



# The Effect of Covid-19 on Consumers' Payment Behaviour: Integration of the Theory of Planned Behaviour and the Health Belief Model

Ming-Pey Lu<sup>(✉)</sup> and Zunarni Kosim

School of Economics, Finance and Banking, Universiti Utara Malaysia, Darul Aman, 06010  
Sintok, Kedah, Malaysia

{lu.ming.pey, zunarni}@uum.edu.my

**Abstract.** The coronavirus 19 disease crisis has impacted people's behaviour and changed their ways of living. People are cognitively change their behaviour to protect their lives during this crisis due to the negative effects of COVID-19. The theory of planned behaviour (TPB) and the health belief model (HBM) are employed to determine consumers' intention to adopt cashless payments with the influence of the COVID-19 crisis in Malaysia. A total of 222 responses were collected from internet survey during November and December 2020. The hierarchical regression was conducted to test the prediction. Attitude and social norms in the TPB model and the perceived benefits and self-efficacy in the HBM model are discovered as significant factors in predicting consumers' intention to adopt cashless payments. In addition, the findings reveal that the integration of TPB and HBM models shows a stronger effect than examining the two behaviour change models separately. This is one of the few studies that explore the impact of health issues in the digital financial services context.

**Keywords:** Health behaviour · Coronavirus 19 · Behavioural intention · Consumer behaviour · TPB

## 1 Introduction

A health crisis, coronavirus 19 disease (COVID-19), that hit the world suddenly has brought new changes to people's views on behaviour, lifestyle, and value. Malaysia has implemented the movement restrictions in 2020 as the cases of COVID-19 were increase significantly. In order to limit places people could gather, many non-essential businesses were required to temporary stop their operations during the period. Additionally, many people are forced to remain in their homes and work remotely. Today, although the global economy gradually recovers from the COVID-19 crisis, everyone is back on track, but the fear of the crisis is inevitable. We are still reminded of protective measures every day, for example, to wear a mask in public, to keep a safe distance from others and always clean our hands. Thus, this health crisis has impacted people's behaviour and changed their ways of living.

Thanks to technology, our society keeps functioning during the COVID-19 crisis. Many merchants and retailers have shifted to the digital business model during the lockdowns. Cashless payments are another payment option that could potentially reduce the COVID-19 infection. Cashless payment is when the financial transactions between buyer and seller are carried out through electronic channels, for example, payment cards, online banking and e-wallet, without using physical money (Bilińska-Reformat & Kieźel, 2016). The cashless payments support transactions in e-commerce and payments for goods and services.

In Malaysia, although many efforts have been made by the government in recent years to encourage the use of cashless payments, but it has yet to reach a comprehensive level. Lim (2020) reported that cashless payment transactions account for only 5 percent of total daily payments in Malaysia. This may be due to the low financial knowledge among Malaysians (Financial Education Network, 2019). Security risk is the main concern in using cashless payment methods like mobile payments (Chuah et al., 2019). People are skeptical about the privacy and cybersecurity of the payment systems on the market. In addition, transactions in Malaysia are dominated by cash (McKinsey, 2020). Therefore, there is a need to explore the important aspects that could change consumers' payment behaviour.

Cashless payment is one of the digital financial services that can help the underserved population improve their access to the formal financial sector (Kim, 2015) to build an inclusive society. Consumers can transfer and receive payments and store value electronically with their mobile phones, payment cards, or other digital devices. Besides that, cashless payment is also an important tool to hinder tax evasion. Immordino and Russo (2018) demonstrate that the use of debit and credit cards for payments makes tax evasion more difficult because the system build a trail for the underlying transactions. The cashless payment system can help government to improve tax collection and curb corruption. Besides that, government also use cashless payment like e-wallet as a platform to distribute the stimulus package to the vulnerable groups during the COVID-19 crisis. The cashless payment system provides convenience to consumers. It allows financial transactions through the internet that can be conducted anytime and anywhere, for example, ordering foods and groceries deliveries. This enhances the customers' experience. Hence, ensuring the adoption of cashless payment is important given the advantages that it contributes to the nation and consumers.

