Journal of Theoretical and Applied Information Technology
30th April 2021. Vol.99. No 8

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

AN EMPIRICAL STUDY OF MOBILE TICKETING SERVICE ADOPTION IN RAPID TRANSIT: EVIDENCE FROM JAKARTA

TASKIA FIRA INDRIASARI[1] , RIYANTO JAYADI[2]

[1,2]Information Systems Management Department, BINUS Graduate Program – Master of Information Systems Management, Bina Nusantara University

E-mail: [1]taskia.indriasari@binus.ac.id, [2]riyanto.Jayadi@binus.edu

ABSTRACT

This research aims to know whether the implementation of the QR Code as fare media in MRT Jakarta has provided the expected benefits by identifying factors that encourage people to use it. Therefore, this research was conducted using an integration of Technology Acceptance Model (TAM) Theory and Diffusion of Innovation Technology Theory (DIT). This research conducted a survey method and resulted in 401 respondents indicated that Actual Usage was influenced by various reasons related to Behavioral Intention to Use, Attitude, Perceived Cost, Perceived Ease of Use, Perceived Usefulness, Timesaving, Compatibility, and Trust. among others. This study's outcomes enhance the current knowledge about QR Code System as fare media in MRT Jakarta. It can also be used by MRT Jakarta to devise appropriate strategies to improve the quality of QR Code system in MRT Jakarta in order to increase the number of passengers using QR Code.

Keywords: *Technology Adoption, User Behavior, Mobile Payment, Technology Acceptance Model, Structural Equation Modeling.*

1. INTRODUCTION

Over the past few decades, companies all over the world started to notice a great need for information system in the business field [1]. One of the benefits of using Information System to support the business process is the integration of data and information through the company, which improves the company's quality and productivity. Thus, the growth of Information System is increasing every year and keeps expanding in all business areas. Nowadays, almost every company and organization depend on Information Technology, including the transportation and logistics business area.

People's need to use public transportation increases over Time. Public Transportation has become very important due to increased people's mobility because nowadays, public transportation is not only for moving people and goods from one place to another, but it has become a service business. According to BPTJ study, by the end of 2019, public transportation in Jakarta will have become the choice for 32 percent of commuters, covering 67 percent of Greater Jakarta, while also improving average vehicle speed [2].

Meanwhile, in recent decades, public transportation services profited not only from the business but also from the introduction of new technologies. The introduction of IoT, however, potentially represents a real revolution for public transportation. This means public transportation becomes more rapidly, less polluting, more convenience, and accessible. The interaction of passengers with transportation providers became more comfortable and safer as ticketing and payment systems went from paper to electronic and online. Also, real-time information systems became available to make it more approachable [3].

A day will inevitably come in the not-so-distant future where we will live in a cashless society. We are already living in an age of rapid evolution towards cheaper, faster, approachable, and safer payment methods that will drive broader financial inclusion and approval [4]. Quoting Bank Indonesia data, Indonesia now already has 38 e-wallet applications that have received official licenses.

During 2018, e-wallet transactions in Indonesia were reported to reach US $ 1.5 billion (Rp21.57 trillion). It is predicted that electronic wallet transactions will increase to US $ 25 billion or around Rp359.54 trillion [5].

Indonesia's central bank, Bank Indonesia (BI), has now officially imposed the QR code standardization called QR Code Indonesian Standard (QRIS) on January 1st [6]. The usage of QR Code as a payment media also has a significant role in the economy. This statement is proven with QR Code payment users in China, which has reached 70% of the population [7]. One of the most effective ways to optimize the use of QR Code is by applying in Jakarta's Transportation Sector (Bank Indonesia, 2019b).

As an essential element of public transit system, the metro system has gained progressing recognition for both academically and functionally due to its values of enormous capacity, high speed, and high reliability. Therefore, the urban rail system has been expanding fast. In contrast, rapid growth has let a series of difficulties, such as over-saturation on the train, platform, and other subway facilities [9]. One of the improving public transit in Jakarta is Mass Rapid Transit (MRT) Jakarta already had served a total of 19.9 million passengers, with an average of 83,516 passengers daily and a record of 93,165 passengers in one day [2]. Unfortunately, the QR Code user is still low compared to other payment media such as bank cards, single trip cards, and multi-trip cards. As of June 2020, the daily average of MRT Jakarta passengers is 11,315, meanwhile the daily average of passengers using QR code as payment media is 482 passengers (source: MRT Jakarta, 2020).

In fact, improving QR Code usage will also improving Indonesia's economy. Indonesia's economy has great potential to reap the benefits of digitalization. Being the fourth largest population in the world where the demographic is dominated by generations Y and Z, Indonesia became one of the most prospective consumer segments to absorb the wave of digitalization. With these prospects, it is not surprising that online platform businesses, especially fintech and e-commerce, flourish in Indonesia (Bank Indonesia, 2019b).

