

## The Usage and Efficiency of RFID among Road Users in Johor Bahru

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**Abstract:** Due to the population of Malaysia rise every year and the demand of motor vehicle in the road increase, so the road users in Malaysia growth rapidly. The demand of toll payment system also increase accordingly. High usage of toll payment directly affects to the longer time in passing the toll and bring the delay of issues. One of the factors of delay issues is the toll detection problem at the toll payment booth. Many type of toll payment system implementation at the toll payment booth but Radio Frequency Identification (RFID) seem more prominent. Even through RFID is entrenched in the market but there are still challenges in implementation of the technology. Therefore, this study seeks to identify the usage and efficiency of RFID among road users. The research methodology adopted in this research is quantitative methods and the instrument that use to collect the data is questionnaires. The location of this research was conducted at Johor Bahru and the respondents of this research are driver with driver's license. The results of this study show that RFID has the potential in providing convenient toll tracking to reduce the time wastage of passing the toll booth. The biggest challenge of RFID implementation are the financial and installation support due to the technical and cost of the technology. In conclusion, the research provides substantial knowledge of effective toll management with RFID implementation in automatic toll payment system at the roll collection sector.

**Keywords:** Radio Frequency Identification, Efficiency, Usage, Toll detection

### 1. Introduction

Nowadays, Malaysia still in the stage of developing country and has not changed to fully developed country. It requires full possession of an economy that is competitive, dynamic, robust, and resilient. Although Malaysia just a developing country but the population still increasing every year. The current population of Malaysia is now 33,143,949 as of May 2022 (Worldmeter, 2020). The population of Johor has reached 3.79 million in 2021 (Department of Statistics Malaysia, 2021). Thus,

the road users in Malaysia growth rapidly. The demand of toll payment system also increase accordingly. High usage of toll payment directly affects to the longer time in passing the toll and bring the delay of issues.

Due to the population of Malaysia rise every year and the demand for motor vehicle in the road increase, thus the road users in Malaysia growth rapidly. Thus, the demand of toll payment system also increase accordingly. In previous, the first Malaysia toll payment system are using Touch n'Go card or cash as the payment options. Later in 1999, the SmartTag launched as other toll payment option. However, according news of Rnggiplus.com, the Ministry of Works (KKR) announced that it will be implementing radio frequency identification (RFID) technology for light private vehicles (Class 1). This is expected to take effect starting from 15 January 2022, heralding the eventual phasing out of Touch 'n Go and SmartTag in the near future.

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Radio Frequency Identification (RFID) is a wireless technology for tracking or tagging and identification of products and components through low-power radio waves. RFID is a revolutionary technology, which limits the experience of application in various contexts. The Radio Frequency Identification (RFID) Systems are based on radio frequency (RF) and RF reader tags.(Costa, 2021).

According to the research paper of Sanghvi (2015), the major problem being having heavy traffic at every toll booth in the city. Thus, this paper is focuses on effectively rectified and provided efficient toll tax collection facility for consumer at every toll station. The main obstacles of road transport and consumption of time. Time and efficiency are a matter of priority of present day (Saurabh, 2016). However, the efficiency can be conclude as low efficiency (Sumathi, 2018).

Therefore, to achieve the research objectives the usage of RFID among road users in Johor Bahru are determined. Consequently, the efficiency of RFID among road users in Johor Bahru is predicted.

This study was conducted at Johor Bahru, Johor. The respondents targeted in this study focused on road users with the driving license in Johor Bahru, Johor. This study used a quantitative method. A survey questionnaire was designed to collect primary data intended from 380 respondents for this study. The sample was selected randomly based on Krejcie and Morgan (1970).

## 2. Literature Review

This chapter aims is to provide evidence of selected literature review on Radio-Frequency Identification (RFID) and more on the subject of the toll payment using the Radio-Frequency Identification (RFID) to help in development of a theoretical framework and hypotheses for this research.