Studies on the intention to use technology have been repeatedly documented with different theories and approaches from diverse disciplines. Many studies have been done to examine the use and preference of electronic banking and payment system from different perspectives (Friadi et al., 2018; Chuah et al., 2019; Adepoju & Adeniji, 2020). Meanwhile, the relevant studies for the period of the COVID-19 crisis only focused on the user technology acceptance model (Saraswati et al., 2021; Yang et al., 2021).

In addition to the technology acceptance model, this study includes the health behaviour theory to examine consumers' behavioural changes during the COVID-19 crisis. The theory of planned behaviour (TPB) model and the health belief model (HBM) are integrated to investigate consumers' intention to adopt cashless payment. This is one of the few studies that explore the impact of health issues in the digital financial services context.

This study will shed light on the issues discussed above. The findings of this analysis can help practitioners such as policy makers, financial institutions, and merchants to understand how consumer behaviour is impacted by health crisis. Moreover, the study's findings can be a valuable source of reference in developing successful strategies to deal with the changing in consumer behaviour and building a more inclusive society.

In summary, we find that the attitude and social norms in the TPB model and the perceived benefits and self-efficacy in the HBM model are discovered as significant factors in predicting consumers' intention to adopt cashless payments. In addition, the findings reveal that the integration of TPB and HBM models shows a stronger effect than examining the models separately.

The remaining sections in this paper are as follows. The Sect. 2 presents the literature review and hypotheses development. The methodology for the study is presented in Sect. 3. Results and discussion are shown in Sect. 4. The conclusion and the study's implications and limitations are covered in Sect. 5 and Sect. 6, respectively.

## 2 Literature Review

### 2.1 Theoretical Background

In Malaysia, the COVID-19 crisis has caused more than thirty thousand fatality cases (Ministry of Health Malaysia, 2022). The negative effects of COVID-19 such as economic shocks, losing loved ones and sickness have forced people to cognitively change their behaviour to protect their lives during this crisis. People are taking preventive measures, for instance, keeping social distance, staying at home, and avoiding crowded places. The World Health Organization (WHO) encourages people to pay using a cashless system to reduce the infection of the virus (Huang, 2020). Cashless payment is another payment option. The financial transactions can be completed through the internet without physical interaction between the involved parties. The transactions in the economy can keep functioning with cashless payment, especially during the lockdown, quarantine, and movement restriction period.

Behavioural change models have been widely used to understand human behaviour change as a result of social and environmental changes in many fields, such as health, education, and technology. When consumers make payment electronically rather than with cash, they have shifted their behaviour to cashless payment (Tee and Ong, 2016). The TPB and the HBM models can be used to investigate the behavioural change of consumers towards cashless payment during the health crisis. The TPB model focuses on understanding an individual's acceptance and usage of technology (Mathieson, 1991) while the HBM model highlighted the importance of how an individual's health beliefs affect preventative behaviour (Becker, 1974).

The TPB model is frequently used in behavioural study. It is a psychological theory that postulates that attitude, social norms, and perceived behavioural control influence the psychological phenomena of human behaviour intention (Ajzen, 1991). The TPB model provides details that explained the person's intention to use that could capture various aspects of their belief (Mathieson, 1991). Intention will form a specific plan outlining the timing, places, and ways to conduct the target behaviour (Gollwitzer, 1999). Attitude is how a person feel about the evaluation of the behaviour of interest and social norms shows

how a person's view is influence by people who are important to them (Fishbein & Ajzen, 1975). Meanwhile, perceived behavioural control describes perceived ease or difficulty of a particular behaviour (Ajzen, 1991). Studies such as Khatimah and Halim (2016) and Ayudya and Wibowo (2018) use the TPB model to study behavioural intention to adopt e-money.

