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The Impact of Perceived Usefulness, Perceived Value, and Perceived Security on Mobile Payment App Loyalty through Satisfaction: User Interface as Moderator

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Abstract

The purpose of this study is to examine the influence factors of perceived usefulness, perceived security, perceived value and moderator effect of user interface toward mobile payment app loyalty through customer satisfaction on GrabPay user in Klang Valley, Penang, and Johor. This study inspects the influence factors toward customer satisfaction and relationship between customer satisfaction and mobile payment app loyalty among the GrabPay user in Klang Valley, Penang and Johor by using Structural Equation Model (SEM) analysis of 468 respondents. The findings of this study shown perceived usefulness, perceived security and perceived value had significant relationship to customer satisfaction. In addition, customer satisfaction and perceived value had significant positive effect on mobile payment loyalty app. The satisfaction had strongest significant level to mobile payment app loyalty. This study is important to management team, consumer and merchant who are involve in mobile payment app as it indicates the influence factors of perceived usefulness, perceived security, perceived value and moderator of user interface toward customer satisfaction are the among critical elements in affecting the mobile payment app loyalty. There are only a few research studies related to customer retention on mobile payment app loyalty with the modified variables from Technology Acceptance Model (TAM) theory and electronic Service Quality (e-SQ) model. Instead, many researchers were conducted to examine the adoption of mobile payment app through behavioural intention. Hence, this study is to extend the research model by adding moderating effect of user interface, influence factor of perceived security and perceived value toward customer satisfaction that lead to mobile payment app loyalty. Moreover, examine the perceived value toward mobile payment app loyalty.

Keywords: Customer Satisfaction; Mobile Payment App Loyalty; User Interface; Perceived Security



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1. Introduction

The electronic payment service markets are in transition from traditional payment service to mobile payment app service with potential new technology innovation. (Dahlberg, Mallat, Ondrus, & Zmijewska, 2008). The new technology innovation with the revolution in wireless connectivity enabling mobile payment app to be important factor that rise financial service leader's attention (A. Au & Kauffman, 2008). Recent reported by business wire on June 2019 that mobile payment app in Malaysia is expected to achieve a CAGR of 20.7% to reach US\$70.6 billion which is equivalent to MYR 293.2 billion by 2025 with respective market segment included retail spending, travel booking, bill payment, and financial service (Wood, 2019). Based on the e-Commerce Consumers Survey 2018 (ECS, 2018) conducted by Malaysian Communications and Multimedia Commission (MCMC), Malaysia ranked number two in ASEAN with 16.6 millions of e-commerce consumers or 51.2% of Malaysia population. Mobile payment app service has raised awareness of Malaysian in the area of Klang Valley, Penang, and Johor.

According to Shin (2009) study, perceived usefulness, perceived ease of use and perceived security are strong supported and positively influence the user adoption on of mobile wallet by using the Technology Acceptance Model (TAM) theory (Shin D.-H. , 2009). Based on Lee and Wong (2016) study, the e-service quality such as efficiency, system availability, fulfilment, privacy that has positive significant relationship with customer satisfaction and positive result in customer loyalty toward mobile payment by using electronic service quality (e-SQ) model (Lee & Wong, 2016). However, there are currently no findings on the user interface that can moderate the customer satisfaction and fewer studies of the relationship between customer satisfaction and mobile payment app loyalty. Therefore, this study is to fill the gap by investigating the influence factors of perceived usefulness, perceived security and perceived value to customer satisfaction and user interface as moderator (Zhang et al., 1999). In addition, the relationship of perceived value and customer satisfaction to mobile payment app loyalty.

According to grab website, GrabPay is one of the popular e-wallet provider in Malaysia with the payment services such as rides service, in-store purchase, credit transfer, GrabFood, and prepaid top up (GrabPay, 2020). Besides, GrabPay had more than 3000 merchants to serve their consumer nationwide (Press Centre, 2020). In addition, GrabPay app has recorded 20 millions downloaded that created a huge communities in Malaysia (Hassan, 2020).



