International Journal of Innovative Technology and Exploring Engineering (IJITEE)
ISSN: 2278-3075 (Online), Volume-9, Issue-7, May 2020

Factors Influencing Customer's Satisfaction on Mass Rapid Transit Feeder Bus Electronic Payment System

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Abstract*: This paper introduces the current trend of the electronic payment system implementation on feeder bus in Malaysia. Smart card technology has been implemented in many countries around the world as a substitute for cash transaction. Rapid Bus Sdn Bhd was responsible for introducing electronic payment system for all Mass Rapid Transit feeder bus across all the 57 routes in February 2019. By using the Pearson correlation coefficient, the analysis stated that the significant level is 0.05 .Furthermore, it used to identify the hypothesis should be acceptance or rejected. When relationship for both variables is significant, it's required to resolve on the level of the acceptance. The development of this e-payment system is an effort to support the cashless payment system parallel with the government aspiration to increase the efficiency of the national payment system. The aim of this study is to identify the factors that influence customers' satisfaction of Mass Rapid Transit feeder bus electronic payment system. This study not only reveals the factors that influence customers' satisfaction which are e-pay reliability, e-pay miles coverage, staff technical competencies and smart card functionality, but identified the significant ones among them

Keywords: Electronic Payment System, consumer satisfaction, smart card, feeder bus.

I. INTRODUCTION

On February 1, 2019, Rapid Bus Sdn Bhd which manage the MRT feeder bus, had set to start a completely cashless payment framework for the all their MRT feeder buses. This implementation of e-payment system is based on the current cashless payment method employed by MRT feeder buses where the average of 49 percent customers / riders had adopted this payment method. This has portrayed Malaysia's effort in improving its transportation payment system. Therefore, it is important to evaluate whether customers are satisfied with the electronic payment implemented. Other than in MRT feeder buses, the same type of payment system had also been implemented in monorail, parking, toll highway, commuter railways and many more in Malaysia.

Revised Manuscript Received on May 30, 2020.
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The systems should increase customers' convenience and provide better operations to carriers for their future plan in upgrading in public transportation services [1]. The implementation of electronic payment system will generate more connectivity in the network of bus services and allows many more destination to be served seamlessly across the MRT feeder bus usage. With the removal of cash and replacing it with the electronic, innovation in fare will be promoted. Till date, this e-payment system is installed in all 57 feeder buses routing from MRT Sungai Buloh to MRT Kajang Depot in the state of Selangor, Malaysia.

Outcome from the preliminary study showed that among the causes of electronic payment systems problem were trigger by human error by scanning an invalid card. Invalid card refers to insufficient card cash amount, wrong card and duration expired card. The problem also came from the technology itself. Errors from the ticket / reload machine or from the system software. Any minor problem that may occurs in the software or hardware, will cause system problem such as the system break down. As a result, card reload will be suspended until error is fixed and to make the situation worst, fares can't be collected during bus ride. Hence, a study needs to be conducted to identify the factors influencing customers' satisfaction of MRT feeder bus electronic payment system. To achieve the research goal, several objectives from this study are outlined:

i. To investigate on the current experience of consumer on E-payment system in MRT feeder Bus.
ii. To identify the factors that influence customers' satisfaction on the e-payment system in MRT Feeder Bus.
iii. To provide suggestion to improve the e-payment systems in bus services

II. LITERATURE REVIEW

A. Definition of Electronic Payment System

The function of electronic payment system is the way for users to access and attribute in the bus service. The usage of electronic payment system has become more common and visible in our society due to its easy access and give more benefit to the consumers [2]. Electronic payment system is becoming more crucial for both businesses and consumers [3]. Electronic payment system is used for the completion of electronic commerce transactions and have been defined as any payment system that facilitates secure electronic commerce transactions between organizations and individuals [4].

However, the potential use of the smart card in the transport sector are bigger than the using cash payment, indeed the potential for using a card which can stored the detail of the passenger in order for them to use the smart card [5].

