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TAM of E-parking in order to Increase Regional Income

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Abstract

The phenomenon of e-parking itself has been implemented in several big cities in Indonesia, namely in Jakarta, Bali, Solo, Surabaya, and Bandung. The application of e-parking carried out by DISHUB in Bandung was used to overcome the problem of leakage of parking retribution receipts. This study aims examine Technology Acceptance Model (TAM) in the adoption of e-Parkir as parking infrastructure collection. In this study sampling using snowball sampling with staff in UPT Parkir Kota Bandung. The methodology of research is qualitative method and the data collected by interview, literature review, and observation. Meanwhile the analyses data done by reduction, presentation, and conclusion drawing and then the analyses method used description analysis. Conclude it was found perceived usefulness and perceived ease of use one of the most that affecting e-parkir acceptance. Our result also have confirmed perceived usefulness and perceived ease of use has been positively influencing attitude towards using e-parkir and give positive effect to behavioral intention dan actual usage e-parkir.

Key words: (12pt, bold)

Regulation; Retribution; Internet of Things (IoT).

1. Introduction

Garut Regency's revenue target from the parking sector has decreased (Supriadin, 2018). According to the head of the Garut Regency Transportation Agency, this is because illegal parking controls parking lots in public areas (Suherman, 2018). According to the results of the initial survey, illegal parking is the cause of the parking lot of arrowroot because the illegal parking attendants and make illegal parking their livelihood, and their lives depend on this work. Another thing is because the Garut Regency Government, especially the Garut Transportation Agency, lacks the personnel to manage and control parking, especially roadside parking, which causes illegal parking in Garut Regency to be rampant.

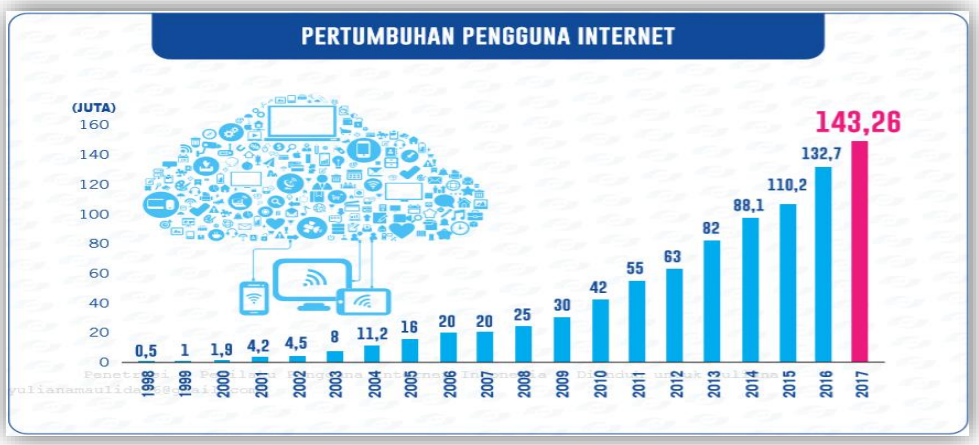
Another problem from the results of the initial survey that causes the ineffectiveness of receiving parking fees is that there is no time limit for applied regarding the period for parking vehicles. The fraud has an impact on parking receipts because the number of motorized vehicles is increasing every year. Based on the results of other preliminary surveys that lead to the ineffectiveness of parking retribution receipts, namely the mechanism for collecting parking retributions themselves that involve too many hands which causes leakage of parking

retribution receipts and the absence of transparency in parking receipts from field parking attendants to the regional treasury.

Parking receipts for regions are included in Regional Original Revenue (PAD) obtained through regional taxes and regional levies. PAD is included in the efforts of local governments to finance local government expenditures themselves in the context of administering government and development (Siahaan, 2016).