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This study will contribute to management team of mobile payment app provider, graphical user interface (GUI) design development companies and financial institutions to understand the influence factors of customer satisfaction and mobile payment app loyalty. Besides, the findings of this study can be leverage by managers to understand the factors that impact customer loyalty in order to better improve their customer retention program. In addition, understanding the role of user interface design is crucial to help create attractive design and security assurance (Galitz, 2007).

2. Literature Review

2.1 *Mobile Payment Application*

Mobile payment define as that type of payment transaction processing in the course of which within an electronic procedure the payer employs mobile communication techniques in conjunction with mobile devices for initiation, authorization or realization of a payment (Pousttchi K. , 2003). The person to person mobile payment application such as GrabPay that promote cashless transmission from one person to another through mobile device (Varshney, 2002). Grab is an e-hailing company that well recognised in Malaysia while GrabPay is the subsidiary function from Grab. GrabPay provide mobile payment service to consumer in the segment of rides, food delivery, online and offline transactions. In addition, the first mobile payment app provider to adopt DuitNow QR in order for the GrabPay to be used over the one QR code across difference mobile payment app providers and banks (GrabPay, The Rakyat's e-Wallet Accelerating Malaysia's Digital Economy, 2020).

2.2 *Perceived Usefulness*

Perceived usefulness defined as level of an individual have confidence in a particular system that could increase his or her job performance (Davis, 1989). Further study shows perceived usefulness is the individual's subjective assessment of the value that the new information technology in a specific task is evaluated (Gefen & Straub, 2003). Perceived usefulness is another form of encouragement to the individual believe that using the particular system will inspire his or her performance (Davis, Bagozzi, & Warshaw, 1989). The consequences of the behaviour in perceive usefulness is individual evaluated of the attractiveness of the usefulness (Chau, 1996). Previous study stated that the perceived usefulness is positively related to customer satisfaction (Amin, Rezaei, & Abolghasemi, 2014). It shows perceived usefulness was a strong indicator of customer satisfaction in mobile website.



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The user interface design has the connection to the accessibility of the system that mobile payment app should be user friendly and ease of use in order to attract more users.

H₁: Perceived usefulness has a positive effect on satisfaction

2.3 Perceived Security

Perceived security is defined as the level of customer believes that using a particular mobile payment app platform will be secure and the user's perception of control the interactive system is highly influenced by the perceived security (Shin D., 2008). The lack of perceived security is the major barriers to mobile payment app adoption that lead to customer as main reason of refusal to use (Cheong, Cheol, & Hwang, 2002). The security concerns can be divided into four type which are data integrity, confidentiality, non-repudiation and authentication (Suh & Han, 2003). Data integrity indicates that the precise data exchange when transaction is performed whereas confidentiality refer to privacy of the intended user when data exchange during transactions. Moreover, non-repudiation represent user is unable to deny their transaction and authentication mean the data exchange is restricted to authorized person only.

H₂: Perceived security has a positive effect on satisfaction

2.4 Perceived Value

Customer's perceived value is defined as the aspect of quality, money, benefit and social mindset. The quality aspect indicates that the value received is differentiate from the money paid and the quality of the product. (Bishop, 1984). It refers to the positive perceived value is generated when customer paid less for a high-quality product. In addition, from the money aspect it indicates that value is created when paid less for goods (Bishop, 1984). In economic concept it called consumer surplus that the highest price consumers willing to pay versus the actual amount being paid. The benefit aspect demonstrated that the utility of perceived sacrifices and perceived benefits are evaluated by customers' overall assessment (Zeithaml, 1988). It implies that the trade-off between what they get and what they have to give up for obtaining goods. The social mindset aspect shows that the value of buying a product or services fall in the particular social community that could increase the influence of the self-image (Sweeney & Soutar, 2001). According to previous study by Kuo, Wu and Deng



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(2009), perceived value is positively influenced customer satisfaction that higher perceived value can lead to higher customer satisfaction.

