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**PERCEPTIONS AND PERCEIVED ACCEPTANCE ON  
INTENTION TO USE OF PREPAID METER**

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***Abstract***

Prepaid meter system has long been offered by utilities in numerous countries around the world. In Malaysia, it stills being debated by various agencies and the implementation only limited to industrial consumer. In order to maximize the effectiveness of implementation process and costs spends, it is important to measure consumer adoption tendency for prepaid meter. However, in measuring consumer intention to use, it is vital to investigate factors contributed to adoption tendency and the way it impacts consumer decision in the future. Thus, this study aims to examine the impact of perceptions and perceived acceptance on intention to use prepaid meter. Perceptions in this regards are the view consumers have on prepaid meter particularly issues related to additional costs, the effects of prepaid meter on energy conservation, social influences as well as perceptions on system capability. Meanwhile, perceived acceptance relates to consumer acceptance on system ease of use, disconnection problems, different payment methods and systems reliability. Based on the results generated from 629 completed questionnaires, both perceptions and perceived acceptance were found to be have positive impact on consumer intention to use. This result implies that perceptions and perceived acceptance are two important points for policy makers and utility providers to tackle on in order to minimize losses arising from underutilized system.

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**Keywords:** Prepaid meter, intention to use, perception, perceived acceptance.



## 1. Introduction

In recent year, electricity sector has witnessed a significant share of innovations in terms of technology development which included consumer empowerment in the product. One of the innovation is prepaid meter where approximately 22 million prepaid meters of gas and electricity has been installed in the world (Telles Esteves et al., 2016). Prepaid meter is payment method that works on debit basis where consumer needs to pay upfront before using the service. For electricity, prepaid meter functions by allowing the current flows through it into the building as long as the meter has positive balance (Kelsey & Smith, 2016). However, once the balance reach credit limit, the current will be disconnected until consumer top-up. It usually comprises of system master station, a vending or top-up machine and prepaid meter. In addition, prepaid meter has an interface that can help consumer to monitor their usage and handling transfer of credit. Thus, compared to postpaid meter, it gives autonomy for consumers in controlling their electricity usage and energy purchase (Baptista, 2013).

In Malaysia, Tenaga Nasional Berhad (TNB) is the largest electric utility generated from power plants connects to its 9.2 million customers in Peninsular Malaysia, Sabah and Labuan, through a network system made up of the supply value chain for decades. Currently, majority of TNB customers are using postpaid meter that pay their electricity and other utility bills at TNB's Customer Service Centre by cash, cheque, credit card or debit card. In April 2018, Tenaga Nasional Berhad (TNB) has revamped their myTNB mobile app to enable customers to pay electricity bill online via smart phone. TNB initiated the plan to introduce a prepaid system for electricity purchases, which is similar to hand phones prepaid system since 2003. The hope of the prepaid system is to reduce the incidence of inaccurate meter readings caused by natural ageing, faulty installation or deliberate tampering. TNB loss RM400 million a year due to electricity theft costs.

As the vital point of electricity service system is a set of surrounded relationships of consumer-utility provider and perceptions, the change in the system will induced new perceptions and reshaping these relationships (Jacome & Ray, 2018). From the utility perspectives, it enables them to enforce payment of usage and recover costs as well as maintaining distribution companies' revenues (Kambule et al., 2018). In addition, this innovation has the ability to reduce errors, pilferage and energy losses (Malama et al., 2014; Telles Esteves et al., 2016). Meanwhile, for consumer, it introduces new option of payment which allows them to choose either immediate disconnection upon exhaustion of all electricity units or delayed disconnection whilst accruing debt (Malama et al., 2014). Thus, it empowers consumer to manage electricity cost in their household budgets and consequently promoting energy efficiency and conservation. These advantages may differ from consumer perceptions of prepaid meter especially since it is a new technology introduced against conventional postpaid meter which they familiar with. Various studies have been conducted to examine consumer satisfactions on the systems but rarely on consumer perceptions before the implementation. Therefore, this study aims to examine consumer perspectives on prepaid meter and whether they intent to use it in the future.