The main reason why this research needs to be done is because there are still a few passengers of rapid transit Jakarta who use QR code as payment media. As evidence, the weekly average of passenger use QR code as payment media is 482 passengers in June 2020 (Source: MRT Jakarta). This data is taken while pandemic where touching stuff and human interaction have to be eliminated but still didn't affect QR code usage is another factor to this research. This is proven that the use of QR code in MRT Jakarta is very low compared than other payment media such as bank cards, single trip cards, and multi trip cards. Preliminary interviews were conducted with two passengers of rapid transit Jakarta and an employee in MRT Jakarta. This research also does a literature review of related works to help the author develop the model and hypothesis. However, these factors are still hypothetical and need to be studied further. Therefore, this study will be conducted to identify whatever these factors affect the citizen of Jakarta's intention to use QR code as a fare media for MRT Jakarta. Later, this research is expected to insight and become a reference for the government and company to improve the quality of MRT Jakarta and QR Code as fare media and also to gain knowledge and enlightenment regarding QR Code in MRT Jakarta for both researcher and reader.

This research proposes an approach to evaluating critical factors that encourage passengers to use QR Code as payment media in MRT Jakarta. The rest of this paper is organized as follows. In section II, we discuss and review the literature related to the topic. Section III is explained the method used to do this research. Section IV consists of the results of the research. In Section V, we implicate the result to managerial and theoretical aspects. Section VI is the conclusion of the research.

2. THORITICAL BACKGROUND

2.1 Mobile Payment

Mobile Payment as known as electronic payment, or normally refers to a payment media that does not involve cash [11]. At this moment, mobile payment is one of the most critical drivers of success in changing trend for the payment market [12]. On the other hand, mobile payment can be stated as an integral part of mobile commerce using mobile devices such as mobile phones, tablets, and is used for payment of goods and services. Mobile payment is one of the payment methods, which means using an application through a smartphone. Payment mechanisms are carried out comfortably and safely by maintaining privacy, integrity, and confidentiality in payments using a mobile device. Therefore, the topic Mobile payment is crucial to be done because of its necessity and usefulness to be implemented to all citizen

2.2 Technology Acceptance Model

The TAM (Technology Acceptance Model) concept was first developed by Davis, which proposes a theory as a foundation for learning and understanding user behavior in accepting and using technology [13]. TAM aims to describe and estimate user acceptance of an information system by describe the causal relationship between belief and the behavior, goals, needs, and actual use of the user / user of an information system. Therefore, the TAM model is suitable for this research for explaining computer users' behavior based on beliefs, attitudes, desires, and user behavior relationships because this model aims to describe the main factors of user behavior towards user acceptance of the technology.

2.3 Diffusion of Innovation Theory

Diffusion of Innovation Theory (DIT) by [14]. Grounded in sociology, DIT [15] has been used since the 1960s to study various innovations, ranging from agricultural tools to organizational innovation [16]. In information systems, [14] adapt the innovation characteristics presented and refine a set of constructs that can be used to study individual technology acceptance. This theory has seven primary constructs, including relative advantage, ease of use, image, visibility, Compatibility, result demonstrability, and voluntary use [17].

2.4 Hypothesis Development

Behavioral Intention to Use implemented by Technology Acceptance Mode [13] defined behaviour intention as the degree of an individual's intention to perform a particular behaviour or act. When the user has a good experience using fintech, the willingness to use will increase accordingly [18]. Therefore, this variable is explained by this research as the level of passengers' intention to use QR code in MRT Jakarta at the moment and also in the future also including their willingness to recommend it to their relatives. This hypothesis is also supported by a study in [19].

H1. Behavioral Intention to Use (BI) significantly influences on Actual Usage (AU).

Cost is also a major factor that can positively influence perceived value, which is a general assessment of consumers of the usefulness of a product [20]. Perceived Cost is implemented based on the result of preliminary study and literature review. Therefore, this variable is explained by this research as the passengers' level of perception towards the cost value of the system which is the QR code in MRT whether its worthy and has competitive price. This hypothesis also supported by research studies in [21].

H2. Perceived Cost (PC) significantly influence on Behavioral Intention to Use (BI).

According to TAM, the influence on intention to use is a person's Attitude, the degree to which using technology is valued by an individual [22]. Davis (1986) found that the influence of Attitude on technology use was the best modest in predicting technology use with two users' beliefs–perceived usefulness and perceived ease of use–as powerful and parsimonious predictors. Therefore, this variable is explained by this research as the level of passengers' perception and judgements towards the QR code in MRT whether its convenience, helpful and enjoyable to use. This hypothesis also supported by research studies in [22].

H3. Attitude (A) significantly influence on Behavioral Intention to Use (BI).

According to [23], Compatibility is an extension in which an innovation is perceived to be consistent or compatible with adoption beliefs, lifestyles, existing values, experience and current needs, and high Compatibility can produce the desired innovation adoption. The variable Compatibility is implemented based on Technology Acceptance Model developed by Moore & Benbasat [14]. Therefore, this variable is explained by this research as the passengers' level of perception towards the suitability of the system which is the QR code in MRT whether it fit their lifestyle, value and also their payment reference regarding its user interface and business process. This hypothesis also supported by research studies [22].

H4. Compatibility (CO) significantly influence on Perceived Usefulness (PU).

H5. Compatibility (CO) significantly influence on Perceived Ease of Use (PEU).