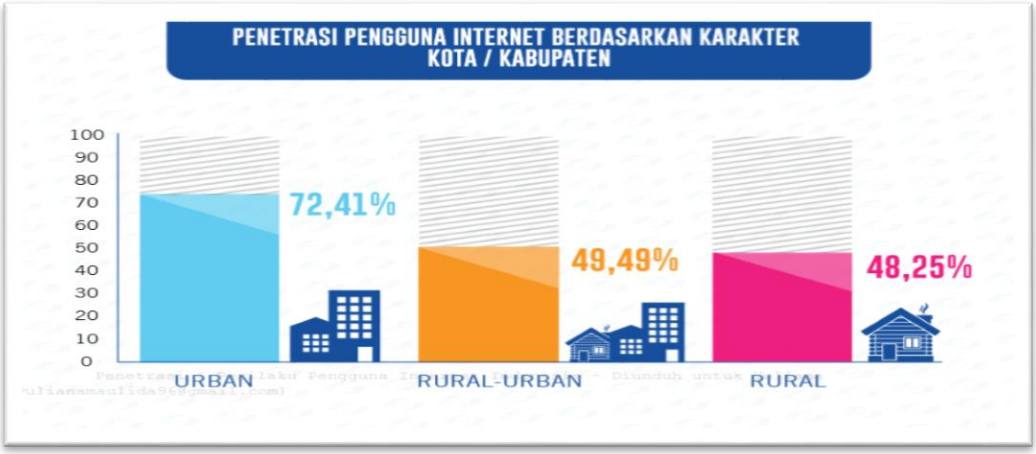
One of the efforts local governments could do in the current digital era is to maximize local revenue. One of which is through parking retribution income, by using a new information technology base. The use of new information technology bases in Indonesia is increasing every year. The following is data that shows the growth of new information technology users using the internet in Indonesia, which has increased continuously from 1998 -2017 related to internet user penetration in Indonesia, which is source from the survey results of the Indonesian Internet Service Providers Association (APJII).

Picture 1.
Internet Users Growth



Source: Asosiasi Penyelenggara Jasa Internet Indonesia (APJII)

Picture 2.
Internet City/Regency Users Growth



Source: Asosiasi Penyelenggara Jasa Internet Indonesia (APJII)

Based on the phenomenon illustrates that the Indonesian people both living in big cities and small areas have taken advantage of new internet-based information technology. As in today's digital era, making information technology a part of everyday life, in every aspect of human life that provides direction, almost every organization; in their institutional setting use information systems to improve service systems and speed up their operations (Seth et al., 2019). This means that the Indonesian people, both in big cities and small areas, almost accept the existence of a new information technology base present in their daily lives.

Internet of Things (IoT) is one of the new information technologies that are commonly used in human daily life. The Internet of Things (IoT) aims to extend the benefits of the regular internet – constant connectivity, the ability to control, share data, and other items in the physical world (Peoples et al., 2013). The Internet of Things (IoT) has become a technology that has received widespread attention and has many applications in many fields (Schlick et al., 2013). The Internet of Things (IoT) has been applied to parking fees, especially to manage and control the receipt of parking fees and parking attendants electronically so that parking fees are maximized, namely using e-parking.

The phenomenon of e-parking itself implemented in several big cities in Indonesia, namely in Jakarta, Bali, Solo, Surabaya, and Bandung. Based on the results of initial observations, the application of e-parking carried out by DISHUB in Bandung was used to overcome the problem of leakage of parking retribution receipts by installing 445 e-parking machines in 221 points spread across the city of Bandung. The implementation of e-parking in Bandung itself has only been running for 2 years. To find out the acceptance of e-parking in Bandung, which has been applied for 2 years, a revenue measuring instrument is needed. Where a measuring tool that can measure acceptance and understanding of a new information technology base by measuring the behavior of its users is using the Technology Acceptance Model (TAM) theory.

2. Literature Review

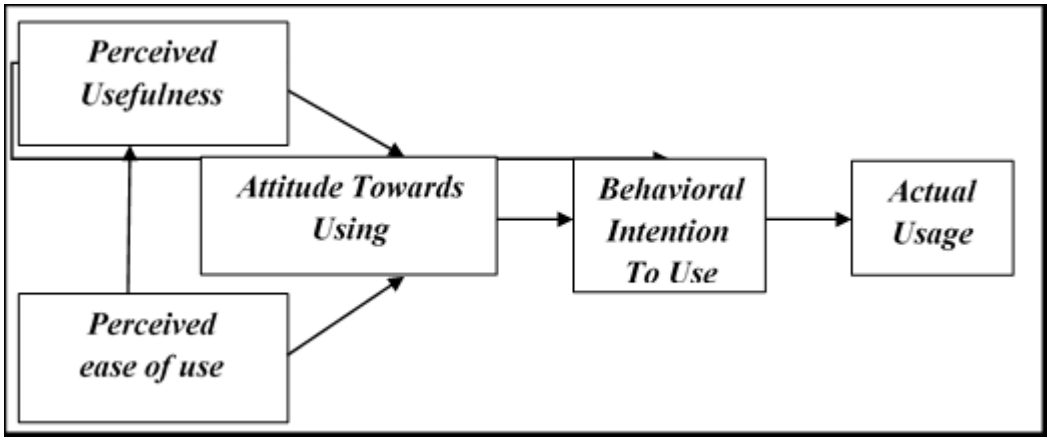
Technology Acceptance Model (TAM)