Meanwhile, the HBM is a prominent model to explain people's willingness to adjust their behaviour based on their health perceptions (Becker, 1974). This model is commonly used to investigate human health practice and health preventative behaviour. The HBM shows that an individual's proclivity to adopt a behaviour is predicted by their belief of their susceptibility to the disease (perceived susceptibility), the severity of the disease's negative effects (perceived severity), the advantages of adopting a health behaviour (perceived benefits), and fewer barriers to engaging in a health behaviour (self-efficacy). Intention in a specific behaviour can be predicted using the HBM model (Huang et al., 2020; Shmueli, 2021).

Many health-related behaviour studies have combined these two models to understand a person's behaviour change such as diet and fasting behaviour (Nejad et al., 2005), cervical smear test (Bish et al., 2000), vaccine (Gerend & Shepherd, 2012; Alhalaseh et al., 2020), and tourism (Huang et al., 2020). However, there are few studies conducted by integrating these two theories in investigating the predictors of behavioural intention to use digital financial services like cashless payment.

## 2.2 Hypotheses Development

The TPM and HBM are overlapping constructs in predicting human behaviour (Huang et al., 2020). These two theories are complementary for each other in some aspects. This study integrates attitude, social norms, perceived behavioural control, perceived benefits, and self-efficacy into the research model. The study's research framework is illustrates in Fig. 1.

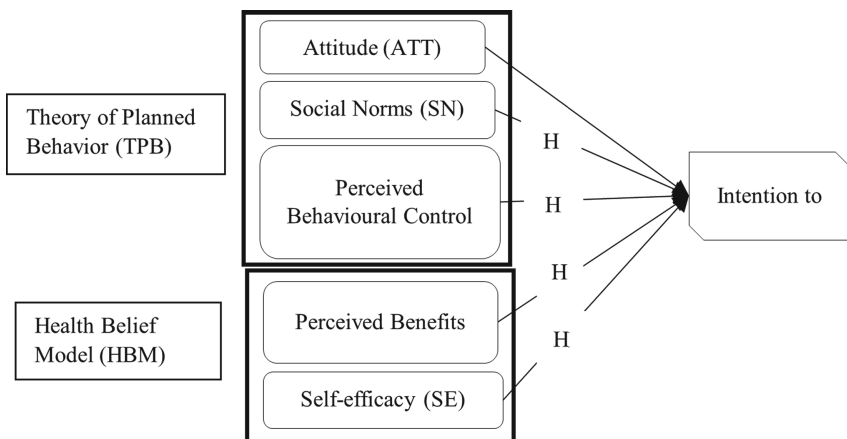


Fig. 1. Research Framework

Intention is defined as the forces that motivate a particular behaviour. The stronger the intention, the more probable it is that the behaviour will actually be carried out. Ajzen (1985) explains that intention is an individual's propensity to choose whether or not to take any action. Attitude, social norms, and perceived behavioural control are the three factors that drive people's intentions. Chuah et al. (2019) reveal that Malaysian consumers have a high intention to adopt mobile payments, as it is still a relatively new payment method in Malaysia.

Attitude is described as the extent to which an individual has a positive or negative response towards the behaviour of interest. It is a person's judgement whether the action is beneficial or not beneficial. A study by Friadi et al. (2018) find that perceived usefulness and perceived ease of use influenced an individual's attitude in using e-money. An individual's attitude determines whether they like or dislike something, and as a result, attitude may motivate them to act consistently in relation to the object or idea. In the context of this study, by feeling that using cashless payment is convenient and they enjoy the benefits given, the intention to use it increases. Therefore, we hypothesize that:

*H1: Consumers' attitude towards cashless payment and the intention to use cashless payment are significantly related.*

Social norms are belief about perceived social pressure to engage in an action. Sentosa and Nik Mat (2012) show that social norms directly affect consumers' intention on online shopping. Chuah et al. (2019) also find that the consumer's intention to adopt mobile payment services is positively impacted by social norms, where they are highly influenced by peers, siblings, and colleagues. In the context of this study, when the most important people, such as family members and close friends, believe that adopting cashless payment is a wise decision, the intention to use it increases. Therefore, we hypothesize that:

*H2: Social norms and consumers' intention to use cashless payment are significantly related.*

Perceived behavioural control refers to how simple or complex an individual perceives the target behaviour to be. It is a reflection of past experiences in anticipation of challenges. Friadi et al. (2018) find that when resources are available and simple requirements are expected in using smartphone-based e-money, the intention to adopt it is higher. The study by Indrayana et al. (2016), however, shows contradictory results in using Instagram for online shopping. In the context of this study, by having the perception that using cashless payment is fast, easy, and widely available, the intention to use it increases. Therefore, we hypothesize that:

*H3: Perceived behavioural control and consumers' intention to use cashless payment are significantly related.*

Perceived benefits refer to a person's perceptions that an action would reduce the susceptibility and severity of the disease and result in other beneficial effects (Jones et al., 2015). Perceived benefits are the strongest predictor of changing behaviour (Sulat

et al., 2018). Alhalaseh et al. (2020) find that perceived benefits explain the intention to vaccinate against influenza. Additionally, Huang et al. (2020) demonstrate positive relationship between perceived benefits and preventative behaviour. When people think that the advantages of action can help to limit the risks, this increases their willingness to change their behaviour. In the context of this study, the higher the belief that cashless payment can protect against COVID-19 virus infections, the intention to use it increases. Therefore, we hypothesize that:

*H4:* Perceived benefits and consumers' intention to use cashless payment are significantly related.

Self-efficacy is the belief that the target behaviour can be completed despite perceived obstacles (Rosenstock et al., 1988). Huang et al. (2020) show that self-efficacy has a significant relationship with preventative behaviour. Shahnazi et al. (2020) also find that the more confident a person is in taking the action, the more likely they will perform it. However, Ding et al. (2015) show the contradictory findings. In the context of this study, despite the movement control restrictions, the conditions under quarantine, the desire to keep social distance, and to practice personal hygiene, people can use cashless payment in their transactions, In the context of this study, despite the movement control restrictions, the conditions under quarantine, the desire to keep social distance, and to practice personal hygiene, people can use cashless payment in their transactions, the intention to use it increases. Therefore, we hypothesize that:

*H5:* Self-efficacy and consumers' intention to use cashless payment are significantly related.

### 3 Methodology

To test the proposed hypotheses developed, primary data is used to collect information pertaining to consumers' payment behaviour towards cashless payment during the COVID-19 crisis in Malaysia. This study collected a convenient sample with a self-administered questionnaire. The target respondents of this study would be Malaysian who use cashless payments. The participation was entirely voluntary. An internet survey was used to collect a total of 222 responses during November and December 2020. The purpose of this study was informed to the respondents before they responded to the questionnaire.

#### 3.1 Measurement of Variables

Table 1 shows the structure and sources of questionnaire. There are two sections in the questionnaire. The first section was for respondents' demographic data, and the second section was developed based on the constructs of this study. The survey's statements are rated on a five-point Likert scale, ranging from (1) Strongly Disagree to (5) Strongly Agree. Johns (2010) shows that respondent is confused in selecting the responses when more than five-point Likert scale. He argues that when there are more than five scale

**Table 1.** The structure and sources of questionnaire

Variables	Questions	Sources
Intention to use	3	Venkatesh et al. (2003)
Attitude	5	Davis (1989), Fishbein and Ajzen (1975)
Social norms	6	Ajzen (1991), Mathieson (1991)
Perceived behavioural control	2	Ajzen (1991)
Perceived benefits	3	Hwang et al. (2017), Shahnazi et al. (2020)
Self-efficacy	3	Shahnazi et al. (2020)

points, the accuracy of the data is greatly reduced. The existing literature was derived and adopted for the dependent and independent variables in this study.