B. Servqual Model

Service quality plays an essential role to ensure customer satisfaction as the customer was the one who is the patrons of the products [6]. Customer satisfaction comes from those features which induce customers to buy a particular product [7]. Meanwhile, dissatisfaction defined by the writers has its origin in deficiencies and is why customers complain. Comparing level of consumer satisfaction form the actual service that have been delivered and also customer's expectation before a service encounter is the way for measuring service quality for SERVQUAL model. These 5 constructs variables for service quality (SERVQUAL SCALE). They are as follows:

i. **Reliability**

The implementation that involved on timely manner and also customer services.

ii. **Responsiveness**

The willingness of service personnel to respond when the problem occurs.

iii. **Tangibles**

The equipment or tools that required to improve services and as a presentations of service personnel.

iv. **Empathy**

The action of convenient way and the consideration of the services to customers by helps their special needs.

v. **Assurance**

Focuses on the professional knowledge of the services personnel by solving the problem

C. Passenger Perception

Issue of integration, reliability and effectiveness of the public transport services including the system that already implemented in public transportation in Malaysia like MRT feeder bus is still worrying. People are created with different behavior and attitudes; and therefore, their expectations would also be varied. Similarly applied to public transportation, there is a spectrum of customer / user seeking different expectation from the implemented system. Previous research has shown that this type of system is appreciated by the customer but there is no actual knowledge or information about the level of satisfaction from the customer or potential customer [8]. Services or product should be easy and convenient to use in order to match customers' needs and also increase the level of customers' satisfaction and can increase demand which in the context is the number of ridership [9].

III. RESEACH METHODOLOGY

This research employed quantitative methodology. Result from preliminary study provided the starting point in developing the research instrument. A structured questionnaire was prepared to obtain the current expectation of customer on the electronic payment system in MRT feeder bus and investigate the outcome due to the changes in the service of public transportation in Malaysia. This questionnaire had established the customers' current opinion on the MRT feeder bus, efficiency and reliability of implemented electronic payment system and customers' satisfaction on the electronic payment system usage on the public transportation system.

The questionnaires were distributed to Mass Rapid Transit feeder bus customers / riders. The surveys were conducted at four MRT stations, namely MRT Kajang, MRT Maluri, MRT Muzium Negara & also MRT Sungai Buloh. This selection of case study based on the bus station that connected with the MRT interchanged.

A. Sample Size

The calculation of sample size at 95% of confident level is based on the equation below [10].

$$n = \frac{N}{1 + N * (e)^2}$$

Where**:**

n = Sample size

N = Population Size

e = Confident level

The sample size for the customers / riders of MRT feeder bus using above equation is, the population N 13000 consumer daily and confidence level e = 0.70, minimum recommended respondent was 195 respondents. From the returned questionnaires, the total of 180 respondent were valid and accepted for further analysis. The questionnaire took average 10-15 minutes to complete. The data collection was done through face-to-face survey at the bus stop in 4 station of MRT and took about a week to complete.

Table- I: Questionnaire Distribution at MRT Stations

Date	Description	No. Distributed	No. Feedback
08/10/19	Distributed questionnaire at MRT Kajang Station	40 sets	40 sets
10/10/19	Distributed questionnaire at MRT Maluri Station	40 sets	40 sets
12/10/19	Distributed questionnaire inside the MRT Feeder bus (From MRT Maluri Station – Interchange station Cheras - Ampang)	20 sets	20 sets
11/10/19	Distributed questionnaire at MRT Muzium Negara Station	50 sets	50 sets
13/10/19	Distributed questionnaire at MRT Sungai Buloh Station.	45 sets	45 sets

Data collected was tested using Pearson Correlation Coefficient analysis to test the relationship between factors of e-payment system and customers' satisfaction toward the system. Statistical package for social science (SPSS) software was used to run the analysis.

IV. RESULT AND DISCUSSION

Findings from the analysis will be discussed in two parts. First, finding on the demographic of respondents. Second, is the correlation analysis to measures the relationship among independent (e-payment system factors) and dependent (customer satisfaction) variable.

Table- II: Summary of Respondent Profiles (Sample size = 180)

Respondent Characteristics	Sub-Profile	Percentage
Gender	Male Female	28 72
Age	18-under 19-41 42-59 60 and above	12 59 20 9
Nationality	Malaysian foreigner	97 3
Occupation	Student Working Self-employed Not-working	21 62 10 7
How often travel	Once a week 3 to 4 times a week More than 4 times a week	28 5 67
Type card owned	Concession Card Monthly card Normal card	32 53 14

Table II shows the majority of the participants were female (72.0 percent) and majority participants age is within 19 to 41 years old (59.0 percent). Most of them are Malaysian (97 percent) and used the feeder bus services as their mode of transport. They traveled more than 4 times a week (67 percent) using the MRT bus feeder services and 53 percent of customer owned monthly payment card which they need to reload monthly.