H₃: Perceived value has a positive effect on satisfaction

2.5 Satisfaction

Customer satisfaction is divided into two type, namely service encounter satisfaction and overall customer satisfaction (Shankar, Smith, & Rangaswamy, 2003). To be specific, service encounter satisfaction is transaction-specific and overall customer satisfaction is relationship-specific. Transaction-specific satisfaction indicates customer satisfaction toward the most recent purchase experience with particular service encounter (Jones & Suh, 2000). On the other hand, the overall customer satisfaction is the cumulative evaluation that accumulative the overall satisfaction over the time period toward a specific product or service experience (Jones & Suh, 2000). Previous studies shows overall customer satisfaction is the key factor to predict the customer loyalty as overall customer satisfaction reflects customer's accumulative impression of the particular service provider (Cronin & Taylor, 1992; Zeithaml, Berry, & Parasuraman, 1996).

H₄: Satisfaction has a positive effect on mobile payment app loyalty

2.6 User Interface

In the new era of technology driven, user interface become important factor to be consider as user experience that driven by increasing rapid technology changes (Myers, Hudson, & Pausch, 2000). The next generation is well adopted with the computing technology in several of forms and completely comfortable with it (Olsen, 2007). Millennium are more active in cell phone rather than computer nowadays as their daily routines are web searching, social media networking, online shopping, and online streaming. "A well-designed graphical user interface for business system can greatly increase user productivity" (Galitz, 2007). According to Paul and Tomlinson (2008), simplicity and direct access to all destinations offer benefit over the hierarchical menu in the mobile device user interface design. Besides, mobile user interface is one of the factors to distinguish between mobile payment service providers that can moderate the relationship between perceived usefulness and satisfaction (Wu, 2010). In addition, user interface of mobile application security can moderate the perceived security and satisfaction

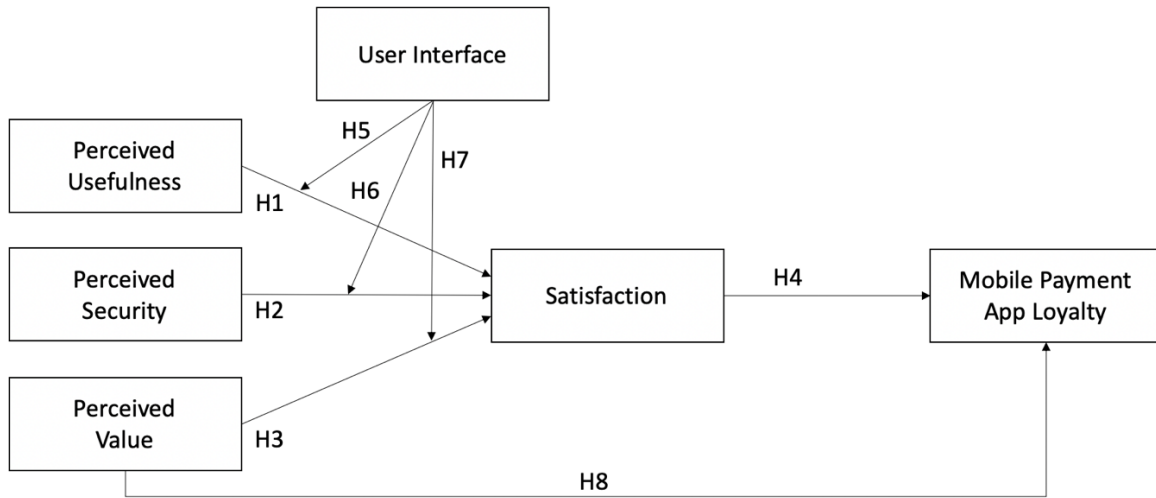


Figure 1: Proposed Research Framework

In this study, a combined of modified TAM theory with independent variables of perceived usefulness, perceived security, perceived value and modified e-SQ model with customer satisfaction toward customer loyalty are adopted (Shin D.-H. , 2009; Lee & Wong, 2016). TAM theory is used because of the new technology of mobile payment that proposed in this research. Furthermore, e-SQ model is used to measure customer satisfaction and customer loyalty. In addition, moderator of user interface is added (Morris & Tomlinson, 2008). Figure 1 shows the proposed research framework and to evaluate the theory based on developed hypotheses.

