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Usage Intention of RFID System in Toll Payment among Klang Valley Residents

Muhammad Azfar Othman[1] & Syuhaily Osman[1,2]

[1]Department of Resource Management and Consumer Studies, Faculty of Human Ecology, Universiti Putra Malaysia, [2]Sustainable Consumption Research Group, Faculty of Human Ecology, Universiti Putra Malaysia

Corresponding Author's Email: syuly@upm.edu.my

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Abstract

In Malaysia, a great traffic congestion always occurs in the expressways during peak times such as going to and from work, weekends, holidays and festivals especially in Klang Valley which has a high population density. To reduce the issue of congestion on expressways, the Malaysian government has announced to use new technology, namely Radio Frequency Identification (RFID). Therefore, the purpose of this study was to examine the influence of attitude, knowledge and perception towards the usage intention of RFID system in toll payment among Klang Valley residents. Theory of Planned Behaviour (TPB) and Technology Acceptance Model (TAM) was adopted to build the research framework. There was a total of 228 residents participated drawn by using systematic sampling method. The data were collected through Google form. The findings of Pearson correlation indicated that attitude ($r=0.802$; $p=0.000$), knowledge ($r=0.329$; $p=0.000$), and perception ($r=0.795$; $p=0.000$) were significantly influenced the usage intention. Meanwhile, from multiple linear regression analysis, it was found that perception had recorded the highest correlation ($\beta=0.446$; $p=0.000$) in influencing Klang Valley residents' usage intention. Therefore, the service providers should develop a better function of RFID system features in order to fulfil the needs of consumers to improve their performance.

Keywords: Radio Frequency Identification (RFID), Attitude, Knowledge, Perception, Usage Intention

Introduction

Technology has been evolving and shaped our lifestyles in various ways, which also revolutionise the way we work and think. The adoption of technological tools has foster

consumers abilities and give us new access to the world. Technology tools are also utilised to make the toll payment system more efficient as the number of vehicles in Klang Valley area has been increasing. According to Ahmed et al (2019), a systematic toll collecting system could abolish the congestion of the traffic and feasible human mistake, does not require any vehicle to stop over and administration to interactively fetch the toll fees.

Highways and expressways in Malaysia are known as Malaysian Expressway System. These expressways provide assistance for transportations of goods and services locally, regionally, and nationally. According to Guo et al (2021), rapid exchange of raw materials and commodities for domestic industry would be made possible by unrestricted traffic in the expressways system, which might encourage local economic growth. In the modern lifestyle that we have today, it is impossible to continue living without them as they are indispensable to economic activities. These expressways are the lives to many activities such as work, shopping, education, tourist, and social activities since it requires the demands of trips for the drivers. With the construction of the expressway, it promotes input and output benefits hence indirectly influence the local economy (Guo et al., 2021).

In Klang Valley, traffic congestions usually happen when drivers are travelling from home to work and back again. Since Klang Valley is an urban area with rapid growth, it became a focus area for people to live and work, making it an overpopulation area with the increase of number of vehicles and poor traffic signal system in certain areas. It causes a great amount of stress to city structure due to the uncontrolled urban growth because of the unforeseen demand to the broad range of resources and services (Brennand et al., 2019).

The toll plazas in Malaysia are considered as conventional toll collections where a manually toll collection is the most common method. During the earlier period, only cash was accepted as a medium of payment for drivers to complete the transaction with the toll collector at the toll plaza. Now with the addition of electronic toll collection (ETC), it expands the capacity of the toll collection as well reduce the toll collection time (Lai et al., 2021). The toll collection lanes in the Klang Valley area can be divided into three types, which are mixed mode, Touch ‘n Go, and Smart Tag lanes. While each of these lanes were designated to various kind of vehicle classes, drivers seek to queue in the shortest line, which results in mixed traffic conditions at the toll plazas (Bari et al., 2022).

The government has recently enforced on the use of Radio Frequency Identification (RFID) technology system for toll payment especially in Klang Valley. Due to this matter, they also would gradually abolish the Touch n Go and Smart Tag lanes at the toll plaza in order to encourage consumers to use RFID technology. RFID is a technology with a wireless automatic identification and data capture that enables tracking and tracing end-to-endsupply chain item level. It is a device that emits radio waves to automatically identifyindividuals or objects between the reader and tags (Casella et al., 2022). It has been widely used by the foreign countries in tracking vehicles, ETC system and user identification. According to Chattoraj et al (2017), RFID tag functions accurately from a long distance and does not necessarily have to direct contact the device.