TAM is a theory based on social psychological theories, such as Theory Reason Action (TRA) and Theory of Planned Behavior (TPB). Compared to TRA and TPB, TAM has become an easy and more specific framework of thinking in explaining users' acceptance of an information system (Bashir & Madhavaiah, 2016). This TAM model not only explains but can predict so that researchers and practitioners can identify the reasons a factor is not accepted and provide appropriate direction (Davis et al., 1989).

The main purpose of TAM is actually to provide a basis for steps that must be taken to find the impact of an external factor that affects internal beliefs, attitudes, and intentions. TAM is designed to achieve this goal by identifying several basic constructs suggested in previous research which argues with factors that affect cognitively and affectively in computer acceptance where TRA is used as a theoretical basis in determining the relationship model of research variables (Davis et al. al., 1989).

The part of literature review contains theories, approach or concept that is used as a fundamental thinking in that article.

Picture 3.
***Technology Acceptance Model* (TAM)**



Source: Davis 1989

Parking Retribution and Locally- generated Revenue

Parking levies are "parking service facilities on the edge of public roads determined by the local government per the provisions of the legislation" (Siahaan, 2016). Parking fees are the key to urban mobility, where local governments authority use the shoulder of the road used as one of the revenues from the General Allocation Fund (DAU) and services provided by the Regional Government for the community (Rye & Koglin, 2014).

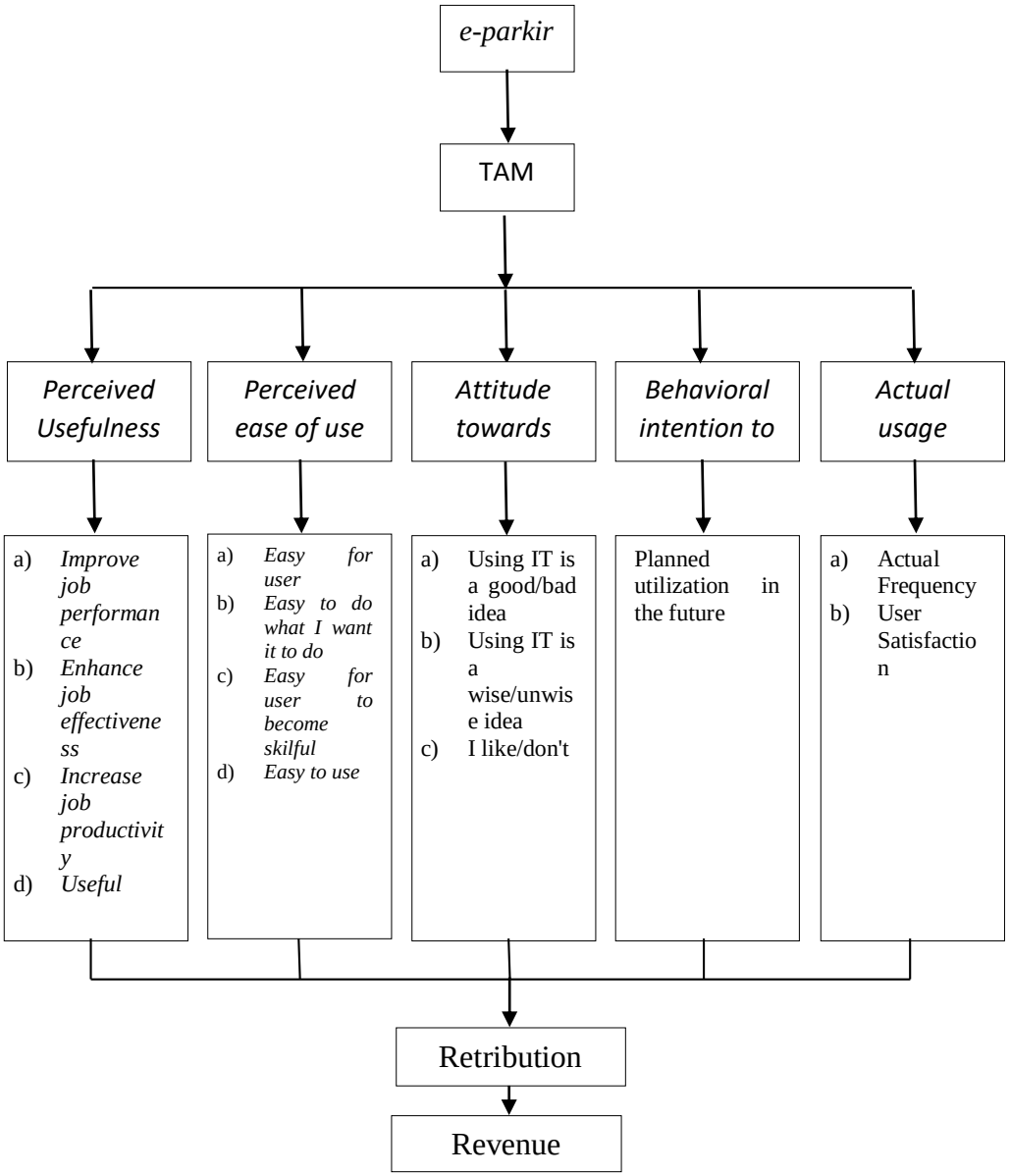
Internet of Things (IoT)