### 2.1 Radio-Frequency Identification (RFID)

Radio-Frequency Identification or RFID is also known as a wireless network that captures data that can be connected to different identification properties (position, color, serial number purchase date, etc) of entities that have labels tag of RFID. Every real object in the digital domain might have a unique identifying number, similar to an IP address, because of RFID (Xuesong Bai, September 2013). The electromagnetic waves that are exchanged between RFID tags and RFID interrogators are used to

acquire data which is known as a reader (Fatah Chetouane, 2015). According to Ahmad Fali Oklilas in 2019, RFID is also recognized as the auto-ID method that normally uses radio waves.

## 2.2 Radio-Frequency Identification (RFID) component

In order for the RFID to support and carry out the function, the component of the RFID needs to be working perfectly. In this part, a few components of RFID are listed as explained in detail referring to the research article reviewed. According to Ahmad Fali Oklilas in 2019, tag RFID that is the combination of 3 different types is known as the tool that is responsible for the transmission purpose. It is also called a transponder.

These three part are Integrated Circuit with the purpose of providing a platform for the storage of data and the command execution. Next part is coil and winding. It function is to process of data or information transmission including the receiving and sending of the radio frequency waves. Last part is RFID Tag which it is a medium for memory storing including important data and information All three of the components are used inside the RFID tag.

The RFID tag can be classified into two different types that differ in a few aspects and usage. According to Fatah Chetouane (2015) explain that the two category of RFID tag are passive tag and active tag. Beside that, reader component that is put inside the RFID system will communicate with the RFID tag as the device of modulation and also as the demodulate of the radio frequency signal. Meanwhile, antenna is a device which is responsible for transmission between the RFID reader and the tag involving the signal of radio frequency. Using the radio frequency wave, the information will be encoded through the transmission line.

## 2.3 Radio-Frequency Identification (RFID) in Electronic Toll Collection Payment

Toll Collection Payment can be divided into two categories which are the manual and electronic (ETC). The manual collection is when the user paid the toll fare with cash while the electronic payment is using application and software systems. In order to use the ETC for payment purposes the application of the RFID system is applied by the user and technology at the toll station.

### *(a) The field of RFID*

Fatah Chetouane (2015) through his articles stated that, to invent and introduce the RFID for the public use three different fields involved in the process is the Computer Software Engineering, Industrial Engineering and the Electrical Engineering. Industrial Engineering contributes their knowledge of the related concept, project management, resources and operations, risk and analysis along with other information that is used for RFID.

Next Chetouane F. in 2015 also described the importance of Electrical Engineering as the RFID is using the concept and principles of Electromagnetism Radio Frequency (ERF) physics, electric circuit and communication to ensure the success. Moreover, the transmission performance of active RFID tags is a very important aspect that is handled by this engineering field. Moreover, the transmission performance of active RFID tags is a very important aspect that is handled by this engineering field.

Lastly, the field stated by the writer is Computer and Software Engineering. This engineering not only contributes for the application system but also the management. For the application system, this field will provide the most suitable software that connects the hardware to the database or main server.

### *(b) Hardware*

Referring to the articles written by Aniruddha Kumawat in 2014, to use the RFID system for toll payment there are a few components of hardware needed. The components are the RFID tag that is controlled by the user, the RFID reader, micro controller, Global System for Mobile Communication (GSM) Module, Liquid-Crystal Display (LCD), Camera and Central Processing Unit (CPU).

The GSM Module acts as the connector between the user and the CPU as it will send the message to the user to show them the deduction to pay the toll fare and also the balance after deduction. Next, the camera at the toll plaza will capture the image of the car passing through the toll along with the evidence of a transaction happening.

*(c) Process and Usage of RFID system*

According to the article made by Kshitija Chandramore in 2019, when the ETC is used to make a payment, there is a series of processes that will happen including before, during and after situations. Before payment is made, the user needs to make sure that the amount of money inside the card is enough or more than the charge that needs to be paid.

Next is the process that occurs during the ETC payment. Each of the vehicles will be provided with unique identifications (ID) that are placed in the radio frequency transmission tag. However, only the country authority with strict conditions as it contains private and confidential information. The unique ID will store all the required details from user, vehicle number, account number and the amount of balance inside.