The acceptance of the consumer towards the RFID technology implementation in toll payment are not very welcoming (Nolder & Kadous, 2018). The attitude of the consumers reflects their evaluative response, it consists of their feelings and beliefs that driven by intentions and actions of the individual (Ajzen, 2005; Nolder & Kadous, 2018). Klang Valley residents might need to gather some information about RFID technology and build their knowledge properly (Li et al., 2021) in order to evaluate its effectiveness. According to Shirani et al (2020), people often found it strenuous to see how it would improve their everyday lives and energy use, expressing skepticism and concern that energy usage would be increased.

When the government tried to implement the RFID system at the toll plazas in Klang Valley area, the residents were not ready to accept the technology as it was new and troublesome for them to get used to it. According to Palka et al (2017), the awareness of people in operating latest equipment arise with the rapid growth rate of new technologies. However, not all residents have similar traits when it comes to accepting new technologies. A study from Tomczyk (2020) showed that some teachers present a very positive attitudes while another were being careful on new media and using information and communication technologies (ICT) for teaching. The residents in Klang Valley may showed unfavourable response toward the RFID system implementation at the toll plaza, but there are still several residents tried to follow the governments' initiative.

The residents also do not have the knowledge on how the RFID system works compared to the older system like Touch n Go and Smart Tag that they have been using. This have put the residents in a difficult position when it comes to new technology knowledge for their literacy (McCormick, 2004). They do not have the clear idea on how the RFID system supposed function in making toll payment, so they prefer to continue using the older system as they have known how it works. With better understanding of the information that is easily accessible, it may improve support for the new technology (Johnson et al., 2016).

Every residents have their own preferences and qualities that they consider useful in relation for their new technology acceptance. According to Kim et al (2018), individuals have a perception of the potential possibilities and ideas in technology exploitation to benefit the desired outcomes. This indicated that the residents' perception towards RFID system is crucial for their intent to use it as they desired to benefit a fast and efficient system to make their toll payment. In order to encourage the usage of RFID system, it should portray a good impression towards the Klang Valley residents to attract them to use it. The success of the RFID system can only begauged by the residents' perception towards the technology (Aljaraideh, 2019).

Therefore, this study was conducted to examine the usage intention of residents in Klang Valley to RFID technology in the toll plaza. It can also give exposure and importance to road users on safety as well as technological improvements nowadays.

Literature Review

Attitudes

Consumer's attitudes are a clear determinant for the new technology evaluation (Wang et al., 2022). When the RFID technology were introduced and implemented at toll plaza in Klang Valley, there is skepticism arise from the Klang Valley residents. A study by Ovezmyradov and Kurata (2022) stated that local companies in China were reluctant and skeptical in using RFID applications for its risk of providing confidential information. Klang Valley residents might see it as a troublesome addition to the ineffective toll system which contribute to more congestion in the area. Hence, it became a challenge to commercialising the RFID system (Nguyen et al., 2019) as the government tried to implement it at the toll plaza. When the attitude component and expansion of the resident's notion of evaluation including their feelings and beliefs about risk of the new technology are present, it improves the predictive power of skepticism for the resident's evidence collection.

Previous research related to new technology acceptance was conducted by Cheng and Guo (2021) on technology-based innovation in hospitality industry. The use of robot for hotel in Japan drawn criticism among employees and customers for its services. This situation depicted that not all individuals are welcoming all kinds of technology where some people would prefer to use traditional approaches with interactions between humans. The study

found that consumer's attitude towards technology only affected their booking intention with trust and curiosity as the mediating variables.
A study by Gantulga et al (2022) showed that people were inclined to use the RFID system on smart mobility in urban area based on the information shared by electronic word-of-mouth (e-WOM) on social media platforms. People wanted to know how the RFID technology can help them based of its usefulness, ease of use, risk and other factors that might affect their attitude in adopting the new technology. Another study by Lee and Park (2022) investigated about the consumer's belief on the use of RFID technology for retail store system. The RFID system used could be reflected by its hedonic nature by how the consumers enjoy it during their shopping experience in self-service beauty store. The study uses the TAM (i.e., perceived usefulness, perceived ease of use) with perceived enjoyment and novelty to measure the consumers' attitude towards RFID technology which also influence the adoption intention. Consumers were more likely to accept the RFID technology when they possess high innovativeness and self-confidence on technology. Attitude towards the RFID technology have a significant influence in the adopting intentions for the self- service beauty store.
By referring to the findings above, it can be concluded that attitude is one of the important factors that influence the intention of the consumers. However, all of the studies above have different dependent variables and there is only few research about the relationship between attitude and usage intention of the new technology especially RFID technology. In order to widely implement the use of RFID technology in toll payment, we must observe how the residents in Klang Valley reactions over the action. Hence, this study hypothesized that:

Ha1: There is a significant relationship between attitude and usage intention towards RFID system in toll payment among residents in Klang Valley.

Knowledge
According to Zagzebski (2017), knowledge is a highly valued condition in which a person is in cognitive contact with the reality world. RFID implementation has become a concerned issue among the Klang Valley residents as the government want to abolish the older system in the toll payment. Since the RFID technology is still new to the residents, it is best to get to know about the technology. According to Kwon(2022), new knowledge is often generated from existing knowledge and then becomes the new basis for the next discovery. A growing body of literature also suggests that in highly dynamic environments, increased organizational knowledge can reduce risks and uncertainties (Madsen & Desai, 2010).
Residents might need to have experience using the RFID system in order to have some knowledge on the technology. According to Brückmann (2022), experience can have more positive results than little knowledge about a technology regarding the intention to use it. Therefore, it might be more significant to test the RFID technology combined with some information in mind rather than information alone on the intention to adopt RFID. By increasing one's knowledge and experience, it might be more cost-effectively to achieve RFID adoption-related goals (Brückmann, 2022).
Due to this matter, Klang Valley residents might need to gather some information about RFID technology and build their knowledge properly (Li et al., 2021). When they have necessary knowledge about the technology, they can develop their attitudes towards the technology by evaluating different alternatives based on the knowledge obtained, then choose either to perform or refuse product usage intention based on their attitudes (Li et al., 2021).
Based on the previous study on knowledge about technology, Fletcher-Brownet al (2021) studied about how knowledge about mobile health technology could help improve public

health services. With the presence of ICT, it can enhance the complex knowledge transfer among the healthcare organisation. Knowledge obtained from the mobile health technology through their application is the main indicator of success in achieving lost-lasting advantage. The findings of the study found that technology would help the health care stakeholder in delivering the knowledge for their management and services.
Another study by Scuotto et al (2020) researched about the knowledge of oneself towards their intention to use technology for technology transfer. The integration of information acquired through knowledge exchange between partners intechnology transfer could be achieved by confirming the organisational effectiveness and exploiting market opportunity efficiently. Knowledge became the motivational factor for an individual and their intention towards technology transfer. Given the example of several studies that have been done on knowledge, it can be emphasized that knowledge is one of prominent factor that influence the usage intention of technology. Past literatures on the knowledge of technology can provide some insights about the RFID usage intention that influenced by the consumers' knowledge. However, there is very little studies that discussed on knowledge of RFID technology in social science perspective, and the literatures available for the topic aremostly in technical perspective. Therefore, this study hypothesized that:

Ha2: There is a significant relationship between knowledge and usage intention towards RFID system in toll payment among residents in Klang Valley.

Perception
According to Qiong (2017), perception is a process of achieving awareness or understanding of sensory details or information. RFID system can be considered as smart technology as it became the latest technology implemented in the toll payment system in Malaysia. Some residents find it hard to adopt the new system as it involves much process to apply for the technology. According to Shirani et al (2020), people often found it strenuous to see how it would improve their everyday lives and energy use, expressing skepticism and concern that energy usage would be increased. Like any new technology, a large number of factors can influence its acceptance and some consumers will put up barriers against the acceptance of new technology.
Based on past research about perception towards technology, Zhang et al (2022) found that there is influential relationship between consumer perception and low-carbon technology adoption behaviours. Consumer perception had a main role that influence the decision of enterprise on technology adoption. There is a disparity in consumer perception that affect the preferences in adopting the low- carbon technology, However, the finding of the study revealed that minor or major differences in consumer perception would result in greater adoption of low-carbon technology.
Previous study by Paaske et al (2017) investigated the perception of the healthcare workers about the RFID technology for their implementation in healthcare services. Several factors were described about the RFID technology accuracy in terms of privacy, recognition and user-friendliness. By increasing the effectiveness of RFID ability at the workplace reduce negative perceptions among the healthcare providers. The study shown that perception play an important role in implementing the technology in healthcare services.
All in all, the findings of the research done on perception done showed that perception is one of crucial indicator in determining the implementation of the technology intention or behaviour. People would have their own thoughts and judgement when it comes to using

new technology as it may display some benefits or drawbacks and compared it with the existed technology with similar functions. Thus,

Ha3: There is a significant relationship between perception and usage intentiontowards RFID system in toll payment among residents in Klang Valley.