3. Research Methodology

3.1 Questionnaire and Data Collection

In this study, quantitative technique was conducted and questionnaire was developed to collect quantitative data about the GrabPay’s mobile payment app loyalty. The five point Likert scale ranging from “strongly disagree” to “strongly agree” is adopted to test all the variables. There are eight questions adapted from Schierz et al. (2010) with four questions for perceived usefulness and four questions for perceived security respectively. Besides, this study adapted Yang and Peterson (2004) measurement constructs for perceived value, satisfaction and loyalty with four questions, eight questions and six questions respectively. In addition, seven questions adapted from Zhang et al. (1999) for user interface.



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An online questionnaire was created and data collected through the particular questionnaire's service provider. This is the most convenience method of data collection across the Malaysia. In addition, the questionnaire was placed on social media and distributed through GrabCar's driver to their client. Data collection method through google survey form as it provides the statistical summary of respondents.

3.2 Population

In this study, the target population is GrabPay user in Klang Valley, Penang and Johor because in these locations consist of 32.7% overall of Malaysia population with higher spending power and higher adoption of new technology (Department of Statistics Malaysia, 2020). Total of 505 questionnaire were collected in the selected cities. However, there are 468 respondents qualified and 37 respondents have not use GrabPay before. Hence, 468 respondents were used for data analysis.

3.3 Data Analysis

The statistical analysis method used in this study is SmartPLS. PLS-SEM is selected to be data analysis method for the following reason in this study (Hair et al., 2012). First, moderator and mediator are proposed in this study that involve complex modeling. Second, PLS-SEM has the ability of redundancy analysis that avoid indetermination factor. Third, PLS-SEM is robust to violations of multivariate normal distribution.

4. Analysis And Results

4.1 Descriptive Analysis



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Table 1: Respondents' Demographic Profile (n=468)

Characteristics	Frequency	Percentage (%)
Gender		
Male	221	47.2
Female	247	52.8
Age		
15 - 24	99	21.2
25 - 34	271	57.9
35 - 44	96	20.5
45 - 54	1	0.2
55 and above	1	0.2
Education Qualification		
SPM	24	5.1
Diploma	22	4.7
Degree	318	67.9
Master	102	21.8
PhD	2	0.4
Monthly Salary		
RM1001 – RM2000	46	9.8
RM2001 – RM3000	98	20.9
RM3001 and above	324	69.2
State		
Federal Territory of Kuala Lumpur	111	23.7
Selangor	124	26.5
Penang	121	25.9
Johor	112	23.9

Based on the findings, there are 52.8% of female and 47.2% of male respondents. Furthermore, there are 57.9% of respondents in the age of 25-34 year old whereas only 21.2% and 20.5% are in the age of 15-24 year old and 35-44 year old respectively. In addition, the education qualification of the respondents are majority Degree and Master Level which is total 89.9%. This data indicates that most of the highly educated people are tend to use mobile



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payment app service and willing to adopt new technology. Moreover, most of the respondents, 69.2% are monthly salaried at RM3001 and above. Follow by 20.9% and 9.8% of respondents are monthly salaried at RM2001 – RM3000 and RM1001 – RM2000 respectively. Besides, there are 235 respondents are from Klang Valley while 121 and 112 respondents are from Penang and Johor respectively. It shows that people who are staying in Klang Valley, Penang, and Johor had higher spending power as compare to other states.

4.2 Assessment of Measurement Model

Table 2: Convergent Validity

Construct and Items	Outer Loadings	CR	AVE
<i>Mobile Payment App Loyalty (Loyalty)</i>			
I say positive things about the GrabPay to other people.	0.682	0.865	0.517
I would recommend the GrabPay to those who seek my advice about such matters.	0.689		
I would encourage friends and relatives to use the GrabPay.	0.727		
I would post positive messages about the GrabPay on some internet message board.	0.739		
I intend to continue to do business with the GrabPay.	0.715		
I intend to do more business with the GrabPay.	0.759		
<i>Perceived Security (PS)</i>			
The risk of an unauthorized third party overseeing the payment process is low.	0.823	0.874	0.635
The risk of abuse of usage information (e.g., names of business partners, payment amount) is low when using mobile payment app services.	0.789		
The risk of abuse of billing information (e.g., credit card number, bank account data) is low when using mobile payment app services.	0.835		
I would find mobile payment app services secure in conducting my payment transactions.	0.736		