The radio frequency will constantly be emitted by the tag that leads to easy recognition. When the user enters the toll plaza, within a specific range, the radio frequency signal released by the tag will be received by radio frequency receiver. The signal will be passed to the microcontroller due to the signal amplification. When the user inside their car wants to exit, they will arrive again at the toll payment plaza thus, the data is obtained and recognized such as the date, time, destination and location address (Aniruddha Kumawat, 2014).

#### 2.4 The Automatic Toll Collection Payment

According to Annirudha Kumawat (2014), there are three types of Toll Road Exits such as Open Tolls, Closed Tolls and All-Electronic Tolls. The Open Tolls system is with mainline barrier toll plazas which are on an open toll system that make all cars must stop at several points when driving through the roadway to make a payment for toll fare charged. This type of toll collection system is saving big cost as it is not built at every exit and enter of the roadway. However, it may lead to traffic congestion, and enable the vehicles on the road to dodge tolls by exiting and re-entering the roadway.

Besides that, there is a Closed Tolls system that when a vehicle arrives on the roadway, it receives a ticket. In some circumstances, the toll to be paid at the exit is indicated on the ticket. The driver must pay the fixed amount of charge for the specific exit while exiting. If a driver ticket is lost, they might be required to pay the maximum cost for passage on that roadway. (Kshitija Chandramore, 2014).

Annirudha Kumawat (2014) stated that the All-Electronic tolls fare is usually collected at the start of the toll plaza where when the transponder is placed before the gate as soon as the vehicle reaches near the transponder the amount is deducted. Then, the gate is opened and the customer account is debited and no cash toll collection payment happens. In addition, Modern toll roads frequently applied the combination of these three systems, with variable entry and exit fees added by mainline charges on occasion.

#### 2.5 The Advantage and Disadvantage of RFID in Electronic Toll Collection System

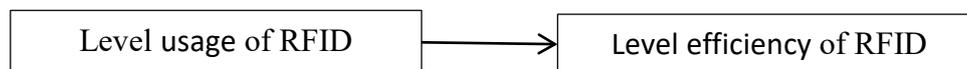
According to Mustafa Mahmud Hasan in 2016, he stated that there are several advantages in Electronic Toll Collection Systems. Electronic Toll Collection lanes increase road traffic speed and efficiency while saving drivers time. Besides that, the RFID Electronic Collection System can provide vehicles that will move quickly and do not have to line up at the toll lane. But it also got disadvantage such as If a vehicle wants to use RFID toll but does not have enough funds in his account, they might face the problems which is they may have to reverse their vehicles to use the manual method because he had to pay money manually (Rawshan Zaman, 2016).

In addition, Nowshin Ahmad (2016) states that the cost of collecting tolls is gradually reduced over time. Because the technology does not require any human interaction for the toll transaction, the necessary manhour is reduced. ETC users do not stop paying tolls, resulting in a significant reduction of trip time. According to Rawshan Zaman (2016), the driver must have money in his account to pay the toll. Any vehicle paying the toll must keep a sufficient amount of money in his account at all times.

Besides that, the RFID Electronic Collection System can provide vehicles that will move quickly and do not have to line up at the toll lane. It will make it easier for other vehicles to pass through the toll and can avoid toll congestion on the highway. (Nowshin Ahmad, 2016).

## 2.6 Conceptual Framework

The conceptual framework of this research is shown in Figure 2.1. According to the model, the independent variable is level usage of RFID. The dependent variable is level efficiency of RFID.



**Figure 1: Conceptual framework**

## 2.7 Research Hypothesis

There are three research hypotheses of the research:

H1: There is a relationship between level usage of RFID and level efficiency of RFID

## 3. Research Methodology

This section discusses in detail the research methods used to conduct this study. The methodology is a methodical step that covers all of the steps involved in conducting the research, from data collecting to data analysis (Hathaway *et al.*, 2017). The elements of respondents of the study, research instrument, data collection procedure, and data analysis procedure will all be covered in this chapter.

### 3.1 Research Design

Research design is used to identify and/ or develop the procedures of the research and to ensure the quality of the results were reliable, valid and accuracy (Kumar, 2011). Statistical methods used to look at the relationships between dependent and independent variables of the research and expressing the patterns with numbers. It also helps the researcher to make decision on accept or reject those hypotheses of the study which to determine the relationship between both variables (Rudestam & Newton, 2015).