Usage Intention

Usage intention is indirect expression and often not reflected by behavioral data in which it is affected by both user intrinsic preference and spatio-temporal context (Ping et al., 2021). Consumers are driven to use the products or services based on their preference or what they think can benefit them. In terms of RFID system, it will take time for the Klang Valley residents to immediately use the technology sincethey are not familiar and doubt the system will be useful to them. According to Tseng et al (2019), it is necessary to guarantee the quality of products and services in terms of technology development. Hence, it is important to make sure the system is well developed and demonstrated to convince the residents to use them.

Previous studies have only focused on usage intentions and behavior for specific industries or products. In Malaysia, the concept of usage intention on RFID system is still quite new, there have not been many studies on this topic, especially using the Theory of Planned Behavior and Technology Acceptance Model combined model to research usage intentions. Therefore, the author decided to do this paper, in order to test the relevance of this theory to the Malaysian context.
Finally, the following hypothesis was constructed to examine the most significant factor that will influence the residents' intention towards RFID system in toll payment.

Ha4: Attitude, knowledge and perception are the most significant determinants on usage intention towards RFID system in toll payment among residents in Klang Valley.

Theoretical Underpinning

Theory of Planned Behaviour (TPB) was used in this research for examining the usage intention of RFID system in toll payment among Klang Valley residents. The theory stated that attitude, subjective norms, and perceived behavioural control, will shape an individual's intention and willthen act accordingly (Ajzen, 1991). Henceforth, attitude, subjective norms and perceived behavioural control are fundamental of beliefs of the behaviour (Ajzen, 1991). The use of TPB show a significant contribution in determining intentions and behaviour (Cheng, 2019).
Some studies have used the TPB in measuring the intention of adopting the new technology. A study by Wang et al (2022) showed that all variables in the TPB have shaped the usage intention to use new technology for shopping. Other relevant studies such as usage intention on technology use in mobile applications in food delivery sector (Belanche et al., 2020) and mobile health service in health information technology field (Zhang et al., 2020). In this study, attitude, knowledge as subjective norm and perception as perceived behavioural control will be the independent variables used to determine the usage intention of RFID system in toll payment.
Meanwhile, another theory, i.e., Technology Acceptance Model (TAM) was also utilised in this study to examine the factors towards usage intention of RFID system in toll payment among Klang Valley residents. TAM proposed by Davis (1980) and later refined by (Davis, 1986). TAM has proven to be among the most effective models in the information systems

literature for predicting user acceptance and usage behaviour. The independent variables which are perceived usefulness and perceived ease of use for determining the attitude toward usage which could affect the behavioural intention in actual usage of the technology. TAM display a high significant and demonstrate its efficiency on the adoption of technology (Salloum et al., 2019).

This study incorporates the influence of RFID system in toll payment from TAM (Davis, 1986) and the intention from TPB (Ajzen, 1991). TAM was extensively tested using different sample sizes and user groups within or across organizations, analyzed with different statistical tools, and compared with competing models (Gefen, 2000). It was applied to many different end-user technologies such as email (Adams et al., 1992; Davis, 1989), word processors (Adams et al., 1992; Davis, 1989), groupware (Taylor & Todd, 1995), spreadsheets (Agarwal et al., 2000), and World Wide Web (Lederer et al., 2000). Some studies also extended TAM by including additional predictors such as gender, culture, experience, and self-efficacy. Overall, researchers tend to suggest that TAM is valid, parsimonious, and robust (Venkatesh & Davis, 2000).