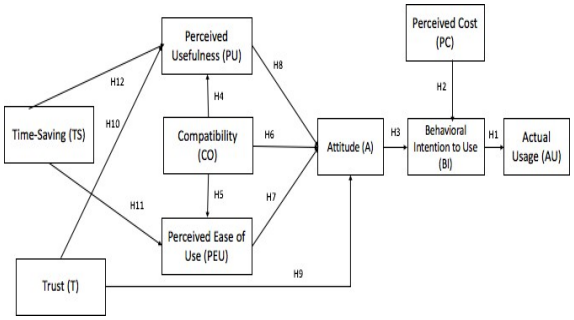
H6. Compatibility (CO) significantly influence on Attitude (A).

Perceived ease of use is stated to as the level to which a person believes that using a certain technology, predicting the system would be free of the attempt [24]. Meanwhile. in the context of fintech services, according to [25], the indicator of perceived ease of use is the friendliness of operation processes and ease of downloading the application, which will affect consumers attitude towards using

the service. The variable Perceived Ease of Use is implemented based on Technology Acceptance Model developed by Davis [13]. Therefore, this variable is explained by this research as the passengers' level of ease of use towards the QR code in MRT whether it's easy to understand, easy to learn and easy to be skillful regarding its user interface and business process. This hypothesis is also supported by research studies in [26].

H7. Perceived Ease of Use (PEU) significantly influences on Attitude (A).

Perceived Usefulness is stated as the level to which a person believes that using a certain system to boost their job performance [27]. The variable Perceived Usefulness is implemented based on Technology Acceptance Model developed by Davis [13]. Therefore, this variable is explained by this research as the passengers' level of usefulness towards the QR code in MRT whether it improving their productivity and the performance of daily activity regarding its user interface and business process. This hypothesis is also supported by research studies in [26].



H8. Perceived Usefulness (PU) significantly influence on Attitude (A).

This research is conducting a test for the effect that occurs in Trust towards the intention to use QR Code payment system which has been proven in previous research based on [28] that Trust can influence the user to use particular technology and system through identifying their Behavioral Intention to Use the system directly and indirectly. The variable Trust is implemented based on the result of literature review and lack of privacy policy in the system. Therefore, this variable is explained by this research as the passengers' level of perception towards the security of the system which is the QR code in MRT whether its trustworthy or not. This hypothesis is also supported by research studies in [26].

H9. Trust (T) significantly influence on Attitude (A).

H10. Trust (T) significantly influence on Perceived Usefulness (PU).

Variable Time Saving has already been proven in [29], that it influences the intention to use for the user. Intention to Use the system, which is in this research is QR Code payment system. The variable Time-saving is implemented based on the result of preliminary study and literature review. Therefore, this variable is explained by this research as the passengers' level of perception towards the efficiency and effectiveness of the system which is the QR code in MRT regarding its connetion time and business process.This hypothesis is also supported by research studies in [26].

H11. Time-Saving (TS) significantly influence on Perceived Usefulness (PU).

H12. Time-Saving (TS) significantly influence on Perceived Ease of Use (PEU).

3. RESERCH METHOD

3.1 Proposed Model

Based on the background of the problem, literature review, preliminary survey review of previous similar research, and research models developed, the researcher conducts the Research Model regarding this research result. The following is the research model used in this research as shown in Figure 1 below.

Figure 1: Proposed Model

3.2 Data Gathering

Based on the Cochran's formula [30] found in [31], the number of samples from the population of 14.457 average daily passengers of MRT Jakarta using QR code has resulted in a total minimum of 374 samples. Researcher was gathering the data by using a Google Forms questionnaire from July 21st 2020 to August 30th 2020. This research is intended for people who already used QR Code as payment media in MRT Jakarta. The final questionnaire consisted of 28 statements that used a five-point Likert scale, ranging from totally agree to totally disagree. Based on the data gathered from the questionnaire, this research resulted 401 respondents. The male respondent was 216 users

(53.8%) and the female user were 185 users (46.2%).

From 401 responses, there is no respondents from the age under 15 years old (0%), then 173 of the respondents were 15 – 25 years old (43.3%), 143 respondents from 26 – 35 years old (35.8%), and for the age of 36 – 45 years old there are 65 respondents (16.2%), 20 respondents from the age 45 – 60 years old (4.7%), and the last one for the age above 60 years old there are zero respondents (0%).

Most of the sample were private company employee which is 130 respondents (32.5%), 98 respondents (24.6%) from entrepreneur, following with 87 respondents (21.7%) from college students, 40 respondents (10%) from government employee, unemployed have 26 respondents (6.7%), the last one is for student which has 20 respondents (4.6%).

3.3 Validity and Reliability Test

Data analysis on this research was conducted with partial least squares (PLS), a structural equation modelling (SEM) technique that uses a component-based approach to estimation with Smart PLS tools version 3.0 to make researchers feel more comfortable to process and analyze the questionnaire data. The proposed research model was tested using a measurement model in order to estimate the significance of path coefficients, a bootstrapping procedure was used. Bootstrap analysis was performed with 5000 subsamples. The result shows that the measurement model meets all standard conditions as shown in Table 1 Below.

