted to RM437 million from investment scams, followed by e-commerce scams with RM383 million, telecommunications scams with RM334 million, e-finance scams with RM104 million, romance scams with RM41 million, and non-existent loan scams with RM39 million [34]. She also stated that Malaysians from all levels of society were among the scam victims, including retirees and older citizens as well as professionals including merchants, engineers, physicians, teachers and lecturers [51].

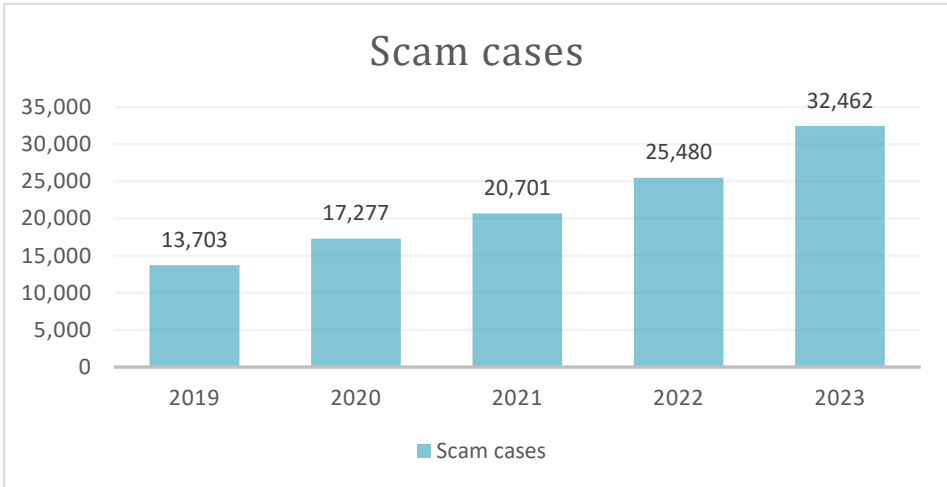


Fig. 1. Scam cases recorded from 2019 to 2023

A lack of digital financial literacy is the primary cause of the increase in online scams. It could also hinder the adoption and effective use of digital financial services and products. Datuk Jessica Chew Cheng Lian BNM Deputy Governor was worried by the poor level of digital financial literacy among Malaysians found in the Financial Capability and Inclusion Demand Side Survey (FCI) conducted in 2021. In particular, over two-thirds of respondents do not consider a website's security measures before making an online purchase, and one in three respondents voluntarily divulge their PIN or bank account credentials to close friends [14]. As seen by the rising number of scam cases, Malaysians are vulnerable to online fraud and can easily be deceived by scammers. Another challenge is that cash is still the most popular method of payment. Despite the fact that the use of cash for payments has decreased since the pandemic, 78% of Malaysians still pay with cash for 48.4% of daily expenses. Among the reasons people are not making the leap to digital payments are the ease of using cash for purchases, its security, and the worry about technological failure [40].

Malaysia aims to become a cashless society and fully digitalized nation, and it has come a long way toward achieving this goal in recent years. Nevertheless, it is apparent that a number of obstacles still need to be overcome before this vision can be realized. There is still more work to be done, starting with tackling the issues of cybersecurity ignorance and low digital financial literacy. Therefore, the study has chosen perceived

ease of use, digital financial literacy, social influence, and perceived risk as possible contributing factors to identify the key variables influencing the intention to adopt the contactless payment in Malaysia. The research objectives are stated as following:

- i. To investigate the connection between perceived ease of use and the intention to adopt contactless payments.
- ii. To explore how digital financial literacy influences the intention to adopt contactless payments.
- iii. To assess the impact of social influence on the intention to adopt contactless payments.
- iv. To analyze the link between perceived risk and the intention to adopt contactless payments.

2 Literature Review

2.1 Underpinning Theories in the Intention to Adopt Contactless Payments

Three theories were employed in this study. Theory of planned behavior (TPB) to predict the impact of digital financial literacy (perceived behavior control) and social influence (subjective norms) on the intention to adopt contactless payments, with perceived ease of use as one of the factors considered by technology acceptance model (TAM). Lastly, prospect theory (PT) to propose the effect of perceived risk towards contactless payments.