### 3.2 Demographic Analysis

Table 2 presents the 222 respondents' demographic information. There were 32% of male respondents and 68% of female respondents. Most respondents were between the ages of 35–44 years old (45.90%), followed by those aged 25–34 years old (29.70%), 18–24 years old (11.70%), 45–54 years old (11.30%) and aged 55 and above (1.40%). Meanwhile, the majority of the respondents are from postgraduate (51.4%) and diploma/undergraduate education level (46.4%). Malay respondents make up 69.80% of the total, followed by Chinese respondents (21.2%), other races respondents (5%) and Indian respondents (4.1%). Majority of the respondents indicated that their income level is RM5,000 and above (50.90%), while 15.30% respondents' monthly income is RM3000–RM4,999, 14.90% below RM1,000, 12.60% in the RM1,000–RM2,999 monthly income range, and 6.30% were dependent with no income. Respondents lived in urban areas (60.80%), making up the majority.

### 3.3 Reliability and Discriminant Analysis

Table 3 presents the construct's descriptive statistics and reliability of the study. The Cronbach's  $\alpha$  value for all the constructs falls between 0.728 and 0.951, which exhibits strong internal reliability. The mean for all constructs is greater than standard deviation. This shows the independent variables and the dependent variable both positively responded. Among the independent variables, attitude shows the highest mean value of 4.205 which indicates the greatest influence on the intention to use cashless payment and is followed by self-efficacy (4.138), perceived behavioural control (3.937), perceived benefits (3.928), and social norms (3.312).

**Table 2.** Respondents' Demographic

Measure	Item	Frequency	Percentage (%)
Gender	Male	71	32
	Female	151	68
Age	18–24	26	11.7
	25–34	66	29.7
	35–44	102	45.9
	45–54	25	11.3
	55 and above	3	1.4
Education	Primary level	1	0.5
	Secondary level	1	0.5
	Diploma/undergraduate	103	46.4
	Postgraduate	114	51.4
	Others	3	1.4
Ethnic	Malay	155	69.8
	Chinese	47	21.2
	Indian	9	4.1
	Others	11	5.0
Income Level	<RM1,000	33	14.9
	RM1,000–RM2,999	28	12.6
	RM3,000–RM4,999	34	15.3
	>RM5,000	113	50.9
	Dependent	14	6.3
Residence Area	Rural	15	6.8
	Suburban	72	32.4
	Urban	135	60.8

The KMO should be minimum 0.5 to show the sampling adequacy (Kaiser, 1974). The KMO for this study is 0.919 shows the sampling is adequacy for the study. The correlation matrix is not an identity matrix, as shown by the significance of the Bartlett's test (.000).



**Table 3.** The construct's descriptive statistics and reliability

Items	Loading	Cronbach's $\alpha$	Mean	SD
<i>BI</i>		<i>0.951</i>	<i>4.273</i>	<i>0.825</i>
BI1	0.943		4.27	0.921
BI2	0.957		4.30	0.792
BI3	0.968		4.25	0.877
<i>ATT</i>		<i>0.897</i>	<i>4.205</i>	<i>0.772</i>
ATT1	0.738		4.10	0.970
ATT2	0.726		4.10	1.033
ATT3	0.829		4.22	0.891
ATT4	0.708		4.27	0.877
ATT5	0.672		4.34	0.802
<i>SN</i>		<i>0.926</i>	<i>3.312</i>	<i>0.931</i>
SN1	0.762		3.29	1.046
SN2	0.877		3.15	1.097
SN3	0.720		3.51	1.041
SN4	0.891		3.17	1.141
SN5	0.748		3.38	1.069
SN6	0.821		3.37	1.145
<i>PBC</i>		<i>0.728</i>	<i>3.937</i>	<i>0.873</i>
PBC1	0.820		3.88	0.986
PBC2	0.670		3.99	0.984
<i>PBF</i>		<i>0.841</i>	<i>3.928</i>	<i>0.913</i>
PBF1	0.572		4.10	1.004
PBF2	0.801		3.66	1.117
PBF3	0.739		4.02	1.022
<i>SE</i>		<i>0.898</i>	<i>4.138</i>	<i>0.897</i>
SE1	0.881		4.06	1.031
SE2	0.567		4.17	0.906
SE3	0.799		4.18	1.013