In order to declare indicator stated valid is to make the convergent validity valid which can be initiated from a factor outer loading value that is greater than 0.50 according to [32]. Meanwhile, Discriminant validity is proven with AVE with value of 0.50 or higher shows that the construct can represent more than 50% of the variance of its indicators [33]. Finally, a construct is said to be reliable if the Cronbach's alpha value must be more than 0.6 and the composite reliability value must be more than 0.7 [34].

The calculation using SmartPLS shows that all of the indicators in convergent validity have the result value of Outer loadings above 0.50, and the result of Average Extracted Value (AVE) all value above 0.50. Furthermore, based on the results of the discriminant validity test, it can be seen by Fornell-Larcker (see Table 2), all variables have AVE Roots, which have the same value or greater than the construct correlation

4. RESULT AND ANALYSIS

After all the data are declared valid and reliable (based on the validity and reliability tests), it can be said that the data is feasible to be processed in the next step, which is to test the hypothesis. In this stage, the researcher defines the hypothesis acceptance by analyzing the value of the hypothesis. In hypothesis testing, the first indicator is Path Coefficient. The path coefficient can have a value between -1 to 1, where 0.1 to 1 shows a perfect positive correlation, value 0 shows no influence to the variable, values between higher than -0.1 to lower than 0,1 are not significant values, and values between -0.1 to above -1 indicates opposed correlations [35].

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

Table 1 : Validity and Reliability Test

Variable	Item	Loadings	Cronbach's Alpha	CR	AVE
A	A1	0,808	0,712	0,839	0,635
	A2	0,745			
	A3	0,836			
AU	AU1	0,904	0,867	0,919	0,79
	AU2	0,881			
	AU3	0,881			
BI	BI1	0,822	0,829	0,886	0,661
	BI2	0,835			
	BI3	0,817			
	BI4	0,776			
CO	CO1	0,871	0,821	0,893	0,736
	CO2	0,848			
	CO3	0,854			
PC	PC1	0,829	0,773	0,868	0,687
	PC2	0,823			
	PC3	0,835			
PEU	PEU1	0,838	0,801	0,883	0,715
	PEU2	0,838			
	PEU3	0,86			
PU	PU1	0,821	0,773	0,868	0,687
	PU2	0,82			
	PU3	0,845			
T	T1	0,851	0,792	0,878	0,705
	T2	0,819			
	T3	0,848			
TS	TS1	0,857	0,806	0,886	0,721
	TS2	0,844			
	TS3	0,845			

Table 2 : Fornell-Larcker Criterion Data result

Variable	AU	A	BI	CO	PC	PEU	PU	TS	T
AU	0,889								
A	0,554	0,797							
BI	0,650	0,746	0,813						
CO	0,709	0,658	0,711	0,858					
PC	0,472	0,690	0,616	0,582	0,829				
PEU	0,596	0,764	0,731	0,694	0,683	0,845			
PU	0,639	0,799	0,776	0,745	0,662	0,762	0,829		
TS	0,516	0,674	0,591	0,674	0,674	0,720	0,715	0,849	
T	0,402	0,611	0,493	0,584	0,501	0,576	0,592	0,629	0,840

Table 3 : Hypothesis Test result

Hypothesis	Path	Path Coefficient	T-Statistics	Effect Size	Result
H1	BI -> AU	0,650	17,735	0,732	**Significant**
H2	PC -> BI	0,194	2,561	0,047	**Significant**
H3	A -> BI	0,612	9,184	0,464	**Significant**
H4	CO -> PU	0,447	5,696	0,283	**Significant**
H5	CO -> PEU	0,382	6,846	0,198	**Significant**
H6	CO -> A	0,001	0,021	0	**Not Significant**
H7	PEU -> A	0,324	6,026	0,134	**Significant**
H8	PU -> A	0,463	7,915	0,236	**Significant**
H9	T -> A	0,150	2,911	0,045	**Significant**
H10	T -> PU	0,117	2,133	0,021	**Significant**
H11	TS -> PEU	0,462	7,618	0,290	**Significant**
H12	TS -> PU	0,340	3.983	0,150	**Significant**

ISSN: 1992-8645 www.jatit.org E-ISSN: 1817-3195

Second indicator is T-Statistics, which hether the values of the path coefficients of the inner model is significant or not with a two tailed T-test, in the test the path coefficient is significant if the values show 1.96 in the t-statistics with a significance level of 5% [36]. Thus, if the value of T-Statistics higher than 1.96 and the value of the coefficient path is higher than 0.1, it shows a level of significance in hypothesis testing. Table 3 below also show the result of the effect size or f^2 from exogenous variable to endogenous variable with requirement if the value is more than 0.02 then the impact is low, if the value is more than 0,15 then the impact is moderate, besides if the impact is more than 0,35 then the impact is high