Theory of Planned Behavior (TPB)

The theory of reasoned action (TRA) is developed to explain human behavior [20; 2]. Attitudes and subjective norms predict people's intention to act in particular ways. An attitude is a conviction about something or someone being good or bad. On the other hand, subjective norms are other people's opinions that act as pressure to engage in or refrain from engaging in the behavior. However, TRA has its limitation as it can only account for behavior that is under voluntary control [32]. In other words, behavior is considered as a decision and action made based on rational thinking. Yet, in reality, individuals are not always aware of their behavior. Behavior varies in complexity and is influenced by many factors, including emotions, beliefs, personal values, psychographic traits, and so on. Therefore, the theory of planned behavior (TPB) is introduced by [1] as an extended version of TRA by incorporating the perceived behavior control. Perceived behavior control refers to perceived ease of performing the behavior given the availability of resources and opportunities.

Studies have concluded the appropriateness of TPB in explaining technology adoption intention [35; 6; 39; 43]. According to [35] study on intention to use an information system (IS), TPB is able to provide particular information by identifying causes for a problem or hurdles, the development and post-implementation evaluation of a system.

[6] found that TPB constructs explained 26% of the variance in medical students' intention to adopt new technology. The findings in [39] study indicated that TPB can account for almost 54% of the variance in households' intention to use a greywater treatment and reuse system. Likewise, [43] discovered a significant influence of TPB's constructs on the intention to use Industry 4.0 technologies by SMEs dairy manufacturing companies in Malaysia, with approximately 43% of explanation power.

Overall, TPB indicates that when there is a stronger positive attitude, supporting subjective norm, and a high level of perceived control, individuals are more likely to intend to take action.

Technology Acceptance Model (TAM)

The technology acceptance model (TAM) is introduced by [15: 16] to examine why users use or reject a given technology and how the system characteristics influence users' acceptance. It is developed from TRA by including perceived usefulness and perceived ease of use to determine users' attitudes and acceptance of the system. The belief that an individual would achieve greater outcomes if they used a specific technology is known as perceived usefulness. While, perceived ease of use refers to an individual's expectation that utilizing the technology will be effortless. According to TAM, individuals will be more likely to adopt a technology if they consider it to be easy to use and beneficial.

Prospect Theory (PT)

Prospect theory (PT) is an alternative theory to expected utility theory that explains how individuals make decisions in the actual world when faced with uncertainties [24]. The theory implies that individuals would base their choices on gains or losses from the status quo. During the choice making process, they are found to be loss averse (i.e. fear of loss), thus, losses typically have a greater impact on them than profits. Their perceptions are used to subjectively evaluate those choices. According to the notion, the individuals' perceived risk plays an essential role in influencing their decision-making.

The findings of past studies concluded the validity of PT in gaining important insight into people's willingness and reluctance to adopt a new technology, given the risks and challenges associated with the technology adoption. Those studies include digital health technology adoption [27], the adoption of green technology innovation [53; 30], and consumer adoption of retail technology [12].

2.2 Past Studies Examining the Adoption of Contactless Payment

The necessity of digital and cashless transactions in today's world has led to significant shifts in the payment methods utilized during the previous several decades. Data currently available indicates that consumers want innovative, useful, and speedy technology. Yet, privacy and security concerns have been identified as the main reasons for the restricted or slow uptake of contactless payments. Therefore, we have selected four possible factors (perceived ease of use, digital financial literacy, social influence, and

perceived risk) that could be the predominant reasons for the adoption of contactless payments. The following parts of this section describe the findings of past studies on those factors.

Adoption is an individual's act of acceptance and willingness to utilize something [46]. As such, technology adoption can be referred to as a process of incorporating and implementing new technologies into existing daily operations. Technology adoption has gained the attention of researchers since the global outbreak of Covid 19 pandemic. Numerous studies have indicated that contactless payments are likely to be adopted due to its convenience and simplicity to use, especially for users who possess a high level of digital financial literacy, and embraced by the society. However, perceived risk is discovered to be a major impediment that can hinder the adoption process.