Quantitative approach was suitable and used in this study to collect data. Questionnaires survey was selected as a tool to help the researcher to collect data. The respondents were selected randomly from the sample in the population of vehicles pass through the toll in area of Johor. The respondents of this study are drive with driver's license in Johor Bahru. This study recruited a total of respondents to participate in this survey. Then, the results were analysed by using SPSS software for some analysis which included reliability analysis, descriptive analysis, normality test and correlation to answer the objectives of the research.

The questionnaire was distributed to the respondents via Google Form platform. The questionnaire will be distributed at random and designed in an easy to answer format. The respondents must complete those questionnaires to achieve the objectives of this survey. The questionnaire has been divided into several sections, which are section A, section B, section C, and section D, to get the relevant data.

Section A of the questionnaire will ask questions regarding the respondents' demographic profile, such as age, gender, race, driving period, current status. Meanwhile, section B is to identify the usage

of RFID. Meanwhile, section C and D of the questionnaire consists of questions regarding the level efficiency of RFID among road users in Johor Bahru and the relationship between usage and level efficiency of RFID among road users in Johor Bahru. This study had been done through random sampling among road users, with all road users having an equal chance to participate in this study.

### 3.2 Data Collection

The research will be focused on road users in Johor Bahru. The study's objectives were to determine the usage of RDIF among road user in Johor Bahru, identify the level of efficiency of RFID among road users in Johor Bahru, and to investigate the relationship between the usage of RFID and level efficiency of RFID among road users in Johor Bahru. There were two categories of data which were primary data and secondary data used in the research to gathering information about the topic.

Firstly, questionnaire was being prepared for this study to achieve the research objectives in closed questions. Then, the researcher applied a letter from Faculty of Technology Management & Business to prove that the researcher as a student from University Tun Hussien Onn Malaysia and the research activity is being approved by the university. Since the simple random sampling technique is being use, so the individuals are randomly picked within the road users and invited to answer the questionnaire. The data collection process taken about two months. The types of method used by the researcher to distribute the questionnaires where was only online which is google form method. There were a total of 380 sets of questionnaires had distributed to individual in area of Johor Bahru randomly. The researcher had make the questions in online via Google From.

Secondary data collecting is quick and easy, with government publications, websites, books, journal articles, and internal records serving as secondary data sources (Ajayi, 2017). By using secondary data, it helped to improve the knowledge about the problem and provided a basis for comparison for the data acquired. To gather relevant information for this study, researchers used journal articles from several sites such as ResearchGate, Science Direct, and Emerald Insight. The information gathered allows this investigation to obtain exact data to support the evidence.

### 3.3 Data Analysis

Data Analysis Procedure whereby the data has been collected from the respondents to measure the usage of RFID and efficiency level of RFID among road users in Johor Bahru. The quantitative statistical software programs will be utilized to address the research objectives which include the reliability analysis, descriptive analysis, normality analysis and correlation analysis.

#### (a) Descriptive statistics

Descriptive statistics are used to summarize data in an organized manner by describing the relationship between variables in a sample or population (Kaur, 2018). There are two categories of descriptive analysis which are measures of central tendency and measure of variability. Measure of central tendency was used in this research where to measure the mean or average of the data. Table 1 shown the agreeableness level according to mean interpretation by Wiersma.

**Table 1: Agreeableness level according to mean interpretation (Wiersma Smasudion, Awang & Ahmand, 2017)**

Mean	Central Tendency Level
1.00 - 2.33	Weak
2.34 - 3.67	Moderate
3.68 - 5.00	High

*(b) Reliability analysis*

The purpose of reliability test is conducted for pilot study and actual study to measure the consistency. The Cronbach's Alpha or reliability coefficients of 1.00 indicates perfect reliability, value of 0.00 or less than that prove that the questionnaires are not reliable and the range of 0.80 to 0.90 is range that usually being used in most research (Salkind, 2012). Table 2 shown the internal consistency of Cronbach's Alpha.