The discriminant validity among the constructs is determined by the correlation analysis as shown in Table 4. The correlation coefficient for all the constructs are significant and below 0.85 (Hair et al., 2010), hence, the discriminant validity for all constructs in this study is considered supported.

**Table 4.** Correlation Coefficient of Independent Variables and Dependent Variable

	BI	ATT	SN	PBC	PBF	SE
BI	1.000					
ATT	0.829***	1.000				
SN	0.491***	0.520***	1.000			
PBC	0.508***	0.624***	0.478***	1.000		
PBF	0.605***	0.699***	0.387***	0.530***	1.000	
SE	0.695***	0.674***	0.508***	0.529***	0.718***	1.000

Note: \*\*\* denotes that the observed mean is significantly different from zero at 1% level (2-tailed).

## 4 Results and Discussion

### 4.1 Regression Analysis

The TPB and the HBM models are integrated to predict consumers' intention to use cashless payment in the midst of the COVID-19 crisis in Malaysia with hierarchical regression.

Table 5 shows the summary of hierarchical regression results for the three models. The model 1 consists of variables from the TPB, the model 2 of variables from the HBM, and the model 3 integrates the variables from both models. The model has no multicollinearity problem as all constructs have tolerance values higher than 0.1 and VIF lower than 10 (Hair et al., 2010). In addition, the data used in this study had no autocorrelation problems, as showed by the Durbin-Watson index of 1.972, which falls between 1.50 and 2.50. Therefore, the model satisfied the assumptions required to make sure the significance test is valid.

The mode 1 shows that the TPB variables explained 68.9% (adjusted  $R^2 = 0.689$ ) of the variance in intention to use cashless payment with the influence of COVID-19 crisis in Malaysia. The results show that attitude ( $\beta = 0.862$ ) and social norms ( $\beta = 0.079$ ) are statistically significant predictors of consumers' intention to use cashless payment. However, perceived behavioural control has no statistically significant impact on the intention to adopt cashless payments. Thus, the hypotheses of H1 and H2 are accepted. The F-value of 164.482 ( $p < 0.001$ ) in Model 1 shows the fitness of this model.

The Model 2 shows that the HBM variables explained 50.2% (adjusted  $R^2 = 0.502$ ) of the variance in intention to use cashless payment with the influence of COVID-19 crisis in Malaysia. According to the findings, the significant factors explaining it are perceived benefits ( $\beta = 0.486$ ) and self-efficacy ( $\beta = 0.202$ ). Thus, the hypotheses of H4 and H5 are accepted. The F-value of Model 2 of 112.418 ( $p < 0.001$ ) shows the fitness of this model.

The model 3, which is the integration of TPB and HBM variables, explained 72.1% (adjusted  $R^2 = 0.721$ ) of the intention to use cashless payment with the influence of COVID-19 crisis in Malaysia. The model 3 added 3.2% to the explained variance by TPB and 21.9% to the explained variance by HBM models, respectively. When the key variables from TPB and HBM models included in the hierarchical regression, the