## **2. Problem Statement**

Despite listed benefits; prepaid meter also brings concern especially over fuel poverty and social injustice. The enhancement of budgetary control is not a solution for socioeconomic problem especially in paying for electricity (O'Sullivan et al., 2016). In extreme cases, consumer that unable to bear for electricity cost will use it below their comfort threshold or self-disconnect thus denying their rights for energy justice (Broto et al., 2018; Snell et al., 2015). These results contradict the main objective of prepaid meter implementation. Initially, prepaid meter systems are created to combat the issues of debt and coverage where in 1980s South Africa, use this system to supply electric power to low-income neighbourhood and giving consumers' empowerment in household budget (Wambua et al., 2015). It shows that decisions made by the government may have different significances on consumers and utility providers.

Thus, consumers may have contrary opinion regarding the usage of prepaid meters which heavily weight on their perceptions on the new technology (Wambua et al., 2015). Furthermore, social acceptability of prepaid meter determines the success or failure of policy makers decisions (Chou & Yutami, 2014). With high level of investment, it is essential for government to align consumers and utility interests while making sure that proper regulations to protect these interests (Kambule et al., 2018). Therefore, in designing appropriate policy, government needs to understand consumer perceptions and perceived acceptance about prepaid meter.

## **3. Research Questions**

This study aims to address the following critical research questions:

- Does a perception of prepaid meter have influences on its intention to use?
- Do perceived acceptances of prepaid meter have influences on its intention to use?

## **4. Purpose of the Study**

The main purpose of this study is to examine the influences of perceptions and perceived acceptance on consumer intention to use prepaid meter.

## **5. Research Methods**

The study use self-administered questionnaires which distributed randomly to citizen of Malaysia from various backgrounds with the final data amounted to 629 respondents. The data were then analysed using IBM SPSS. Table 01 shows the summarized demographic profile of the respondents. In term of respondents' age and number of household members, the mean value is 36.50 and 3.74 respectively. The questionnaire consisted of four sections; demographic, perceptions, perceived acceptance and intention to use. Likert scale of 5 points are used to measure responds and the questionnaires consisted of 8 items of perceptions, 10 items of perceived acceptance and 3 items of intention to use. Item was constructed after qualitative study of current users of prepaid meter and also included items adapted from various study related to consumer views on prepaid meter. Perceptions in this regards are the view respondents have on prepaid meter particularly issues related to additional costs, the effects of prepaid meter on energy

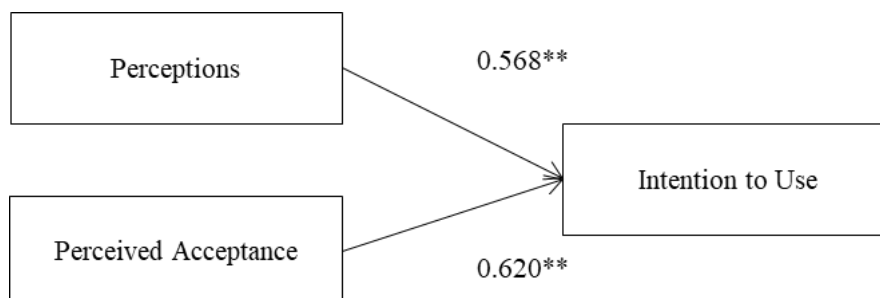
conservation, social influences as well as perceptions on system capability. Meanwhile, perceived acceptance relates to respondents acceptance on system ease of use, disconnection problems, different payment methods and systems reliability. Lastly, intention to use questions was probe to respondents' willingness to install prepaid meter in the future and their attitudes towards it. Reliability analysis shows that all variables have strong reliability with the value of Cronbach's alpha for perceptions is 0.864, for perceived acceptance is 0.918 and for intention to use is 0.838.