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4.3 Assessment of Structural Model

Table 4: Path Coefficient Result

Exogenous Variable	Endogenous variable	SE	Path Coefficient	t-value	P-value	R ²	Q ²
Satisfaction ->	Loyalty	0.046	0.495	10.864	0.000	0.588	0.296
PU ->	Satisfaction	0.041	0.091	2.248	0.025	0.629	0.306
PV ->	Satisfaction	0.058	0.216	3.750	0.000		
PV->	Loyalty	0.050	0.358	7.052	0.000		
PS ->	Satisfaction	0.067	0.450	6.885	0.000		
<i>Moderating Effect of User Interface</i>							
PU ->	Satisfaction	0.037	0.033	1.060	0.289		
PV ->	Satisfaction	0.075	0.077	1.028	0.304		
PS ->	Satisfaction	0.073	-0.132	1.725	0.085		

Note: PU = Perceived Usefulness, PV = Perceived Value, PS = Perceived Security, UI = User Interface

In this study, the bootstrapping process with 5000 subsamples from the original data set with one tailed test is applied to calculate the significance of the path coefficients (Hair et al., 2013). Table 4 shows the path coefficient result between exogenous and endogenous of all variables are greater than 1.96 (Chin et al., 2003). Besides, the R2 value of 0.588 of loyalty shows that 58.8% of the variation on satisfaction is explained through factor influence. Furthermore, the R2 value of 0.629 of satisfaction indicates that 62.9% of the variation on factor influence can be used as a predictive power. In addition, the Q2 values of both the loyalty and satisfaction are 0.296 and 0.306 that can be interpreted a reliable predictive relevance. However, the moderator effect of user interface had the t-value lower than 1.96.



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Table 5: Result of Hypothesis Test

Hypothesis	t-value	Result
H ₁ : Perceived usefulness has a positive effect on satisfaction	2.248*	Supported
H ₂ : Perceived security has a positive effect on satisfaction	6.885**	Supported
H ₃ : Perceived value has a positive effect on satisfaction	3.750**	Supported
H ₄ : Satisfaction has a positive effect on mobile payment app loyalty	10.864**	Supported
H ₅ : User interface moderate positively the relationship between perceived usefulness and satisfaction	1.028	Not Supported
H ₆ : User interface moderate positively the relationship between perceived security and satisfaction	1.725	Not Supported
H ₇ : User interface moderate positively the relationship between perceived value and satisfaction	1.028	Not Supported
H ₈ : Perceived value has a positive effect on mobile payment app loyalty	7.052**	Supported

Note: *P<0.05, **P<0.01

Table 5 shows hypothesis H₁, H₂, H₃, H₄ and H₈ are supported. Perceived usefulness, perceived security and perceived value has positive effect on satisfaction. Satisfaction is the strongest predictor to mobile payment app loyalty as compare to perceived value. However, the hypothesis of moderating effect of user interface is not supported. The user interface does not moderate the effect of independent variable to satisfaction.

5. Discussion And Conclusion

5.1 Discussion of Major findings

GrabPay user shows loyalty toward the mobile payment app when receive high satisfaction on the perceived usefulness, perceived security, and perceived value (Lee & Wong, 2016). It is supported by hypothesis H₄ and the e-SQ model. GrabPay provider should continue improve the security insurance, provide better services experience and creating product beneficial to consumer in order to increase their loyalty and leading them to continue using the mobile payment app.

Besides, GrabPay user shows that the high level of perceived usefulness of the mobile payment app will significantly increase the satisfaction on the GrabPay app (Shin D.-H. , 2009). It is supported by hypothesis H₁ and TAM theory. GrabPay provider should further improve the user interface design in order to ease the mobile payment app into fewer steps needed such as “one-click payment” solution when make a payment by using GrabPay app (Bezhovski,



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2016). In addition, GrabPay provider can advertise their usefulness of the GrabPay app to increase the satisfaction of the consumer.