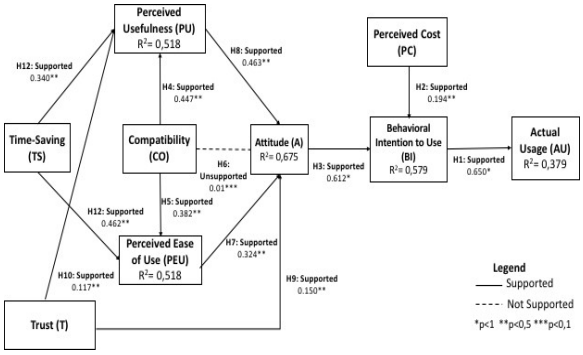


Figure 2: Structural Model

5. DISCUSSION AND IMPLICATIONS

5.1 Theoritical Implications

This research supports TAM's conceptual theory and the affiliation between DIT and external factors in QR Code payment adaptation. Regarding the research's academic contribution, this is one of the first studies to empirically analyse the determinants of passengers acceptance of QR payments in MRT Jakarta. Based on the analysis of the results taken from the data, it is concluded that this research supports mainly the finding in previous studies related. There's only one hypothesis that does not proven, which is Compatibility has no significant effect to Attitude. This shows that the results are not in accordance with previous research by [37].

Therefore, it is shown that the compatibility of the system is important in accordance to the attitude of passengers towards the QR Code as payment media in MRT Jakarta. This also proven by the absence of the effect between these 2 variables and makes compatibility doesn't have indirect effect towards behavioral intention to use and actual usage through mediation with variable attitude. This can be concluded that the compatibility of the system doesn't define passenger perception or judgement towards QR Code as their payment media in MRT Jakarta and directly affected the fact that they will use it or not

Another, Behavioural Intention to Use (BI) has positive and significant effect to Actual Usage (AU). This shows that the results are in accordance with previous research by Zijing Zhang & Yang [19], which states that the influence of Behavioural intention to Use to Actual Usage. Therefore, it is shown that the intention to use from passengers is important is in accordance to the actual usage of the QR Code as payment media in MRT Jakarta. Moreover, the influence of behavioural Intention to use towards Actual Usage has high Effect size. This can be concluded that at this moment, the passengers' intention is still low and in order to improve the passengers QR Code usage is by increase passenger's intention due to its high influence.

Perceived Cost (PC) also has positive and significant effect to behavioural Intention to Use (BI). This shows that the results are in accordance with previous research by Mallat et al. [21], which states that the influence of Cost factor on behavioural Intention to Use. Therefore, it is shown that money spent from passengers is important is in accordance to the intention to use QR Code as payment media in MRT Jakarta. Moreover, the influence of perceived cost towards behavioural Intention to Use has low Effect size but has indirect effect towards actual usage. This can be concluded that the price of the ticket is not the main factor that make passenger choose QR Code as their payment media in MRT Jakarta. Based on observations, this is because the possible ticket prices will not be different from other payment media.

Attitude (A) has positive and significant effect to Behaviral Intention to Use (BI). This shows that the results are in accordance with previous research by Schierz et al. [22] and Liébana-Cabanillas et al. [38], which states that the influence of Attitude towards Using factor on Behaviral Intention to Use. Therefore, it is shown that the attutide from passengers towards the system is important in accordance to the intention to use of the QR Code as payment media in MRT Jakarta. Moreover, the influence of Attitude towards Behavioral Intention to use has high Effect size but also has indirect effect towards actual usage. This can be concluded that in order to

improve the passenger's intention and intensity using QR Code is by make sure the attitude or judgments, also behaviour from passengers towards QR is good.

Moreover, Compatibility (CO) has positive and significant effect to Perceived Usefulness (PU). This shows that the results are in accordance with previous research by Di Pietro et al. [37], which states that the influence of compatibility of the system is crucial factor on Perceived Usefulness. Therefore, it is shown that the compatibility of the system is important in accordance to Usefulness of the QR Code as payment media in MRT Jakarta. Moreover, the influence of Compatibility towards Perceived Usefulness has moderate effect size. compatibility also has indirect effect which give significance influence to attitude, behavioral intention to use, and actual usage through the mediation of perceived usefulness. This can be concluded that the compatibility of the system is needed in order to make passengers feels the system is useful so that they want to use the system and at the moment the compatibility is still low. This can be explained by using QR Code is put in more effort, such as always have to make sure the availability of mobile phone, battery and internet connection wise.

Compatibility (CO) has positive and significant effect to Perceived Ease of Use (PEU). This shows that the results are in accordance with previous research by C. Kim, Mirusmonov, & Lee [39] which states that the influence of compatibility of the system is crucial factor on Perceived Ease of Use. Therefore, it is shown that the compatibility of the system is important in accordance to Ease of use of the QR Code as payment media in MRT Jakarta. Moreover, the influence of Compatibility towards Perceived Ease of use has moderate effect size. compatibility also has indirect effect which give significance influence to attitude, behavioral intention to use, and actual usage through the mediation of perceived ease of use. This can be concluded that the compatibility of the system is needed in order to make passengers feels easy to use so they will actual use the system and at the moment the compatibility is still low. This also can be explained by, the fact that passengers prefer bank card because they use it daily for shopping and many other daily activities.