By addressing all the literature identified in the prevalence issues stated previously, this study therefore proposed the following hypotheses and research framework (Figure 1):

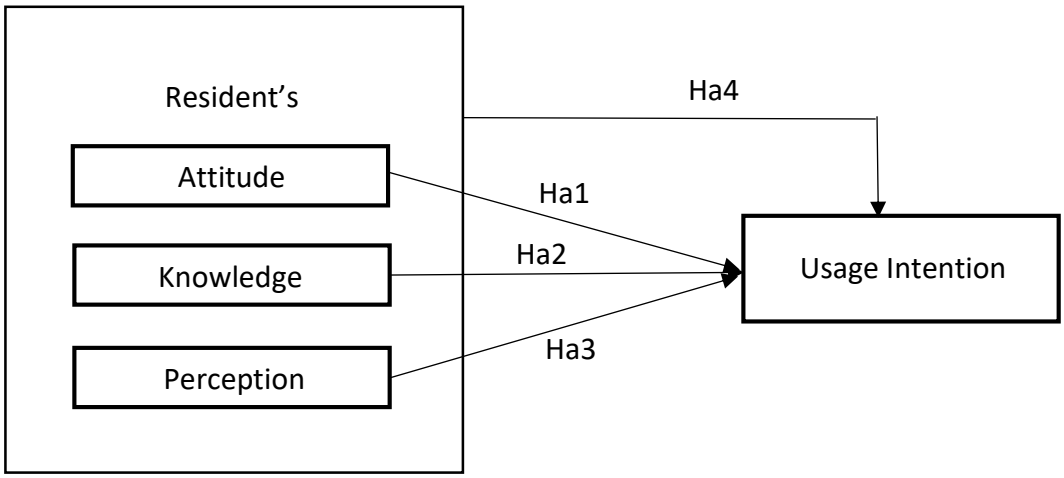

Figure 1: Operational Research Framework for the Study

Methodology

Research Design and Location

This research examined both the independent and dependent variables through a cross-sectional study using sample survey whose samples were drawn in such way could be generalized to Klang Valley residents. Cross-sectional study measured units from Klang Valley residents at only one point in time and survey research was employed in this study by using standardized questionnaires.

As for the study location, Klang Valley was chosen because it is packed with population around 8,420,000 people residing in the place. Most people residing here accommodate themselves with cars so they would most likely be moving around the place and find some toll plaza to go through. This area was considered highly appropriate research location to get the study sample which can generalize the population of Klang Valley residents. Based on the data updated by Raya (2021), there are about107 toll plazas in Selangor and 40 toll plazas in Kuala Lumpur, making it a total about 147 toll plazas overall in the Klang Valley area. There was also news reported (NewStraits Times, 2022) that more than 1.5 million of highway users

had changed to RFIDsystem platform for toll payment, with majority of them within the Klang Valley area.This makes Klang Valley a distinguished location to research the RFID system usage among their population.

Sampling Method and Research Instrument

The population for this study was targeted at the Klang Valley residents. The selection of respondents is based on the following criteria: Age not less than 18 years old in the year of research; must have a driving license; and driving a car on the highway/expressway. The sample size for this study was calculated using Krejcie and Morgan's (1970) formula. According to a study conducted by Tami et al (2021), there is an 83% prevalence of RFID usage intention among residents at a 95% reliability level with an accuracy value of d of 0.05 and therefore, equal to 217 sample size. However, according to Kotrlik and Higgins (2001), during the data collection procedure through survey forms, 5% more should be added to overcome for incomplete or missing data. As a result, the minimum sample size required for this study was 228 of the Klang Valley residents. Following systematic sampling technique, four districts have been selected from the 11 districts in Klang Valley area and they were Petaling, Gombak, Kuala Selangor and Kuala Lumpur. After selecting those districts, simple random sampling was then used to obtain the total sample sized determined in which every residents were approach randomly at the public area, by using intercept method.

The instrument used was a questionnaire which started with section A that consisted of five questions on the background of the respondents. The personal information was regarding the respondent's gender, age, ethnic, marital status and income. In this part, all of the questions were categorical data. It was followed by the elaboration of different independent variables and dependent variable. In these sections, responses were recorded on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The measurement items for measuring the DV and IVs and related sources together with the results from Cronbach's alpha reliability test are shown in Table 1.