**Table 2: Internal consistency of Cronbach's Alpha (Sekaran & Roger, 2016)**

The Cronbach's Alpha	Interpretation
$\alpha \geq 0.9$	Excellent
$0.7 \leq \alpha < 0.9$	Good
$0.6 \leq \alpha < 0.7$	Acceptable
$0.5 \leq \alpha < 0.6$	Poor
$\alpha > 0.5$	Unacceptable

*(c) Normality analysis*

Normality analysis is used to determine whether the data set was well-model and to compute how likely for random variable the data be normally distributed. There are two well-known tests for normality which are the Kolmogorov-Smirnov Test and Shapiro-Wilk Test. Shapiro Wilk was used as the sample size of the study is less than 50 and while in this study the sample size is more than 50, thus the Kolmogorov-Smirnov was used.

*(d) Correlation analysis*

Correlation analysis normally used in study included Pearson and Spearman correlation. The Pearson correlation used if the data normally distributed while the Spearman correlation used if the data not normally distributed.

Dudovskiy (2018) stated that Spearman Rank correlation requires the data to be sorted and the value to be assigned a specific rank with 1 to be assigned as the lowest value. Moreover, in case of data value appearing more than once, equal values will be specified their average rank. Table 3 shows the nominal degree of relationship used to analyse the results obtained.

**Table 3: Nominal degree of relationship (Salkind, 2019)**

r, coefficient value	Interpretation
0.8 to 1.0	Very strong
0.6 to 0.8	Strong
0.4 to 0.6	Moderate
0.2 to 0.4	Weak
0.0 to 0.2	Very weak

**4. Results and Discussion**

This chapter discussed about data analyse and findings for those questionnaires that have been distributed to respondents in Johor Bahru. All the collected data were analysed by using Statistical Package for Social Science (SPSS) software. Reliability analysis, demographic analysis, descriptive analysis, normality test and correlation analysis were discussed in this chapter.

#### 4.1 Response Rate

**Table 4: Response rate**

Items	Description
Population	42,000
Sample size	380
Questionnaires distributed	450
Questionnaires collected	253
Usable respondents	253
Percentage (%)	61.84

The respondents of this study was focused on the road users in Johor Bahru. The table 4 shows that the population of this study was 42,000 vehicles will enter Malaysia via the Johor causeway and the Second Link daily, there were 380 sample size based on Krejcie and Morgan (1970). The response rate was 61.84% which was 253 out of 380 and all the questionnaires collected were usable.

#### 4.2 Pilot Study

**Table 5: Reliability for pilot study result**

Item	Cronbach's alpha	N-items in scale	Interpretation
Independent Variables			
Level usage of RFID	0.837	7	Good
Dependent Variables			
Level efficiency of RFID	0.891	9	Good

A total of 16 questionnaires has been used which was random distributed from the sample size of the research to conduct this pilot test. The result of the questionnaire was analyzed using SPSS software. There were two variables included level usage of using RFID and level efficiency of RFID. The independent variable contained with seven items and the Cronbach's Alpha for the independent variable is 0.837. The Cronbach's Alpha for the nine items level efficiency of RFID is 0.891. Thus, the internal consistency reliability used in the study can considered as good and can be used for the actual data collection.

#### 4.3 Actual Study

**Table 6: Reliability for actual study result**

Item	Cronbach's alpha	N-items in scale	Interpretation
Independent Variables			
Level usage of RFID	0.728	7	Acceptable
Dependent Variables			
Level efficiency of RFID	0.855	9	Good

Actual study was conducted after the result of pilot study that the questionnaires were reliable and valid. The Cronbach's alpha of the level usage of RFID is 0.728 where the reliability level of the level usage is acceptable. The Cronbach's alpha for level efficiency of RFID is 0.855 which the interpretation is good. The result shown that reliability level of the questionnaire is good.