In Finland, [25] found that while perceived ease of use had a positive effect, perceived risk was negatively related to intention to use contactless payments. Contactless payments have shown to be advantageous to retailers due to the convenience and speed of using the system. Conversely, an insecure contactless payment system could lead to brand disengagement and even switching behavior. Karjaluoto et al.'s finding was corroborated by [10] study in India, which provided additional evidence that respondents' acceptance of contactless payments was influenced by perceived ease of use. Individuals choose contactless payments because it allows for more efficient and speedier checkout procedure by integrating a variety of payment methods, such as cards, mobile apps, and digital wallets.

According to [47] study conducted in Indonesia, when users viewed e-wallet services at GenBI Solo to be easier to use, faster, easier to grasp, and effortless, their propensity to use them will also rise. Besides that, they found that security (indicated by confidentiality, privacy, authentication, limiting viruses and authenticity bypass attacks) was another important factor. Users were more likely to use an e-wallet frequently if they feel secure and have assurances regarding the protection of the money and personal information they save in it. Another Indonesian study by [54] found that intention to use an e-wallet was positively and significantly related with perceived ease of use and social influence. These results demonstrated the value of e-wallet's convenience in time and money savings. On the other side, consumers' attitudes about using new technology will be influenced by social influence from friends and family.

Interestingly, [55] study found that users' intention to use mobile payment (M-payment) in China was negatively impacted by ease of use. This unexpected discovery was caused by users' increased proficiency and accustomed to smartphone features. Therefore, users' intention to adopt was not encouraged by how simple it was to utilize M-payment. Meanwhile, social influence and perceived security had significant positive impact. Users heavily rely on the advice, suggestions, and encouragement from important people (family and friends) in their lives to make decision to use m-payment. The perception of security has the potential to mitigate uncertainty and ensure the functioning of M-payments, thus, increasing users' adoption intention.

In Malaysia, [33] conducted an important-performance matrix analysis to identify key factors influencing the adoption of NFC mobile payments. Their findings showed that ease of use had the highest performance value (79.054), followed by social influence (66.464) and perceived risk (59.165). However, ease of use (0.044) and perceived

risk (0.004) had lower total effect values compared to social influence (0.136). The study revealed that social influence had a positive and significant impact on adoption intention, while ease of use and perceived risk had no discernible effect. They concluded that among tech-savvy young users, the perception of the ease of use became less critical. Additionally, users showed a strong reliance on NFC mobile payment services and had minimal concerns about risks. Social influence from friends, family, and peers was a predominant motivator for adoption.

In Vietnam, [19] found that users' intention to use e-wallets on mobile devices are greatly increased when they perceived e-wallets to be easy to use. This convenience allows users to effortlessly make payments or transfer money digitally, which proved especially beneficial during the Covid 19 pandemic. They also concluded that social influence is the most influential factor. The government promoted contactless payments to reduce physical contact between people. Additionally, endorsements from celebrities, as well as encouragement from family, friends, colleagues, and social community groups, can enhance awareness and form users' attitudes to new technology. Nonetheless, their results indicated that perceived risk was an insignificant factor.

Despite the ambiguous results, perceived risk significantly lowered intentions to utilize cashless payment system in Thailand [38]. In other words, consumers who perceived a lower level of risk were more inclined to utilize cashless payment methods. According to [46] survey, over 54% of Saudi Arabian respondents stated that their primary motivation for not adopting contactless payment technology was lack of payment security, or concerns about transaction security.

Digital financial literacy is another crucial factor to be considered as a possible determinant for the adoption of contactless payment. Users can access the benefits and risks of contactless payments as they gain knowledge and proficiency in using digital devices. Therefore, digital financial literacy increases the level of users' trust and encourages the use of contactless payments. There is much to investigate in this study to comprehend the importance of digital financial literacy, given the paucity of research on the subject. Nevertheless, the majority of previous studies have found that financial literacy and the use of financial technology (Fintech) are positively correlated [22; 5; 45; 7; 44].

According to [22], German households with high degree of financial literacy were more likely to use Fintech. The reason for this was that households with higher financial literacy levels have a better understanding of financial products. They were better at determining which products provide better results because they had greater financial experience. Likewise, [5] findings showed that financial literacy was crucial and had a statistically significant positive correlation with the use of online banking (i-banking) by adult Cypriots. Compared to respondents with poor financial literacy, those with high financial literacy were more likely to utilize i-banking. It was because financially literate people able to weigh the benefits and risks of the goods and services provided by financial technologies, avoid reckless behavior, and make well-informed decisions. Yet, financial literacy ($\beta = 0.0624$) was found being the least important variable to predict Fintech adoption in Indonesia, even though it had a positive and significant influence [45].