Table 1
Measurement items for the constructs

Constructs	Item	Sources	Cronbach's Alpha
Attitude	I would like to know more about RFID technology.	Van Rensburg et al. (1999)	0.936
	I think RFID technology makes toll payment system work better.		
	To me, RFID technology is good for the toll payment system in the future.		
	I think RFID technology has brought more good things than bad.		
	To me, RFID technology is very important for toll payment at the toll plaza.		
	I find that RFID technology easy to learn.	Edison & Geissler (2003)	

Knowledge	I know pretty much about RFID technology.	Vigar-Ellis(2016)	0.977
	Among my circle of friends, I'm one of the 'experts' on RFID technology.		
	I can tell if RFID technology is worth the price or not.		
	I know how to judge the effectiveness of RFID technology.		
	I have heard of RFID technology that are around.		
	I feel very knowledgeable about RFID technology.		
Perception	RFID technology would enhance my effectiveness in making toll payment.	Buvaneswari et al. (2021)	0.955
	RFID technology would enable me to make tollpayment more quickly.		
	My interaction with the RFID technology is clear and understandable.		
	It will help me understand the RFID technology moredeeply.	Das and Mishra (2016)	
	It motivates me to explore about RFID technology.		
Usage Intention	I am willing to use RFID technology for toll payment	Tsai (2012)	0.985
	I want to use RFID technology for toll payment		
	I want to use the services provided by RFID technology		
	I intend to use RFID technology in the future.	Aburbeian et al. (2022).	
	I intend to use the RFID technology frequently to make toll payment	Vijayasarathy (2004)	

Data Analysis and Results

Description about respondents' background was done through descriptive analysis. A series of inferential statistics was also conducted to fulfill the specific data analysis requirements. In particular, Cronbach alpha test was employed to measure each attribute's reliability and internal consistency (Table 1) which showed that all the constructs were having a good reliability measure, exceeding the minimum value of 0.6 as an indication of reliability (Nunnally, 1978). Meanwhile Pearson correlation coefficient and multiple linear regression analyses were performed to analyse the relationship between consumer's attitude, knowledge and perception with the usage intention of RFID system in toll payment and to

determine which of the independent variables (i.e., consumer's attitude, knowledge and perception) that have the most significant relationship with usage intention of RFID system in toll payment, respectively. Consequently, all the relationship between independent variables and dependent variable were investigated.

Prior of testing the study's hypotheses, exploratory factor analysis (EFA) was performed to explore the underlying dimensions and identifying influential factors (Hair et al., 2006). Principal component analysis extraction method and varimax rotation with a factor loadings cutoff of 0.50 was used for the purpose of retaining items. Assumptions for EFA were checked using a Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's Test of Sphericity (Norusis, 1992). Consequently, construct validity for all the measurements were tested by using EFA. The result of Barlett test of sphericity that was found to be significant (p=0.000) and the KMO measure of sampling adequacy was above 0.5 (KMO = 0.922), indicating that factor analysis is appropriate. This EFA analysis was conducted using principal component analysis extraction and varimax rotation for all the constructs' items. The communality for all the items were scored above the minimum 0.5 recommended level (Hair et al., 2006). A total of four constructs emerged (with total variance explained = 73.539) and the items were found to belong their constructs by referring to the rotated component matrix. Therefore, these measurements were judged to have acceptable reliability and having good construct validity considering the exploratory nature of the study.

Prior of conducting inferential analysis, particularly multiple linear regression, multicollinearity was assessed. Based on the rule of thumb by Hair et al (2013), the largest variance inflation factor (VIF) values should not exceed 10.00, whereas the tolerance level should not be less than 0.10. Based on this rule of thumb, the findings of multicollinearity implied that all the research variables were free of a multicollinearity problem. Therefore, quantitative research data were ready to be further tested by the proposed statistical analyses.

Sample Profile

A total of 54.8% of female and 45.2% of male respondents had completed the survey. This presented the gender disparities in favor of females in data collection. The highest contributed respondents are 47.4%, ranging from 18 to 25 years old. It is followed by respondents ranging from 26 to 33 years old, with 28.1%. Only a minority of respondents are age 50 and above, accounting only for 4.8%. This shows that respondents were dominated mainly by Generation Y (born between 1981 and 1995) and Generation Z (born between 1996 and 2009), while Generation X (born between 1961 and 1980) and older are the least dominant in this survey.

Besides, this sample consisted of three different ethnicities of respondents, which are Malay, Chinese and Indian. Among the respondents, more than half are Malay (62.7%), 23.7% are Chinese, and 13.6% are Indian. Regarding marital status, most of the respondents are single, 66.2% of them, while 33.8% are married. Also, from the 228 respondents, those who earn less than RM1,000 comprised a higher percentage of the respondents, which is 32.9% of respondents, and respondents who earn between RM1,000 and RM3,999 come in a close second, which was 32.5%. 6.6% of respondents who earned more than RM12,000 was the lowest participation in this study. This survey was dominated by respondents in the B40 group (earned less than RM4,850), while the minority came from the T20 group (earned more than RM10,959).