Perceived Ease of Use (PEU) has positive and significant effect to Attitude (A). This shows that the results are in accordance with previous research by Hossain et al. [26], which states that the influence of Perceived Ease of Use of the system is crucial factor on Attitude. Therefore, it is shown that the ease of use of the system is important in accordance to attitude of passengers towards the QR Code as payment media in MRT Jakarta. Moreover, the influence of perceived Ese of Use towards Attitude has low Effect size but has significance indirect effect towards behavioral intention to use and actual usage. This can be concluded that the ease of use of the system define passenger perception or judgement towards QR Code as their payment media in MRT Jakarta but not the main factor.

Perceived Usefulness (PU) has positive and significant effect to Attitude (A). This shows that the results are in accordance with previous research by Hossain et al. [26], which states that the influence of Perceived Usefulness of the system is crucial factor on Attitude. The influence of Perceived Usefulness towards Attitude also has moderate effect size and has significance indirectly influence behavioral intention to use and actual usage. Therefore, it is shown that the Usefulness of the system is important in for passengers in order to use the QR Code as payment media in MRT Jakarta and at this moment the perceived usefulness of passengers towards the system is still low. Based on observations, this is possibly happened due the complexity of how to use the system especially for beginners and elderly.

Trust (T) also has positive and significant effect to Attitude (A). This shows that the results are in accordance with previous research by Hossain et al. [26], which states that the influence of Trust of the system is crucial factor on Attitude. Therefore, it is shown that the Trust from passengers towards the system is important in accordance to attitude of passengers towards the QR Code as payment media in MRT Jakarta. Unfortunately, the influence of Trust towards Attitude has low Effect size but has indirectly influence behavioral intention to use and actual usage. This can be concluded that the Trust towards the system define passenger preference towards QR Code as their payment media in MRT Jakarta but the main factor. Based on observations, this is possibly happened due to lack of awareness towards how important can their private information be on the internet.

Trust (T) has positive and significant effect to Perceived Usefulness (PU). This shows that the results are in accordance with previous research by

Hossain et al. [26], which states that the influence of Trust of the system is crucial factor on to Perceived Usefulness. Unfortunately, the influence of Trust towards Perceived Usefulness has low Effect size. Therefore, it is shown that the Trust from passengers towards the system is needed but not major in accordance to Usefulness of the QR Code as payment media in MRT Jakarta. Based on observations, this is possibly happened because of the passengers assume that most of mobile payment company is safe.

Compatibility (CO) has positive and significant effect to Perceived Ease of Use (PEU). This shows that the results are in accordance with previous research by Hossain et al. [26], which states that the influence of Time Saving of the system is crucial factor on Perceived Ease of Use. Therefore, it is shown that the time saving using the system is important in accordance to Ease of Use of the QR Code as payment media in MRT Jakarta. Furthermore, the influence of Time-saving towards Perceived ease of use has moderate Effect size. This can be concluded that the time effectiveness of the system is considered for defining its ease of use. Based on observations, this is possibly happened due to its complexity of using the system, so the system was not really time-saving and will affect the actual usage.

Time Saving (TS) has positive and significant effect to Perceived Usefulness (PU). This shows that the results are in accordance with previous research by Hossain et al. [26], which states that the influence of Time Saving of the system is crucial factor on Perceived Usefulness. Therefore, it is shown that the time saving using the system is important in accordance to Usefulness of the QR Code as payment media in MRT Jakarta. Unfortunately, the influence of Time-saving towards Perceived Usefulness has low Effect size. This can be concluded that the effectiveness of the system doesn't entirely define its usefulness. Thus, although using the system make the passengers don't have to queue for ticket anymore, passengers still think the system is not useful enough.

5.2 Practical Implications

This research purpose to make projects, costs, and resources that have been issued by MRT Jakarta can be used optimally and as they should. This include gate machine cost, scanning machine cost and maintenance. So, hopefully this research will help companies not to waste resources spent on implementing a QR code system. Therefore, this research can provide insight and become a reference for the government to improve the quality of public transport and QR Code as fare media that the factor. Behavioral Intention to Use, Attitude, Perceived Cost, Compatibility, Perceived Usefulness, Perceived Ese of Use, Time saving, and Trust are all essential for passengers in choosing fare media in Public transportation.

This research is shows that in order to improve the quantity of passengers using QR as fare media in MRT Jakarta, MRT Jakarta needs to improve the Usefulness, Ease of Use of the system. Therefore, it will influence the Attitude and intention to use the passenger towards the QR Code system, such as enhancing the productivity and quality in the user's daily activity and not giving the user a hard time using it. And lastly, in order to gain more benefit for both the passengers and the company is for MRT Jakarta to prioritize the system's feature has to be compatible, trusted, reasonable price, and also Time saving for passenger in order to improving the total QR Code user, therefore the quantity of the passenger will increase eventually.