The Internet of Things was introduced in 1999. Internet of Things (IoT) is a technology that consists of several things, namely sensors and actuators where some of these things are connected to the internet (Bernsdorf et al., 2016). The Internet of Things (IoT) aims to provide many of the benefits of the internet in conducting surveillance, sharing data, and more (Peoples et al., 2013).

Based on the description above, the internet of things is an internet model developed where the purpose of the Internet of Things (IoT) is to facilitate human work in everyday life by using the internet, for example, in making payment transactions, supervision, and other things. One of the systems applied to local revenue receipts, especially from parking, is e-parking.

E-parking is an electronic parking fee management solution for local governments. Utilization of information technology in the government sector as a solution to government service problems in-vehicle services (Qohar, 2018).

Picture 4.
Framework



3. Methodology of Research

This study uses primary data sources obtained from the Department of Transportation of the City of Bandung Section UPT Parking. Primary data was obtained from direct interviews with the Transportation Department of Bandung City UPT Parking Section. The data processing technique used to discuss the problem in this research is the qualitative analysis method. The research technique was carryout, namely interviews with officers in the UPT Parking Department of Transportation (DISHUB) Bandung, to determine the extent to which the

acceptance of parking retribution collection using e-parking at UPT Parking Bandung City. Sampling in this study is based on the snowball sampling technique.

4. Result and Discussion

Result

Electronic Parking Terminal (TPE) as known as e-parking is a meter-based parking management system that works electronically and is designed with a computerized system in real-time. E-parking is equipped with color video screen features, e-money payments, software-controlled buttons, an alphanumeric keyboard, and voice delivery. TPE is in the form of a beam of approximately 1.5 meters high and is red (Qohar, 2018). The TPE machine only accepts payments via electronic money cards which consist of several types issued by banks, both private and state banks. Types of electronic money cards that can be used to pay for TPE parking services include:

- BRIZZI from Bank BRI.
- E-money from Bank Mandiri.
- TapCash from BNI Bank.

Based on the results of an interview with Pak Iwan, a UPT officer of Bandung City, the installation of e-parking machines or TPE in Bandung has been installed on 57 roads with 445 machines spread over 221 points. However, the UPT DISHUB officer in Bandung City said the machines used were only on 9 roads, the rest of the machines in 48 roads were off or turned off to reduce electricity usage and engine damage. Therefore, the collection of parking fees on 48 roads is still done conventionally.

Likewise, the parking levy collection system using e-parking is

Users of public roadside parking services pay parking fees to the TPE (Electronic Parking Place) machine. parking payments using electronic cards, according to respondents, is one of the ways the Bandung City government participates in the cashless program or the National Non-Cash Movement (GNNT) from Bank Indonesia. Parking payment transactions through TPE are paid according to the length of time the vehicle is parked. After making a payment at the TPE machine, the electronic money will go directly to the Bapenda treasury.