Relationship between Consumer's Attitude, Knowledge and Perception with the Usage Intention of RFID System in Toll Payment

The result of the Pearson correlation analysis is represented by Pearson's correlation coefficient (r), indicating the relationship's strength. The findings illustrated a positive relationship between attitude (r=0.802; p=0.000), knowledge (r=0.329; p=0.000) and perception (r=0.795; p=0.000) with usage intention of the RFID system in toll payment among Klang Valley residents. Thus, all the related hypotheses were supported. When compared the r-values for each relationship, the findings showed that attitude was having the highest strength relationship with usage intention, while knowledge results are less definite among all other factors.

Such results indicated that respondents who perceived a high level of attitude would have high usage intention to use the RFID system in toll payment. Therefore, respondents with a positive attitude are more likely to use the RFID system when making toll payments. The finding is consistent with the study of Liu et al (2021), who demonstrated that attitude significantly affects usage intention. Meanwhile for the knowledge factor, it was found that respondents' intention to use the RFID system is affected by their knowledge but is less significant compared to the other factors. However, the current result is still congruence with previous study which reported that knowledge is a significant factor in the usage intention of the RFID system (Huang et al., 2021). With regards to the factor of perception, it has the second-highest strength relationship (r=0.795) with usage intention. This indicated that high level of perception perceived by the respondents would have high usage intention of RFID system in toll payment. The finding is consistent with the study of Hidayat and Akhmad (2021), who found that perception has a significant influence towards usage intention of RFID system in toll payment.

Table 2
Relationship between All Factors and Usage Intention (Pearson Correlation Analysis)

Variables	**Usage Intention**	
	Pearson Correlation (r)	**Sig. (2-tailed) p-value**
Attitude	0.802**	0.000
Knowledge	0.329**	0.000
Perception	0.795**	0.000

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

As conclusion for the results obtained by this analysis, attitude has found to have the strongest significant positive relationship with usage intention, slightly higher than perception, while knowledge has the weakest significant relationship among all the factors. This conclusion however shall be further confirmed by simultaneously examined them via multiple linear regression analysis.

The Determinants of Usage Intention of RFID System in Toll Payment

A stepwise multiple linear regression analysis was carried out to find the determinant of usage intention of the RFID system in toll payment and the results are as displayed in Table 3. The significance of the relationship between the dependent variable and all the independent variables was also evaluated.

Table 3
The Determinants of Usage Intention of RFID System in TollPayment
(Multiple Linear Regression)

Variable	Usage Intention				
	B	SE B	β	t	p
Attitude	0.425	0.066	0.442	6.453**	0.000
Knowledge	-0.031	0.036	-0.038	-0.858	0.392
Perception	0.509	0.086	0.446	5.898**	0.000

Note: F=171.363; sig-F=0.000; R-square=0.697; Adjusted R-Square=0.692; ** p ≤0.01

Referring to the findings above, the model was significant at 0.000, particularly the F-value was significant at 171.363. Hence, the overall regression model for all the factors affecting usage intention worked correctly in explaining the usage intention of the RFID system in toll payments. The coefficient of determination (Adjusted R^2) was 0.692 for the examined regression. Thus, it explained that 69.2% of the total variations on usage intention. The determinants included in the model of usage intention were attitude, knowledge, and perception.

Among these determinants, the attitude and perception were found to be significant determinants with the beta-value of 0.442 and significant t=6.453 (p=0.000) for attitude and beta-value of 0.446 (t=5.898; p=0.000) for perception. On the other hand, knowledge was not a significant determinant as its p-value was more than the alpha value set at 0.01. Therefore, the particular hypothesis, i.e., Ha4 was partially supported. Subsequently, by referring to all the values shown above, the most significant determinant determining respondents' usage intention was perception, with a beta value of 0.446, which was the highest value among the other determinants. Similar to past studies, previous findings also indicated that perception play an important role in implementing the technology (Paaske et al., 2017; Zhang et al., 2022).