Pearson Correlation Coefficient

Pearson Correlation Analysis can be defined as a test for measures the relationship among variables. In this research, Pearson Correlation Analysis occur among independent variables (e-pay reliability, e-pay miles coverage, staff technical competencies, smart card functionality, safety of smart card and dependent variable (consumer satisfaction of E-payment system on MRT feeder bus). When significant p-value result is more than 0.05, it indicates that relationship is not significant which means the addressing the factors will not necessarily will make customers' satisfied with the service.

A. E-pay Reliability

Table- III: Correlation between e-pay reliability and consumer satisfaction of Electronic Payment system on MRT Feeder Bus

		E-pay Reliability	Consumer Satisfaction
E-pay Reliability	Pearson Correlation Sig (2 tailed) N	1 180	.638** .000 180
Consumer Satisfaction	Pearson Correlation Sig (2 tailed) N	.638** .000 180	1 180

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

Table III shows the p-value as 0.638 and this indicates that there is a significant relationship between e-pay reliability in feeder bus and level of consumer satisfaction on the implementation of e-payment system on the bus services in Malaysia. The positive value of correlation coefficient is 0.638** and it shows the relationship between 2 variables is moderate. This shows that reliability of the e-pay will influence on the level of customer satisfaction.

B. E-pay Miles Coverage

Table- IV: Correlation between e-pay miles coverage and consumer satisfaction of Electronic Payment system on MRT Feeder Bus

		E-pay miles coverage	Consumer Satisfaction
E-pay Miles coverage	Pearson Correlation Sig (2 tailed) N	1 180	.399** .000 180
Consumer Satisfaction	Pearson Correlation Sig (2 tailed) N	.399** .000 180	1 180

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

Result from Table IV shows that the p-value as 0.399 and this indicates that there is a significant between e-pay miles coverage in feeder bus and consumer satisfaction of electronic Payment system on the bus services. The positive value of correlation coefficient 0.399** indicated that their relationship is weak. This indicates that e-pay miles coverage will not have a strong contribution but has a significant value to the consumer satisfaction if this factor is being addressed. The result it identified that most of the customers of feeder bus agreed that by increasing the pit stop and extending the bus route more than 7 kilometers is preferable. The current route coverage is insufficient that force them to change to another feeder bus for next kilometer.

C. Staff Technical Competencies

Table- V: Correlation between staff technical competencies and consumer satisfaction of Electronic Payment system on MRT Feeder Bus

		Staff Technical Competencies	Consumer Satisfaction
Staff Technical Competencies	Pearson Correlation Sig (2 tailed) N	1 180	.614** .000 180
Consumer Satisfaction	Pearson Correlation Sig (2 tailed) N	.614** .000 180	1 180

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

Table V shows the p-value as 0.614 and this indicates that there is a significant relationship between staff technical competencies and consumer satisfaction of electronic payment system on the bus services.

The positive value of correlation coefficient 0.614** indicated that their relationship is moderate. This explains that customer feels that is the technical staff are competent and well prepared, the services will be better as all issues and enquiry pertaining the e-payment able to be resolved immediately.

D. Smart Card Functionality

Table- VI: Correlation between smart card functionality and consumer satisfaction of Electronic Payment system on MRT Feeder Bus

		Smart Card Functionality	Consumer Satisfaction
Smart Card Functionality	Pearson Correlation Sig (2 tailed) N	1 180	.608** .000 180
Consumer Satisfaction	Pearson Correlation Sig (2 tailed) N	.608** .000 180	1 180

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

Table V1 shows that the p-value as 0.608 and this indicates that there is a significant between smart card functionality in feeder bus and consumer satisfaction of electronic payment system on the bus services. The positive value of correlation coefficient 0.608** indicated that their relationship is moderate. Majority of MRT feeder bus respondent agreed that the implementation of the electronic payment system in bus services is a good effort done by Rapid Bus Sdn Bhd as improvement on the service.

E. Safety of Smart Card

Table- VII: Correlation between safety of smart card and consumer satisfaction of Electronic Payment system on MRT Feeder Bus

		Safety of Smart Card	Consumer Satisfaction
Safety of Smart Card	Pearson Correlation Sig (2 tailed) N	1 180	.555** .000 180
Consumer Satisfaction	Pearson Correlation Sig (2 tailed) N	.555** .000 180	1 180

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

Result in Table VII shows the p-value as 0.555 and this indicates that there is significant between safety of smart card and consumer satisfaction of electronic payment system on the bus services. The positive value of correlation coefficient 0.555** indicated that their relationship is moderate. User feel that their smart card is secure as they have to register all their information into the smart card before they able used it. Hence, if the card is lost, the owner of the card can be traced easily.