Respondents said that the supervision carried out could use applications that link directly to the TPE engine. The results given from the application are in the form of revenue data for each TPE machine. In addition to the TPE machine monitoring application, it is carried out directly in the field by the coordinator of each road segment to monitor the achievement of potential parking service receipts that can be seen on each machine. Likewise, the results of observations through the youtube channel of the parking retribution collection system using e-parking in other cities are the same as the collection system in the city of Bandung.

Table 1.

Pendapatan Retribusi Parkir Tahun 2016-2018 di Kota Bandung

	Revenue	
	Machine TPE	Non TPE
2016	-	4.917.017.000
2017	1.408.574.500	4.575.407.500

	(Juli – Des)	(Jan - Des
2018	5.512.981.500 (9 roads)	4.963.824.500 (48 roads)

Source: Recapitulation of Parking Retribution Revenue DISHUB Bandung City

Discussion

Based on the results of the research analysis of parking retribution collection using TAM, it was found that the acceptance of the use of the e-parking system in the city of Bandung and other cities found that users of the e-parking system accepted the use of e-parking as the latest method of collecting parking fees based on perceived usefulness (PU) and perceived ease of use (PEOU) provided by the e-parking system. Where this is illustrated by the results of research from the indicators contained in the dimensions of PU and PEOU.

This is in line with the theory of Davis et al (1989) that perceived usefulness and perceived ease of use are the main factors related to computer acceptance behavior. Likewise, the results of this study are comparable to those of Wei et al (2018). And also research by Liao et al (2018) states that the results of their research PU and PEOU significantly and positively affect the willingness to use the system.

In line with the research results of Rodrigues Pinho & Soares (2011) and the theory of Davis et al (1989) if the users of the e-parking system have accepted the use of the e-parking system, then the users of the e-parking system will be interested in using the e-parking system. as the latest method of collecting parking fees. The acceptance was obtained from the attitude towards using an indicator which illustrates the interest of users of the e-parking system stating that the use of the e-parking system is a good idea, the use of the e-parking system is a wise idea, UPT Parking officers like the idea of using e-parking, and the UPT Parking Officer felt happy about it.

Likewise with the acceptance of the e-parking system based on the behavioral intention to use (BI) , and actual usage (AU) dimensions that due to attitude towards using (interest), users intend to use the e-parking system in the long term, as well as the length of time. The period of using the e-parking system was in Bandung itself has been running for two years. Jakarta has been running for four years and other cities. Behavioral intention to use (BI) and actual usage (AU) can be seen from the responses and observations studied based on all indicators.

These results are in line with those proposed by Davis et al (1989) and the results of research by Morris & Dillon (1997) which suggests that perceived usefulness and perceived ease of use by users significantly affect attitude towards using as it also has an impact on behavioral intention to use and actual usage.

5. Conclusion

Based on the results of the analysis of the data obtained from the interviews and observations made in the previous chapter, it can be concluded that:

1. The use of e-parking based on perceived usefulness can increase the performance of officers, increasing work effectiveness, increasing work productivity, and being useful for UPT Parking officers in Bandung City. Likewise, in other cities that use e-parking have the same opinion.

2. The use of e-parking based on perceived ease of use can facilitate users, make it easier to do what users want, make it easier for skilled users to use the system, and easy to use for Bandung City Parking UPT officers. Likewise, in other cities that use e-parking have the same opinion.

3. The use of e-parking is based on an attitude toward using, officers think using e-parking is a good idea, using e-parking is a wise idea, UPT Parking officers like the idea of using e-parking, and UPT Parking officers feel happy after using e-parking. -parking. Likewise, in other cities that use e-parking have the same opinion.

4. Use of e-parking based on behavioral intention to use UPT Parking officers are interested in activating all TPE machines in Bandung City in the future. Likewise in other cities use e-parking as a form of support in increasing gross domestic income in Indonesia and support for the BI program, namely GNNT (National Non-Cash Movement).

5. The use of e-parking is based on actual usage, that the use of e-parking itself has been running for 2 consecutive years starting from the trial period which can be seen from the actual frequency, and actual satisfaction. Likewise, in other cities that use e-parking have the same opinion. (Tahoma 11, spacing 1)

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