## 4.4 Demographic Analysis

**Table 7: Demographic information for respondents**

Item	Parameter Name	Frequency (f)	Percentage (%)
Gender	Male	97	41.3
	Female	138	58.7
Age	Below 25 years old	146	62.1
	25 - 34 years old	62	26.4
	35 - 44 years old	22	9.4
	45 years old and above	5	2.1
Ethnicity	Malay	57	24.3
	Chinese	148	63.0
	Hindu	30	12.8
	Others	0	0
Current employment status	Employed	83	35.3
	Currently unemployed	2	0.9
	Student	142	60.4
Have you even heard about the RFID toll payment system?	Retried	8	3.4
	Yes	222	94.5
How often do you pass the toll daily?	No	13	5.5
	One time per day	162	68.9
	Two times per day	46	19.6
	Three times per day	18	7.7
	Four times per day	6	2.6
What type of toll payment method do you use frequently?	More than four times per day	3	1.3
	Cash	0	0
	Touch' n Go card	142	60.4
	SmarTAG or Logtag	47	20.0
	RFID	46	19.6

In general, female respondents dominate the sample as compared to male respondents in this survey. Beside that, the majority of respondents are below 25 years old which are 146 respondents. The sequence followed by respondents between 25 to 34 years old as a second largest of respondents then following by respondents between 35 to 44 years-old and lastly respondent of 45 years old and above due to the oldest are not good in using internet. The majority of respondents are Chinese which are 148 respondents and continue with the sequence followed by respondents in Malay and lastly Hindu ethnicity background Then, respondents were divide into four currently employment status which were students, employed, retired and currently unemployed status. Most of the respondents were students.

The respondent also have been categorized by experience in heard about RFID toll payment system. The table above shows more than 90% of respondents choose "Yes" as their answer which represent that they had heard about RFID toll payment system in the pass. Next, more than half of the respondents

only had one time of the experience in passing through the toll per day. Lastly, the number of respondent that have been categorized by type of method passing through the toll. The table above shows there are 42 respondents are using touch 'n go card to pass the toll while there are 47 respondents out of 253 are using SmarTag or Logtag to pass the toll. For using RFID method to pass through the toll only recorded as 46 respondents.

#### 4.5 Descriptive Analysis

Descriptive analysis involves in examining individual variables characteristics. Thus, researcher would use data obtained in this study to describe mean and the central tendency of the studied variables was use means as measurement at the same time. In addition, this analysis is the efficient way by differentiating for each part in mean distribution based on Likert Scale to measure the level usage of RFID and level efficiency of RFID.

##### (a) Descriptive analysis for level usage of RFID

**Table 8: Level usage of RFID descriptive analysis**

Statements	Mean	Interpretation
RFID is suitable to be put at one of the side corners such as at surface of the windscreen or at the left headlamp of the car.	3.86	High
RFID is using a RFID tag to scan which can be read and displayed easily at the toll booth.	3.65	Moderate
It enhances the quality time to manage as the road user does not need to stop the vehicle and scroll down the window to pay at the toll.	4.29	High
As a road user, I found that the RFID toll payment system is the best user interface.	3.35	Moderate
As a road user, I thought that it is easy to access and easy to get the electronic toll payment to do what I want to do.	4.13	High
Use of the RFID toll payment system helped me as a road user to understand as it contributes to one of the innovations.	3.93	High
Use of the RFID payment system makes me feel more secure in personal information.	3.66	Moderate
Total average	3.86	High

According to the research, the statement of it enhances the quality time to manage as the road user does not need to stop the vehicle and scroll down the window to pay at the toll is the highest mean in the level usage of RFID which is 4.29 while the lowest mean is 3.35 which is as a road user, I found that the RFID toll payment system is the best user interface. In conclusion, the overall of the statement was indicated as high which is 3.86.