[7] found that digital financial literacy influenced the adoption of i-Fintech among

SME entrepreneurs in Selangor, Malaysia. Specifically, knowledge of digital financial products/services and understanding digital financial risk control, played key roles in encouraging the use of i-Fintech. This suggested that having this information would help entrepreneurs comprehend the various digital financial products or services and boost their confidence in managing the risks associated with utilizing i-Fintech. But, awareness of digital financial risks had a significant negative impact. Entrepreneurs may choose not to use i-Fintech if they were aware of the risks associated with cyber security and online fraud. Their findings provided more evidence for the negative impact of perceived risk on the adoption of new technologies. Similarly, financial literacy had positive and significant relationship with the usage of online, mobile and contactless payments among the Norwegians [44]. Their study found that users of the new digital financial payment methods were more financially literate than nonusers.

2.3 Research Hypotheses

Based on the findings of past studies, perceived ease of use, digital financial literacy, social influence, and perceived risk were significant factors. Therefore, the research hypotheses are formulated as follows:

- H1. Perceived ease of use is positively associated with the intention to adopt contactless payments.
- H2. Digital financial literacy is positively related to the intention to adopt contactless payments.
- H3. Social influence has a positive effect on the intention to adopt contactless payments.
- H4. Perceived risk negatively impacts the intention to adopt contactless payments.

3. Methodology

This section consists of several subsections, including research design, research framework, sample design, data collection technique, questionnaire design, and the method of analyses.

3.1 Research Design

The purpose of this quantitative study was to investigate how perceived ease of use, digital financial literacy, social influence, and perceived risk affect Malaysians' intentions to adopt contactless payments. A stratified sampling technique based on various age group was employed to collect the data. Surveys were conducted by randomly distributing the questionnaires to residents of Ipoh, Perak. The reliability test (Cronbach alpha), factor analysis, Pearson correlation analysis, and multiple regression analysis were performed using IBM SPSS Statistics version 26.

3.2 Research Framework

The conceptual framework is constructed by referring to the research hypotheses. There is a direct relationship between the dependent variable (intention to adopt contactless

payments) and the independent variables (perceived ease of use, digital financial literacy, social influence, and perceived risk).

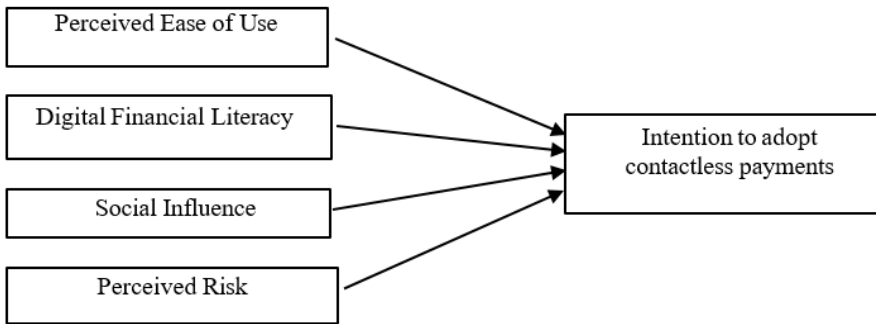


Fig. 2. Conceptual framework for intention to adopt contactless payment

3.3 Sampling Design

According to the Department of Statistics Malaysia, Perak is the fourth highest populous state in Malaysia and Kinta District has the highest population in Perak. Most importantly, Kinta District's age group distributions were relatively balanced and closely match Malaysia's age group distributions (refer to Table 1). Therefore, Ipoh, the Perak's state capital located in the Kinta District, was selected as the survey area. It was based on the consideration that a smaller scale in Ipoh would be easier to handle than covering the whole nation. It offers the chance to look at this study in a more focused setting. Residents of Ipoh are geographically close to one another, which effectively facilitated data collection.