**Table 5.** Hierarchical Regression Analysis

<b>Model 1</b>						
<i>TPB</i>	Beta	Std. Error	t-stat	Tolerance	VIF	Result
Constant	<b>0.526***</b>	0.178	2.964	-	-	-
ATT	<b>0.862***</b>	0.054	15.902	0.546	1.831	Accepted
SN	<b>0.079**</b>	0.040	1.982	0.691	1.448	Accepted
PBC	-0.036	0.047	-0.773	0.578	1.731	Rejected
$R^2 = 0.694$ , Adjusted $R^2 = 0.689$ , F value = <b>164.482***</b>						
<b>Model 2</b>						
<i>HBM</i>						
Constant	<b>1.530***</b>	0.193	7.925	-	-	-
PBF	<b>0.486***</b>	0.062	7.891	0.485	2.061	Accepted
SE	<b>0.202***</b>	0.063	3.219	0.485	2.061	Accepted
$R^2 = 0.507$ , Adjusted $R^2 = 0.502$ , F value = <b>112.418***</b>						
<b>Model 3</b>						
Constant	<b>0.485***</b>	0.170	2.847	-	-	
<i>TPB</i>						
ATT	<b>0.761***</b>	0.062	12.243	0.373	2.679	
SN	0.031	0.039	0.802	0.650	1.538	
PBC	-0.060	0.045	-1.338	0.560	1.787	
<i>Health Belief Model</i>						
PBF	<b>0.259***</b>	0.051	5.078	0.395	2.529	
SE	-0.071	0.052	-1.369	0.392	2.549	
$R^2 = 0.728$ , Adjusted $R^2 = 0.721$ , F value = <b>115.389***</b>						

Notes: Dependent variable = BI. The asterisk (\*\*) and (\*\*\*) denote that the observed mean is significantly different from zero at 5% and 1% level, respectively. Durbin-Watson = 1.972

results demonstrate that only attitude ( $\beta = 0.761$ ) and perceived benefits ( $\beta = 0.259$ ) remain significant. This implies that the decisions to adopt cashless payment is mainly explained by consumers’ attitude and their belief on the use of cashless payment can reduce the risk of COVID-19 infection. But, no relationship is discovered between social norms, perceived behavioural control, and self-efficacy with the intention to use cashless payments in this model.

### 4.2 Discussion

Based on the findings in the preceding section, attitude and social norms are the significant factors in predicting the intention to use cashless payment in Malaysia based on the TPB model. Of these, attitude shows the strongest influence. An individual’s attitude

is affected by the usefulness and perceive ease of use of the electronic money (Friadi et al., 2018). The cashless payment has offers many incentives and bring convenience to the consumers, especially during the lockdown period. These encourage them to use cashless payment. Another important factor in predicting consumers' intention to use is the influence of peers, siblings, and colleagues. This crisis has brought pressure to many people, the fear of the crisis is inevitable. The opinions and recommendations of peers, siblings, and colleagues influence their decisions during this period. Similar findings are shown in studies such as Chuah et al. (2019).

Furthermore, the findings demonstrate that the health belief model significantly predicted the intention to adopt cashless payment with the influence of the COVID-19 crisis. Many countries, including Malaysia, have implemented movement restrictions to reduce infections during the COVID-19 crisis. To thrive in the crisis, many merchants have moved from physical to online selling. Kohli et al. (2020) find that online shopping is on the rise to reduce the risk of infection. The cashless payment is a payment method that support e-commerce. During the lockdown period, people started to rely on online service. People believe that using cashless payment can reduce human-to-human contact and, hence, can protect them against the COVID-19 virus infections. Huang et al. (2020) describe that people would take preventative behaviour against the COVID-19 disease when they perceive the effects of preventative measures like keeping social distance and regular hand washing. This is also found in a study by Alhalaseh et al. (2020), who demonstrated a significant relationship between perceived benefits and intention in health-related behaviour. Besides that, the self-efficacy is significantly explains the intention to use cashless payment in Malaysia. Cashless payments allow people to complete financial transactions anytime and anywhere through the internet, despite the barriers such as under quarantines, the desire to keep social distance and the need to practice personal hygiene. Shahnazi et al. (2020) demonstrate that self-efficacy is an effective variable in overcoming barriers to a healthy behaviour.