##### (b) Descriptive analysis for level efficiency of RFID

**Table 8: Level efficiency of RFID descriptive analysis**

Statements	Mean	Interpretation
RFID may has detached issues when install by own.	3.69	High
The current toll payment such as Touch 'n Go system takes a lot of time to make payment..	3.58	Moderate

Implementing the RFID toll payment system is an excellent way.	4.09	High
The design of the system appeals to the eyes of the user.	4.08	High
The system has the capabilities to adapt to the system environment.	3.93	High
The “drive-thru with no-stop” toll payment method is much easier and more interesting.	4.06	High
The data is more organized due to one vehicle only being able to implement only one RFID sticker.	4.05	High
The current toll payment systems such as Touch ‘n Go can indicate delays and traffic problems.	3.84	High
The “RFID” toll payment system for road users is suitable to implement at Johor Bahru.	3.93	High
Total average	3.91	High

In this part, the highest mean of the level efficiency among road users which respondents agreed that implementing the RFID toll payment system is an excellent way. Moreover, the lowest mean in this variable is 3.58 for the current toll payment such as Touch ‘n Go system takes a lot of time to make payment. The result shows that the level efficiency among road users has the high average mean score of 3.91. This indicated that they have high central tendency level of range.

#### 4.6 Normality Analysis

**Table 9: Level efficiency of RFID descriptive analysis**

Efficiency	Tests of Normality					
	Kolmogorov-Smimov <sup>a</sup>			Shapiro-Wilk		
	Statistic	df	Significance	Statistic	df	Significance
	0.080	235	0.001	0.977	235	0.001

a. Lilliefors Significance Correction

In this study, there are two tests are available for the normality test which are Kolmogorov-Smirnov and Shapiro-Wilk. Thus, the Kolmogorov-Smirnov normality test of had be used in this study because the total of data more than 50. Based on the analysis, the significant level efficiency of RFID by Kolmogorov-Smirnov are not normal distribution where the values is 0.001. Due to these findings, the research will proceed with parametric analysis which is the Spearman correlation analysis.

#### 4.7 Correlation Analysis

**Table 10: Result of Spearman’ Correlation**

	U	E
U	1.000	
E	0.453**	1.000

\*\* . Correlation is significant at 0.01 level (1-tailed).

Note : U: Usage

E: Efficiency

From the above analysis result, Spearman correlation analysis is used in this study due to the study is not normal distribution. The results of Spearman's Correlation Coefficient,  $r$  is 0.453 which was a moderate relationship between level usage of RFID and level efficiency of RFID. The correlation analysis supports a significant positive relationship between level usage of RFID and level efficiency of RFID. Therefore, H1 is supported.

#### 4.8 Discussion

**Table 11: Discussion of the research objectives**

Research Objective	Research Questions	Results	Support evidence
How is the usage of RFID among road users in Johor Bahru?	To identify the usage of RFID among road users in Johor Bahru.	Higher perception of road users is RFID system can enhances the quality time to manage as the road users which the road users does not need to stop the vehicle and scroll down the window to pay at the toll.	The quality of the time can be enhances due to the RFID Tag can reach a range of 27 meters with a 10-millisecond response time which allowing high speed toll collection (Comparehero.my team, 2022).
What is the level efficiency of RFID among road users in Johor Bahru?	To identify the level efficiency of RFID among road users in Johor Bahru.	Implement of RFID in toll payment system was the new technology that use by Malaysia government in increase the level efficiency of passing through the toll booth.	The application of RFID technology can significantly increase in efficiency, quality, resource utilization and productivity (Teodora Rajkovic, 2018).
What is the relationship between the usage of RFID and efficiency level of RFIS among road users in Johor Bahru?	To investigate the relationship between the usage of RFID and efficiency level of RFIS among road users in Johor Bahru.	There is a relationship between level usage of RFID and level efficiency of RFID among road users in Johor Bahru.	There is aligned with Nurul Husna (2018) which there is the significant relationship between usage and efficiency of RFID. The using of RFID in attendance system for staffs UPSI can improve the existing system that capable to eliminate time waste.

#### 5. Conclusion

The conclusion should summarize the main findings of the study, and restate the key points inferred from trends observed and discussed regarding the data. Some suggestions should be included to encourage the continuation of the current research. The recommendations were given for future researcher which are the research is focused on the relationship between level usage and effectiveness among road users in Johor Bahru. Thus, it is recommended to expand the topic with the same objectives which to develop more relevant questions in questionnaire. Second, good time management to complete the research and expand the time for data collection procedure. In the nutshell, the level usage of RFID have significant relationship to effectiveness among road users in Johor Bahru. The perceptive of road users helps the industry to overcome quality of time in passing through the toll.

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