Table 1. Age group distributions of Kinta District and Malaysia

Age group (years old)	Kinta District (%)	Malaysia (%)
15-29	29.40	33.89
30-44	29.41	31.73
45-59	21.37	19.88
60 and above	19.82	14.49

Source: Department of Information 2023

Using the formula from [29] study and the 694,300 residents of Kinta District for year 2023, the sample size was calculated. Based on the calculation, about 384 respondents were required to reflect the population.

$$\begin{aligned}
 \text{Sample size} &= \frac{(3.841)(694,300)(0.50)(1 - 0.50)}{(0.05)^2(694,300 - 1) + (3.841)(0.50)(1 - 0.50)} \\
 &= \frac{666,701.575}{1,736.70775}
 \end{aligned}$$

$$= 383.8882$$

A total of 400 respondents were approached in an effort to reduce the margin of error. The respondents were categorized into four age groups using a stratified sample technique: 15-29 years old, 30-44 years old, 45-59 years old, and 60 years of age and above (refer to Table 2).

Table 2. Population and sample by age groups

Age group (years old)	No. of residents ('000)	No. of respondents	(%)
15-29	204.1	118	29.40
30-44	204.2	118	29.41
45-59	148.4	85	21.37
60 and above	137.6	79	19.82
	N = 694.3	n = 400	100

3.4 Data Collection Technique

Primary data collection technique was used in this study to collect first-hand information from the primary sources. The data collection period was from June to July 2023. The survey was administered physically and via online to include a diverse range of individuals into this study. For physical survey, the respondents were shoppers at the night markets and malls, as well as university students. For online survey, the google form was distributed to respondents' emails and Facebook. In order to ensure the privacy of the personal information gathered, respondents had to sign the consent form before answering the questionnaire. The validity of the survey answers will depend on the accuracy and honesty of the respondents' responses. Researchers were restricted from influencing the respondents, except to provide clarifications if they had any doubts about the questionnaire.

3.5 Questionnaire Design

There are six sections in the questionnaire. In the first section, respondents need to answer multiple-choice questions on their age, gender, ethnicity, occupation, and level of education in order to disclose their demographic backgrounds. The remaining five sections consist of closed-ended questions measuring intention to adopt contactless payments, perceived ease of use, digital financial literacy, social influence, and perceived risk on a five-point Likert scale from 1 = strongly disagree to 5 = strongly agree. All measurement of the variables were adapted from past studies (refer to Table 3).

Table 3. Measurement of variables: Adaptations from past studies

Variables	Items	Past studies
Intention to adopt contactless payment	5	[56]
Perceived ease of use	5	[28]
Digital financial literacy	4	[23]

Social influence	5	[19], [41], [48]
Perceived risk	5	[17]

3.6 Method of Analyses

The reliability test was carried out using Cronbach's alpha, which assesses the stability and consistency of the measuring instruments. This test is crucial to ensure the robustness and validity of the study's results. Cronbach's alpha is commonly employed to evaluate internal consistency, particularly with multi-item measurement tools [4]. As noted by [26], a sample size of at least 100 is recommended for conducting reliability test, and a Cronbach alpha value of 0.7 or higher is generally considered acceptable.

Next, factor analysis and principal component analysis were used to test the construct validity of the measuring instruments. The communalities and factor loadings will be observed to determine the extent to which each item is associated with a common factor. A mean level of communalities that is more than 0.7 is preferred [31]. [21] recommended that a factor loading of 0.3 is required for sample size of 350 or more to be significant. Therefore, any factor loading that is at least 0.3 is deemed acceptable.

The relationship strength between dependent and independent variables was analyzed using Pearson correlation analysis. A perfect positive correlation is denoted by a r value of 1, and a perfect negative correlation by a r value of -1. Table 4 presents the strength level of the relationship according to its correlation coefficient.

Table 4. Correlation coefficients and relationship strength levels

Correlation coefficient	Strength level
$\pm 1.00 - \pm 0.80$	Very strong
$\pm 0.79 - \pm 0.60$	Strong
$\pm 0.59 - \pm 0.40$	Moderate
$\pm 0.39 - \pm 0.20$	Weak
$\pm 0.19 - 0.00$	Very weak

Source: [3]

Meanwhile, multiple linear regression analysis was employed to predict the intention to adopt contactless payments based on the perceived ease of use, digital financial literacy, social influence, and perceived risk. The multiple linear regression equation is as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

Where:

Y = Intention to adopt contactless payments

β_0 = Intercept

X_1 = Perceived ease of use

X_2 = Digital financial literacy

X_3 = Social influence

X_4 = Perceived risk

$\beta_1, \beta_2, \beta_3, \beta_4$ = Slope coefficient

ε = Random error term

4 Empirical Results

This section presents the study's findings through five subsections. These subsections detail the demographic characteristics of the respondents and discuss the results of reliability test, factor analysis, Pearson correlation, and regression analysis.