The biggest implication that can be provided is that the factors that most important are compatibility, perceived ease of use, perceived usefulness and time saving which have a significant relationship and high effect size. Therefore, these factors are the most important for MRT to focused on for increasing the interest and QR code users. So, it is important for MRT to change the system of the QR code business process at MRT. By looking at how to use the system and compared to the KRL system, MRT needs to implement a new additional payment system like KRL by integrate the QR code scanning system directly from Ovo, GoPay, Linkaja and Dana Mobile applications. This will make it faster and easier, compared to MRT Jakarta, which has to download the MRT application, then selects the departure and arrival station, then integrates with the provider application. Not to mention, if there is a change in the plan for the destination station, the tickets purchased will be forfeited and will not be returned.

This also applies to vendors or company providers such as OVO, LinkAja, Gopay and Dana. Successful mobile services will provide users with suitable services that are accessible and fitted to specific users' needs and their location. These services can also be used as a alternate

when regular service is not available. In these situations, QR Code can be seen as extremely beneficial and users might be willing to pay a premium for it. Lastly, This research can help the general readers to gain knowledge and enlightenment regarding QR Code in MRT Jakarta.

5.3 Limitations and further research

The study tested the effect of perceived Cost, Compatibility, time saving, Trust, perceived Usefulness, perceive ease of use, Attitude towards, behaviour intention to use, and also incorporate with the actual usage of QR Code as payment media among passengers in MRT Jakarta. Here several limitations are given below; first, the limited user and answer due to the type of this research which is quantitative research. Another limitation is this study only focus on testing the effect of perceived Cost, Compatibility, time saving, Trust, perceived Usefulness, perceive ease of use, Attitude towards and behaviour intention to use and does not include other possibility behaviour and Attitude towards the system such as cognitive style, subjective norm and many more in the proposed model. Therefore, this research can be done further in the future by (1) amplifying the study with a live survey in MRT Jakarta such as interview, observation or any other tools to strengthen the results from research further, (2) do the qualitative research with the related stakeholders, (3) amplifying the model by incorporating possibility behaviour and Attitude towards the system such as subjective norm any other relevant variables based on the latest literature, (4) this research also can be supported by doing study some other rapid transit company such as TransJakarta, LRT, and KRL

6. CONCLUSION

This research aims to know what factors influence passengers using QR Code as fare media in MRT Jakarta. There is also no usability evaluation was done towards QR Code payment system in MRT Jakarta. Therefore, this research was conducted using the integration of TAM and DIT Theory with external variable factors. The model is tested by partial least square - structural equation modeling (PLS-SEM), which conducts the inner and outer model tests using SmartPLS software. This research conducted a survey method and resulted 401 respondents indicated that Actual Usage was influenced by various reasons related to Behavioral Intention to Use, Attitude, Perceived Cost, Compatibility, Perceived Usefulness, Perceived Ese of Use, Time saving, and Trust. The conclusions that can be drawn from this study are Behavioral Intention to Use, Attitude, Perceived Cost, Compatibility, Perceived Usefulness, Perceived Ese of Use, Time saving, and Trust are mostly have a significant influence in actual usage of passengers on using QR Code as fare media in MRT Jakarta.

REFRENCES:

[1] M. Awais, M. Irfan, M. Bilal, and T. Samin, “Helpful Business Value of Advance Bal Information System,” *International Journal of Computer Science Issues*, vol. 9, pp. 415–422, Jan. 2012.

[2] I. Aqil, “2019: The new era of public transportation in Jakarta,” 2019. [Online]. Available: https://www.thejakartapost.com/user/account/login.

[3] A. Melis, M. Prandini, L. Sartori, and F. Callegati, “Public Transportation, IoT, Trust and Urban Habits BT - Internet Science,” 2016, pp. 318–325.

[4] I. Atmawidjaja, “Bolstering financial inclusion in Indonesia How QR Codes can drive digital payments and enable financial inclusion,” 2018.

[5] A. D. Budiawati, “Transaksi Rp21 Triliun, Ini Daftar Dompet Digital Terpopuler di Indonesia,” 2019. .

[6] K. Mulia, “Indonesia imposes standard QR code, fixed fees for e-wallets,” 2020. .

[7] A. Kim, “RFi Group Insight - Asia_ QR Code payments shaping into relevance _ RFi Group.” 2019.

[8] B. INDONESIA, “Indonesia Payment Systems Blueprint 2025 Bank Indonesia: Navigating the National Payment Systems in the Digital Era,” 2019.

[9] C. Zhong *et al.*, “Variability in regularity: Mining temporal mobility patterns in London, Singapore and Beijing using smart-card data,” *PloS one*, vol. 11, no. 2, p. e0149222, 2016.

[10] M. Jakarta, “Report,” 2020.

[11] N. R. Ab Hamid, R. M. Akhir, and A. Y. Cheng, “Social media: an emerging dimension of marketing communication,” *Journal of management and marketing research*, vol. 12, p. 1, 2013.

[12] J. Hedman and S. Henningsson, "The new normal: Market cooperation in the mobile payments ecosystem," *Electronic Commerce Research and Applications*, vol. 14, no. 5, pp. 305–318, 2015.

[13] F. D. Davis, "Perceived usefulness, perceived ease of use, and user acceptance of information technology," *MIS quarterly*, pp. 319–340, 1989.

[14] G. C. Moore and I. Benbasat, "Development of an instrument to measure the perceptions of adopting an information technology innovation," *Information systems research*, vol. 2, no. 3, pp. 192–222, 1991.