**Table 01.** Demographic analysis of respondents

Demographic information	Number of respondents	Percentage
Gender		
Male	316	50.2
Female	313	49.8
Area of Settlement		
Urban	339	53.9
Rural	290	46.1
Status		
Single	152	24.2
Married	477	75.8
Monthly Income		
Less than RM 500	44	7
RM 500 – RM 1499	72	11.4
RM 1500 – RM 1999	121	19.2
RM 2000 – RM 2999	189	30.0
RM 3000 – RM 3999	71	11.3
More than RM 4000	132	21.0

## 6. Findings

The analysis shows that both perceptions and perceived acceptance are significantly influence intention to use at 0.568 and 0.620, respectively, as shown in figure 01. Meanwhile, the regression analysis indicates that the model is fit and significant at  $P < 0.001$  as shown in table 02. It shows that the R value for model constituting perceptions and perceived acceptance is 0.632 while the total variant that can be explained by dependent variable is significantly at 40%. In addition, intention to use was most strongly affected by perceived acceptance rather than perceptions. Thus, answering our research questions, it can be established that perceptions and perceived acceptance has a positive impact on intention to use.



**Figure 01.** Correlation results

**Table 02.** Correlation results

Model	Standardized coefficient beta	t-value	Sig	R	R-square	Adjusted R-square	F
Perceptions	0.201	3.920	0.000	0.632	0.400	0.398	208.316 (P<0.001)
Perceived acceptance	0.460	8.977	0.000				

As indicated by the result, perceptions and perceived acceptance have positive impact on consumer intention to use prepaid meter. Both independent variables are part of the key challenges in implementation of innovation technology like prepaid meter (Kambule et al., 2018). Previous study has shown the influence of perception on acceptance or rejection of prepaid meter (Azila-Gbettor et al., 2015; Makonese et al., 2006; Malama et al., 2014; Mburu & Sathyamoorthi, 2014; Oseni, 2015; Vutete, 2015). Perceptions will influence their capacity to trust the system and lead to positive reactions in the future (Mburu & Sathyamoorthi, 2014; Esteves et al., 2016). Meanwhile, negative perception will lead to unwillingness and dissatisfaction of the system that may lead to complaints thus straining the relationship between consumer and utility provider. Some of the arguments found in the previous research is the effect of prepaid meter due to the changes it made in consumer life (Kambule et al., 2018). Previous study shows that many consumers remain sceptical of prepaid meter due to their limited awareness, knowledge and understanding (Chou & Yutami, 2014).

In contrast, there is lack of study on consumer perceived acceptance of prepaid meter. Despite the lack of study, one of identified risk in prepaid meter implementation is the lack of acceptance by consumers (Wamunyima, 2016). Even though consumer do not have high influence in the decision making process for implementation, their acceptance and rejection is vital. In some country, acceptance of prepaid meter was achieved through holistic approach that take into account those that can be negatively affected rather than focus mainly on installation and operation (Meyer, 2016). For instance, in Bangladesh, the high level of acceptance of prepaid meter was achieved by allaying fears and defusing opposition related to it. Consumer acceptance of technology is a result of personal and social influences (Tirop & Nganga, 2018) In certain country like Argentina and South Africa, consumers were reluctant to accept prepaid meter as they perceived as a mean for exploitation while unable to solve their issues of energy poverty (Kambule et al., 2018).

## 7. Conclusion

This study reveals that perceptions and perceived acceptance have positive impact on consumer intention to use of prepaid meter. Thus, it is important to raise greater perceptions and perceived acceptance in order for prepaid meter to be well-received in the future. Prior to implementation, it is important to examine consumer view on the new system. This will help policy makers and utility provider to construct proper marketing strategy. For instance, they can provide various medium that can help consumer understand the advantages of prepaid meter while acknowledging several disadvantage of the system. Any opposition must be properly address and answer to ensure no misunderstanding happen especially since the changes may create conflict between consumer and utility provide. The feedback and concern stated by consumer can be used to improve the system or to provide few alternatives for consumer. By allaying their

fear and provide proper dispute of their opposition, prepaid meter can be implemented with limited risk particularly the risk of rejection.

This study has several limitations. Firstly, this study only allows us to examine the statistical impact of perceptions and perceived acceptance on intention to use. This method might not have fully explain in-depth the way both variables effect intention to use nor clarify consumer thoughts upon this matter. However, this constraint that might have created a common method bias, it might not implicated any serious problem. Future research may go in-depth on this topic through qualitative study by using interview technique to gain better comprehension on consumer perspective on prepaid meter. Secondly, there are various factors that influence consumer intention to use a service or product but this study only limited to consumer perceptions and perceived acceptance. Future study can examine the influence of external variables like social norms, perceived risks and technological complexity.

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