4.1 Demographic Characteristics

Out of 400 respondents, 47.0% are female and 53% are male. The majority fall into the age groups of 15-29 years and 30-44 years, each representing 29.5%. This is followed by the 45-59 age group at 21.3% and those aged 60 and above at 19.8%. Ethnically, the respondents are predominantly Chinese (65.3%), followed by Malay (21.8%) and Indian (13.0%). Secondary education represents the highest proportion of respondents' education levels at 36.0%, followed by those with a bachelor's degree (34.8%), a diploma (17.0%), a master's degree (5.0%), a doctorate degree (4.5%), and A-level (2.8%). In term of employment, most of them work in the private sector (33.8%), followed by undergraduates (22.0%), self-employed (16.0%), unemployed (11.3%), retirees (10.0%), government employees (6.3%), and secondary schoolers (0.8%).

4.2 Reliability Test

The study examined the reliability of five factors, consisting of a dependent variable (intention to adopt contactless payments), and four independent variables (perceived ease of use, digital financial literacy, social influence, and perceived risk). The reliability test revealed Cronbach alpha values ranging from 0.907 to 0.953 (refer Table 5). Consequently, all 24 items across the five variables are considered reliable.

Table 5. Cronbach alpha values and means ($n = 400$)

Variables	Items	Mean	Cronbach alpha
Intention to adopt contactless payments	5	4.091	0.932
Perceived ease of use	5	4.019	0.953
Digital financial literacy	4	3.889	0.928
Social influence	5	4.033	0.907
Perceived risk	5	3.882	0.928

4.3 Factor Analysis

The suitability of the 24 items across the five variables for factor analysis was evaluated using the KMO measure of sampling adequacy and Bartlett's Test of Sphericity. The KMO values for each variable are as follows: intention to adopt contactless payments (0.891), perceived ease of use (0.907), digital financial literacy (0.859), social influence (0.867), and perceived risk (0.862), all exceeding the threshold of 0.6. The Bartlett's test is also significant at p-value less than 0.05 for all variables. Therefore, those five variables were deemed appropriate for Principal Components Analysis (PCA) with

varimax rotation. The analysis revealed that most items (except SI4 and SI5) have communalities more than 0.7 and all 24 items have factor loading above 0.3, indicating a strong relationship with the underlying variables (refer Table 6 and Table 7).

Table 6. Factor analysis results for dependent variable

	Factor Load- ing	Communi- ties
Intention to adopt contactless payments (IACP)		
IACP1 I think that using contactless payment to pay is good idea.	0.868	0.753
IACP2 I like making purchases with contactless payment.	0.861	0.741
IACP3 I am satisfied with the use of contactless payment method.	0.919	0.844
IACP4 The contactless payment service meets my expectations.	0.886	0.786
IACP5 The overall purchasing experience via contactless payment was satisfactory.	0.898	0.806
Eigen Value		3.930
Percentage of variance		78.602

Table 7. Factor analysis results for independent variables

	Factor Load- ing	Communi- ties
Perceived ease of use (PEU)		
PEU1 I think learning to use contactless payment is easy for me.	0.916	0.838
PEU2 I think my interaction with contactless payment procedure would be clear and understandable.	0.916	0.840
PEU3 I think it would be easy for me to become skillful at using the contactless payment.	0.925	0.855
PEU4 I would find the contactless payment easy to use.	0.927	0.860
PEU5 I would find a contactless payment procedure to be flexible to interact with.	0.901	0.812
Eigen Value		4.205
Percentage of variance		84.107
	Factor Load- ing	Communi- ties
Digital financial literacy (DFL)		
DFL1 I always adapt technology to everyday life.	0.869	0.756
DFL2 I am well-adjusted in learning new technologies.	0.921	0.848