F. Hypothesis Testing

Table VIII: Result for Hypothesis Testing

Hypothesis	Result	
H1: There is a significant between reliability of e-pay and consumer satisfaction of electronic payment system.	Correlation coeffcient (0.638) P value = 0.000	Accepted
H2: There is a significant between e-pay miles coverage and consumer satisfaction of electronic payment system.	Correlation coeffcient (0.399) P value = 0.000	Accepted
H3: There is a significant between staff technical competencies and consumer satisfaction of electronic payment system.	Correlation coeffcient (0.614) P value = 0.000	Accepted
H4: There is a significant between smart card functionality and consumer satisfaction of electronic payment system	Correlation coeffcient (0.608) P value = 0.000	Accepted
H5: There is a significant between safety of smart card and consumer satisfaction of electronic payment system on MRT feeder bus.	Correlation coeffcient (0.555) P value = 0.000	Accepted

All the independent variables have been considered as positive relationship in this study Therefore, the result have proved that the hypothesis (H1, H2, H3, H4 and H5) have accepted due to there is a positive moderate relationship between the independent variables (e-pay reliability, e-pay miles coverage, staff technical competencies, smart card functionality and safety of smart card) and dependent variable (consumer satisfaction of e-payment system on MRT feeder bus).

From table VIII shows that the highest of p-value is 0.638 that get from the e-pay reliability independent variable. The reliability of e-pay make the fare transaction become more efficient & convenience and this is why most respondents agreed that E-pay reliability as the main factor influencing consumer satisfaction. There is no fumbling for cash, holding up the line of commuters wanting to get on the bus. Consumer can get on board the bus faster and depart on time. The feeder bus also provide the informative on the route and the schedule of the buses for the consumer information. With the good information, it can make consumer alert with the next pit stop and can avoid missed the actual pit stop that they need to stop.

V. RECOMMENDATION

Study has shown that there are some improvements need to be done in order to increase customers' satisfaction toward MRT feeder bus e-payment system.

There improvement that should be considered is as follows:

1) Maintain and upgrading the E-payment system.

The service provider should maintain the system to give a better service to fulfill the customers' travel demand. Rapid Bus should also implement a pricing structure based on operational cost (distance-based) instead if one flat rate.

2) Develop feeder bus tracking system

This tracking system able to reduce the customers' waiting time. All information pertaining bus schedule, bus number and routing, current feeder location. Estimation on the arriving time and fare should be available in the system. If this system is adopted, the customers'' journey will be more pleasant and convenient.

3) Employ mobile payment application

This apps will replace the card in the contactless transaction. It also able to provide customer with digital interface which they can monitor all their payment transactions and reload their credit. This system should also provide an option to link the e-payment to customers' credit or debit card.

VI. CONCLUSION

In conclusion, as a new system that have been implemented in the bus services, e-payment systems on MRT feeder bus showed that the system had brought benefits to the customers who highly depended on public transportation system as their main modes of transportation. The implementation of this payment system was the initiative to support the effort to accelerate the country migration to the cashless society, which has become as the part of the government aspiration to increase the efficiency of the nation payment system. Thus, the trend of e-payment systems is increasing due to its convenient and secure payment functionality. A quality bus services will not only retain consumer to continue using the bus services but also an able to attract potential customers to use the service in the future. Overall, the implementation of e-payment system in MRT feeder bus services were well developed and fulfilled the objective of that were stated in the research proposal. It can be concluded that customers of MRT feeder bus are satisfied with the e-payment system. However, the reliability of the e-payment system was their highest concern among the other factors and will strongly influence their satisfaction towards the overall e-payment system. Therefore to ensure the customers' satisfaction towards the system are met and sustained, the system need to be monitored and maintained closely to avoid unnecessary system errors.

ACKNOWLEDGMENT

I would like expressed my gratitude to Dr. Zuhra Junaida binti Ir. Mohamad Husny Hamid (supervisor) for her guidance, assistance, comments and also valuable advice during the process and writing up this project report. Also thank you to Urban and Regional Planning Department, Built Environment and Surveying, Universiti Teknologi Malaysia for providing the resources and funding for this publication.

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