[15] E. M. Rogers, "Diffusion of Innovations: modifications of a model for telecommunications," in *Die diffusion von innovationen in der telekommunikation*, Springer, 1995, pp. 25–38.

[16] L. G. Tornatzky and K. J. Klein, "Innovation characteristics and innovation adoption- implementation: A meta-analysis of findings," *IEEE Transactions on engineering management*, no. 1, pp. 28–45, 1982.

[17] E. Karahanna, D. W. Straub, and N. L. Chervany, "Information technology adoption across time: a cross-sectional comparison of pre-adoption and post-adoption beliefs," *MIS quarterly*, pp. 183–213, 1999.

[18] E. W. T. Ngai, J. K. L. Poon, and Y. H. C. Chan, "Empirical examination of the adoption of WebCT using TAM," *Computers & education*, vol. 48, no. 2, pp. 250– 267, 2007.

[19] Z. Zhang and X. U. Yang, "Mobile Ticket Purchase Model Construction and Customer Preference Analysis Based on Technology Acceptance Model," in *2019 IEEE 10th Annual Information Technology, Electronics and Mobile Communication Conference (IEMCON)*, 2019, pp. 757–762.

[20] T. H. Kim, J.-N. Lee, J. U. Chun, and I. Benbasat, "Understanding the effect of knowledge management strategies on knowledge management performance: A contingency perspective," *Information & management*, vol. 51, no. 4, pp. 398–416, 2014.

[21] N. Mallat, M. Rossi, V. K. Tuunainen, and A. Öörni, "An empirical investigation of mobile ticketing service adoption in public transportation," *Personal and Ubiquitous Computing*, vol. 12, no. 1, pp. 57–65, 2008.

[22] P. G. Schierz, O. Schilke, and B. W. Wirtz, "Understanding consumer acceptance of mobile payment services: An empirical analysis," *Electronic commerce research and applications*, vol. 9, no. 3, pp. 209–216, 2010.

[23] E. M. Rogers and A. Singhal, "Empowerment and communication: Lessons learned from organizing for social change," *Annals of the International Communication Association*, vol. 27, no. 1, pp. 67–85, 2003.

[24] A. B. Ozturk, A. Bilgihan, K. Nusair, and F. Okumus, "What keeps the mobile hotel booking users loyal? Investigating the roles of self-efficacy, compatibility, perceived ease of use, and perceived convenience," *International Journal of Information Management*, vol. 36, no. 6, pp. 1350–1359, 2016.

[25] L.-M. Chuang, C.-C. Liu, and H.-K. Kao, "The adoption of fintech service: TAM perspective," *International Journal of Management and Administrative Sciences*, vol. 3, no. 7, pp. 1–15, 2016.

[26] R. Hossain, S. M. H. Mahmud, M. A. Hossin, T. Bhuiyan, and Y. X. Hua, "Effects of Cognitive Ability, Trust and Time-Saving: Predicting Further Amelioration and Successive Usage of E-ticketing with TAM, TPB and Cognitive Frameworks," in *Information and Communication Technology for Competitive Strategies*, Springer, 2019, pp. 41–51.

[27] Y. Qu, W. Rong, Y. Ouyang, H. Chen, and Z. Xiong, "Social aware mobile payment service popularity analysis: The case of WeChat payment in China," in *Asia-Pacific Services Computing Conference*, 2015, pp. 289–299.

[28] P. A. Pavlou, "Consumer acceptance of electronic commerce: Integrating trust and risk with the technology acceptance model," *International journal of electronic commerce*, vol. 7, no. 3, pp. 101–134, 2003.

[29] G. Punj and R. Brookes, "The influence of pre-decisional constraints on information search and consideration set formation in new automobile purchases," *International Journal of Research in Marketing*, vol. 19, no. 4, pp. 383–400, 2002.

[30] W. G. Cochran, "Sampling techniques-3," 1977.

[31] J. Kotrlik and C. Higgins, "Organizational research: Determining appropriate sample size in survey research appropriate sample size in survey research," *Information technology, learning, and performance journal*, vol. 19, no. 1, p. 43, 2001.

[32] Z. Zhang, M. J. Zyphur, and K. J. Preacher, "Testing multilevel mediation using hierarchical linear models: Problems and solutions," *Organizational Research Methods*, vol. 12, no. 4, pp. 695–719, 2009.

[33] J. F. Hair, G. T. M. Hult, C. Ringle, and M. Sarstedt, *A Primer on Partial Least Squares Structural Equation Modeling*, vol. 46, no. 1–2. 2014.

[34] W. Abdillah and J. Hartono, "Partial Least Square (PLS): alternatif structural equation modeling (SEM) dalam penelitian bisnis," *Yogyakarta: Penerbit Andi*, vol. 22, pp. 103–150, 2015.

[35] F. Lehner and N. Haas, "Knowledge Management Success Factors--Proposal of an Empirical Research.," *Electronic Journal of Knowledge Management*, vol. 8, no. 1, 2010.

[36] K. K.-K. Wong, "Partial least squares structural equation modeling (PLS-SEM)