DFL3	I can find tools and applications in order to support everyday life.	0.916	0.838
DFL4	I am able to self-teach in order to use applied programs.	0.919	0.845
Eigen Value		3.287	
Percentage of variance		82.180	
		Factor Load-	Communi-
		ing	ties
Social influence (SI)			
SI1	The important people (family/relatives/friends) suggest contactless payment.	0.875	0.765
SI2	The important people (family/relatives/friends) using the contactless payment system.	0.898	0.806
SI3	The important people (family/relatives/friends) support the use of contactless payments.	0.920	0.847
SI4	I think the people in my environment who use contactless payment have a high profile.	0.801	0.642
SI5	I am more willing to accept the contactless payment when people around me have already adopted it.	0.778	0.605
Social influence (SI)			
Eigen Value		3.665	
Percentage of variance		73.300	
		Factor	Communalities
		Loading	
Perceived Risk (PR)			
PR1	I feel that using contactless payment would make me lose control over my privacy.	0.868	0.754
PR2	I feel that using contactless payment would lead to a loss of privacy because my personal data could be used without my permission.	0.866	0.749
PR3	I feel that using contactless payment would expose me to the risk of internet hackers taking control of my personal data.	0.886	0.786
PR4	I feel that using contactless payment would lead to potential fraud of my bank account.	0.901	0.811
PR5	I feel that using contactless payment would subject my bank account to financial risks.	0.888	0.789
Eigen Value		3.889	
Percentage of variance		77.786	

4.4 Pearson Correlation Analysis

According to Table 8, there is a moderate to strong correlation between all independent variables and the intention to adopt the contactless payments. While digital financial literacy ($r = 0.733$, $p\text{-value} = 0.000$) and social influence ($r = 0.610$, $p\text{-value} = 0.000$) have moderately positive correlations, perceived ease of use has a strong positive correlation ($r = 0.814$, $p\text{-value} = 0.000$). On the other hand, perceived risk ($r = -0.021$, $p\text{-value} = 0.678$) has low and insignificant negative correlation.

Table 8. Results of correlation analysis ($n = 400$)

Variables	IACP	PEU	DFL	SI	PR
IACP	1				
PEU	0.814	1			
DFL	0.733	0.876	1		
SI	0.610	0.540	0.526	1	
PR	-0.021	-0.043	-0.045	0.231	1

4.5 Multiple Regression Analysis

In a regression analysis, multicollinearity arises when independent variables exhibit strong correlations with each other. The collinearity diagnostics are presented in Table 9, featuring two metrics: Tolerance and Variance Inflation Factor (VIF). The results indicate that all independent variables have tolerance values exceeding 0.10 and VIF values below 10, suggesting that multicollinearity is not an issue.

Table 9. Results of multiple regression analysis ($n = 400$)

	B	Std. Error	Beta	t-value	Collinearity Statis- tics	VIF
					Toler- ance	
(Con- stant)	0.955	0.146		6.551		
PEU	0.551	0.049	0.652	11.286	0.223	4.491
DFL	0.019	0.047	0.024	0.416	0.227	4.396
SI	0.255	0.034	0.257	7.498	0.631	1.586
PR	-0.047	0.026	-0.052	-1.798	0.904	1.106

Goodness of fit of estimated model:

$R^2 = 0.706$

F ratio = 237.595, $p\text{-value} = 0.000$

Dependent variable: Intention to adopt contactless payments (IACP)

The R-squared value indicates that 70.6% of the variation in the intention to adopt contactless payments is explained by the independent variables (perceived ease of use,

digital financial literacy, social influence, and perceived risk). The high F-ratio value shows that the model is statistically significant and fit better than a model with no independent variables.

The regression results indicate that perceived ease of use ($B = 0.551$, $p\text{-value} = 0.000$) and social influence ($B = 0.255$, $p\text{-value} = 0.000$) are statistically significant predictors of the intention to adopt contactless payments. Perceived ease of use ($Beta = 0.652$) has the strongest influence, followed by social influence ($Beta = 0.257$). These results are consistent with the findings by [54] and [19]. Thus, hypotheses H1 and H3 are supported.

In simple terms, respondents are more inclined to adopt contactless payments when they think it is simple to learn, that it is an easy process to grasp, and that they can quickly become skilled at it. It would be an added benefit, if the respondents perceive the system as user-friendly and adaptable to many scenarios. Besides that, the respondents are found to be influenced by important people in their life, such as family, friends, and peers. It is inevitable as Malaysia is a collectivist society, where social relationships, family, and community play a vital role in shaping individual behaviors and decisions. When influential people suggest, used, or support contactless payments, it creates a sense of social pressure and encouragement to adopt the technology.