Additionally, this study demonstrates that the integration research model of the TPB and the HBM is stronger in explaining the intention to use cashless payment in Malaysia with the influence of COVID-19 crisis compared to examining the two behaviour change models separately. This implies that the health crisis has an impact on people's decisions to adopt cashless payments in addition to the benefits of the technology itself. This may suggest the stimulation effect of the COVID-19 crisis. During the health crisis, nothing is more important than protecting ourselves from the virus infections.

## 5 Conclusion

Payment services are the first and most frequently used services than other financial services. The payment system plays a crucial role in ensuring money circulation and promoting economic and financial stability. Adopting an efficient electronic payment system allows an individual to participate and interact in economic activity, thereby fostering financial inclusion. This study offers valuable empirical findings on the influence of the health crisis on consumers' payment behaviour. The theory of planned behaviour (TPB) and the health belief model (HBM) was integrated to predict consumers' intention to adopt cashless payments with the influence of COVID-19 crisis in Malaysia. Attitude

and social norms are discovered to be the most important determinants by using the TPB model. Consumers form a positive attitude towards cashless payment when they enjoyed the incentives offered and the convenience of using cashless payment. Consumers also significantly influenced by their family members and friends. However, the HBM model finds that the consumers' intention to use cashless payment are significantly influenced by their perceptions of the benefits and their level of self-efficacy. People believe that cashless payment is an effective tool to help prevent infections from the COVID-19 virus. It allows consumers to execute financial transactions successfully even under the circumstances of movement restrictions. Consumers can use cashless payment without having to be physically present at the physical stores, even if they are under the quarantine period, to keep physical distance, and to avoid physical contact with each other. These are the preventative measures to protect ourselves from the infections. Additionally, when the TPB is integrated with the HBM in the hierarchical regression, the results show that the integration model ( $R^2 = 0.712$ ) is stronger in predicting the intention to use cashless payment with the influence of the COVID-19 crisis than the TPB ( $R^2 = 0.689$ ) and the HBM ( $R^2 = 0.506$ ) models separately.

## 6 Implications and Limitations of the Study

Implications are given by the study's result. Due to the COVID-19 crisis, there are many uncertainties as we do not know when the virus will mutate and when it will end. Hence, prevention is the only way out. Cashless payment is a tool that allows people to reach zero contact during the crisis and keep the economy growing without the barriers of movement restrictions that have been implemented.

This study reveals that attitude is the most significant predictor that explains consumers' intention to use cashless payment. Therefore, the cashless payment providers and the central bank should emphasize the benefits and ease of use of cashless payment, so that consumers form a positive attitude towards using cashless payment. The use of poster, brochures, and advertisement on television and radio are effective ways to disseminate this information. In addition, cashless payment providers can have promotional events to engage more merchants in accepting cashless payment so that the services are more accessible and provide convenience to consumers.

Furthermore, this study discovers that perceived benefits is the significant factor to predict consumers' intention to use cashless payments. Avoiding crowded, staying at home, keeping safe distance, and practicing personal hygiene can help to prevent the infections of the virus. Financial transactions can be conducted with cashless payments without being physically present in the store or bank, particularly for those who are undergoing a quarantine period. Health professionals and experts can encourage people to use cashless payment when making payments to lower the risk of infections.

Next, this study demonstrates that other factors, such as health-related issues, also contribute to predicting consumers' intention to use technology, where it is not only determined by the technology itself. These findings can act as a reference sources for future researchers. This study provides evidence about the influence of health-related issues on consumers' behavioural intention to use technology.

Besides that, the limitations of this study include that the data was collected with a convenient sampling technique. Due to the lockdown of the country during the data

collection period, an online questionnaire is the most optimal approach. Therefore, precautions are needed to generalize the findings of this study. Besides that, the analysis of cashless payment post-adoption behaviour can be carried out to build a more comprehensive model to analyse consumers' behaviour rather than focusing on the intention to use it. Lastly, this study focuses on the COVID-19 disease. The analysis of different types of disease like influenza and hand, foot, and mouth disease (HFMD) may give a deeper discussion on the influence of health-related issue on predicting consumers' behaviour.

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