Furthermore, GrabPay user shows that the perceived security of the mobile payment app will influence the customer satisfaction toward GrabPay app (Shin D.-H. , 2009). It is supported by hypothesis H2 and TAM theory. GrabPay provider should assure their security system is high and guarantee customer's banking information is highly secured in their system to build trustable between GrabPay and their consumers. Besides, GrabPay provider can provide the insurance to consumer such as guarantee money payback if fraud is happened to build consumer's confident (Bakar, Rosbi, & Uzaki, 2020). Financial institute should create awareness to inform existing user of the robustness of the security system.

In addition, GrabPay user are satisfied when they received high perceived value that influence consumer choice to continue use of the GrabPay app (Shin D.-H. , 2009). It is supported by hypothesis H3 and TAM theory. GrabPay provider should continue to create high perceived value to consumer such as reward points, discount code, and cash back in order to increase customer's satisfaction. Moreover, GrabPay user receives higher product benefit tend to have higher satisfaction as they received higher perceived value (Kuo, Wu, & Deng, 2009).

Moreover, GrabPay user tend to be loyalty when they had high perceived value from the mobile payment app (Shin D.-H. , 2009). It is supported by hypothesis H₈. GrabPay provider should increase perceived value by providing lower product cost such as discount voucher or higher product benefit such as the convenience of use in order to increase customer's loyalty (Kuo, Wu, & Deng, 2009).

However, the user interface does not moderate the influence factors toward customer satisfaction (Galitz, 2007). The result shows modern generation is established with user interface that caused GrabPay user not creating addition interest of perceived usefulness. In addition, a well design user interface is not generating higher level of perceived security as GrabPay user see brand's reputation as a whole. Moreover, user interface is not increasing perceived value toward customer's satisfaction (Chan, 2014).

5.2 Managerial Implication

The findings in this research highlight the needs for the mobile payment app providers to understand that customer retention in the mobile payment app represents a critical aspect to consumer's loyalty which could impact their business sustainability for long term plan. The findings propose that perceived usefulness, perceived security and perceived value had



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significant impact on consumer's satisfaction in mobile payment app (Shin D.-H. , 2009). Besides, the findings show that satisfaction and perceived value are the predictor for the mobile payment app loyalty.

Moreover, the findings show that GrabPay user are more concern on the perceived security of the mobile payment app (Shin D.-H. , 2009). Personal data privacy security and the risk of abuse information assurance are primary concern to GrabPay user. GrabPay provider should invest more resources into security system in order to provide a robust security system that guarantee to their consumer.

Mobile payment app providers and financial institutions should collaborate to create value to consumers such as lower the transaction fee for mechanism and consumer, advertise the robustness of security system and simplicity of the graphic user interface design to ensure consumer's satisfaction.

In addition, the findings show that consumer's satisfaction are the key predictor to the consumer's loyalty (Lee & Wong, 2016). GrabPay provider should constantly collect consumer's feedback in order to meet consumer's expectation. Besides, GrabPay provider should ensure wider product range coverage to increase the convenient and indirectly improve consumer's satisfaction as it is key to customer retention as they often preferred to stay with the brand.

5.3 Limitation of the study and Recommendation of Future Research

Firstly, there are almost 90% of the respondents are highly educated such as bachelor of degree or higher education. There are less respondents from lower education that might have difference perspective on mobile payment apps. The wider range of education qualification will be beneficial to represent the Malaysia.

Furthermore, the findings show the GrabPay user perception on the mobile payment app loyalty only. There are other mobile payment app providers in Malaysia that included GrabPay, Touch' n Go ewallet, Boost, Vcash and Razer Pay (Birruntha, 2019). Hence the findings could not represent the whole view of mobile payment app loyalty in Malaysia.

In addition, the data collection method was quantitative only in this research. The individual's perception may be varied over the time. A combine method of quantitative and qualitative (cross-sectional) will assures a better results and promising findings.



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5.4 Conclusion

In summary, this research provides a better understanding of the mobile payment app loyalty by identified the factors that influence the mobile payment app loyalty in Malaysia. Based on significant value, perceived usefulness, perceived security, perceived value has positive effect on the satisfaction. In addition, the satisfaction and perceived value are positive effect the mobile payment app loyalty. Moreover, the descriptive analysis, measurement model analysis, structural model analysis, managerial implications, limitation of the study and recommendation for future research are discussed and concluded.

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