On the other hand, digital financial literacy has a small, non-significant positive effect ($B = 0.019$, $p\text{-value} = 0.677$), and perceived risk has a negative but marginally insignificant effect ($B = -0.047$, $p\text{-value} = 0.073$). Thus, hypotheses H2 and H4 are rejected. The insignificance of digital financial literacy and perceived risk in the adoption of contactless payments is likely due to few reasons. Because contactless payments are meant to be simple to use, so people do not need to be highly knowledgeable about digital finance to adopt them. Additionally, most people trust banks and financial institutions because they are heavily regulated by the central bank (BNM). This trust makes them feel less need to understand the technical details.

Meanwhile, the result on perceived risk is consistent with the findings by [33] study, which was conducted in Malaysia. They explained that users relied heavily on the services (NFC M-payments) and did not worry much about potential risks or problems when using it. Likewise, it is common to use contactless payments for daily purchases of goods and services. Over time, the perceived risk diminishes, and the convenience of contactless payments outweighs any concerns. Also, contactless payment security features like biometric authentication and encryption help lower concerns about risk. However, it is important to note that perceived risk does have some influence on the adoption of contactless payments, though its impact is relatively minor. In other words, some people may still have concerns about fraud, data breaches, scams, or unauthorized transactions.

5 Conclusion

This section consists of two subsections. The first part discusses the theoretical and practical impacts of the study's findings. Next, it addresses the limitations and offers suggestions for future study to build on these findings and explore new areas.

5.1 Research Implications

To sum up, the acceptance of contactless payments in Malaysia is mostly determined by perceived ease of use and social influence. If they find this technology easy to use and convenient, and if they observe others using it, they are more inclined to adopt it themselves. However, their actions appear to be largely unaffected by digital financial literacy and perceived risk, suggesting that they prioritize convenience over technical expertise or security concerns. The study's findings align with TAM by showing the important of perceived ease of use, and with TPB by emphasizing the role of social influence in shaping adoption intention.

This study recommended that contactless payment providers concentrate on enhancing user experience and publicizing the advantages of contactless payments via social media and influential networks. People's confidence can be further boosted by educating people about the simplicity and security of these payments. Adoption rate may also be increased by initiatives to develop infrastructure in rural areas and focus awareness campaigns on older or less tech-savvy populations. Besides that, word-of-mouth advertising could be used to spread positive experiences and information from person to person, building trust and credibility.

Despite various measures taken to reduce scams and frauds, this issue continues to pose a threat to users of contactless payments. Therefore, enhancing digital literacy is crucial for raising awareness about preventing scams and fraud. With increased awareness, people can recognize warning signs, avoid risky behaviors, and adopt secure practices. Awareness also encourages people to report suspicious activity promptly, allowing for quick action to minimize damage. Authorities may also further safeguard users and guarantee that contactless payments remain a safe and convenient choice for daily transactions by fostering trust in secure payment systems and collaborating with financial institutions.

In short, governments and businesses should understand the important factors that can overcome the resistance of consumers to reject contactless payments, thereby increasing their usage.

5.2 Research Limitations and Recommendations for Future Study

The desire to adopt contactless payments is highly time-sensitive, influenced by shifts in consumer behavior and advancements in technology. As new technologies and social norms emerge, the insights gained from studies on contactless payment adoption can quickly become outdated. This study anticipated that the adoption of contactless payments will continue to expand in the coming years, driven by ongoing efforts from the government, BNM, banks, financial institutions, and businesses. However, this study also highlighted potential threats from security risks, including scams, frauds, data breaches, and unauthorized transactions, which could undermine public confidence in using contactless payment systems.

Therefore, it is recommended that future study to investigate how these security vulnerabilities affect consumers' trust in contactless payments. Researchers can explore the impact of these risks on long-term adoption rates as well as the best mitigation techniques for preserving user confidence. Furthermore, assessing the effectiveness of

current security measures implemented by the government, financial institutions, and businesses would offer insightful information about how to increase the public's trust in contactless payment systems.

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