Compared to the results of Pearson's analysis which showed that attitude has the highest relationship correlation among all factors, the results of the simultaneous analysis of all factors as done through multiple regression showed that when compared to attitude, perception was more dominant in its influence. This shows that respondents are mostly driven by their own personal judgements and opinions on their intention to use the RFID system for toll payment. However, for knowledge, it was not a significant determinant for usage intention for RFID system in toll payment (β-value= -0.038) even though it has a positive significant relationship (r-value=0.329; p=0.000). Perhaps, the functions and features of RFID system should be explored more by the respondents for the toll payment purpose as knowledge is one of the prominent factors for their usage intention.

Implications and Recommendation to Future Research

This study is useful for consumers in terms to use the RFID system when making toll payment at the toll plaza. They can get better insights and awareness on how RFID system work based on its features and functions. When consumers understand the effectiveness of RFID system in toll payment, they will attract towards positive intention of usage significantly. This study reveals that the main driving force behind RFID usage system is consumers' perception for the RFID technology. Consumers would have their judgements and opinions about the RFID

system when they observed the how the technology users utilised it at the toll plaza and seeing if the technology have any weaknesses for its purposes i.e., vehicles queue at the RFID lane, vehicles reverse motion to retry the toll payment.
Besides, the findings of this study can also be directed to the service providers in recognizing the variety of factors which affect usage intention of RFID system among consumers. Based on the findings which stated that all of the factors such as attitude, knowledge and perception have positive relationship with usage intention, thus, service providers can manage the RFID system better accordingly to these factors to increase the usage of the technology. Service providers also can develop a better function of RFID system features in order to fulfil the needs of consumers to improve their performance. Since perception is the most influential factor towards intention touse RFID system in toll payment, they should ensure that the system function efficiently for the users to avoid any criticism or dissatisfaction towards the technology. All this can help to provide a better quality of the RFID system for consumers and motivate them to use it.
Furthermore, government can gain useful information and idea on the various factors that can be improved. This study provides better apprehension and perspectiveto design and implement RFID system that yield bigger acceptance of the consumers. The findings illustrated that attitude and perception is a significant determinant of usage intention. Thus, government can monitor and accurately strategize for the improvement of the RFID technology system empowerment for toll payment in line with their effort to expand RFID lane at the toll plaza.
Based on the study's findings, it was believed that the results can bring some implications for future researchers as well. This study will improve the existing literature as the findings and the proposed framework will serve as a practical guideline for researchers to enhance their future research. For instances, future researchers could take into account attitude and perception as an extra factor while they are using another model or theory to investigate about RFID system issue. This is because these two factors were found to be the significant determinant for usage intention. In other words, future researchers can explore or design another framework to investigate the factor that can significantly affect the usage intention. Furthermore, future researcher should also consider extending the TPB and TAM model or integrating both model with other factors. Current study only focused on factors including in TPB and TAM models which might not be enough to cover the whole research topic. From the results of multiple linear analysis, the value of Adjusted R^2 explained only 69.2% of variance on usage intention. This shows that there is still about another 30% more of variance that is not explained by usage intention. Hence, it is recommended that other factors can be involved in multiple linear regression analysis in order to gain higher Adjusted R^2 value so it can better explain the variance on usage intention. Therefore, it is with hope that future researcher can investigate and explore other factors that can influence the usage intention of RFID system in toll payment.

Conclusion

Today, the advancement of technologies has affected the way people live in their everyday lives. The findings of this study indicated that all the factors have significant positive relationship with usage intention for RFID system in toll payment. However, there is still several number of Klang Valley residents that were associated with low level of knowledge about RFID system in toll payment. Since RFID system in Malaysia is still not used to be known by most of the people of Malaysia, therefore an understanding of factors influencing usage intention for RFID system is very important to researcher and the service providers. The

information and results in this study will be very useful to help them discover and analyse the potential customers thus they can design more accurate strategies to increase the usage of RFID technology.

All the alternative hypotheses were supported except for Ha4 which was partially supported. The existing result proposed that attitude, knowledge and perception had positive and significant relationship with usage intention of RFID system in toll payment among the Klang Valley residents. Specifically, perception appeared to be the most significant determinant that affecting the usage intention for RFID system in toll payment. This means that residents are leaning towards their personal interpretation of the RFID system which influence their intention to use the technology. Overall, it can be concluded that future generation will start to use the RFID system for toll payment for its features. Therefore, in order to achieve the implementation of RFID system in toll payment, the service providers should take into account the factors of this study and make a lot of promotions to increase the level of awareness among the consumers.

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