

# Parkir Meter (E-Parking System): How It Works and Overcomes Limitation in Collecting Parking Retribution Using Ticket System

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## ABSTRACT

The use of the ticket system to collect parking fees in accordance with the mandate of the Padang City Regional Regulation number 12/2011 has proven to be unable to optimize the parking retribution receipts in the city of Padang. This is proven based on the average number of parking efficiency and effectiveness ratios for the last 3 years (2017-2019) which is only around 33% per year. On the other hand, parkir meter (the e-parking system) initiated by DKI Jakarta, Bekasi, Surabaya, and South Tangerang Government, has been proven to be able to significantly increase parking retribution receipts. This research is a qualitative research in the form of a phenomenological study. The research location is the city of Padang. Research data consists of primary data and secondary data. Primary data obtained through in-depth interviews with 2 local parking attendants. While secondary data in the form of procedures for collecting and depositing parking fees were obtained from the Padang City Transportation Service. The research data is then processed using interactive model analysis developed by Miles and Huberman (1992), which consists of data reduction, data presentation, data reduction, and drawing conclusions. This study found that the ticket system has a number of limitations such as not real time and lack of transparency and accountability. All of these limitations can be reduced when using the e-parking system.

**Keywords:** ticket system, weaknesses, e-parking, parking retribution

## 1. INTRODUCTION

On paper, the Padang city government has a huge opportunity to optimize local revenue (PAD) from the parking retribution sector, considering that in 2020 the number of registered vehicles has reached 356.359 units [1]. [2] and [3] reveal that the number of vehicles is positively correlated with the value of parking retribution receipts. Thus, if it is assumed that 50% of the registered vehicles have parked 3-5 times a year on public roads in the city of Padang, and the parking rates for cars and motorbikes are Rp 2000 and Rp 3000, then the potential receipt of parking fees in the city of Padang ranges between Rp. 6 - IDR 2.6 billion annually. In this case, the more and more vehicles parked on the road, the higher the parking levy received by the Padang city government.

The effectiveness ratio and the parking efficiency ratio are 2 ratios commonly used in a number of research literatures to measure the performance of local governments in managing parking retribution collections. The effectiveness ratio of parking retribution is measured by comparing the realization with the target of parking retribution receipts. In this case, the local government is

considered to have a good performance in managing the collection of parking fees, if it has an effectiveness ratio closer to 100%. While the efficiency ratio is calculated by comparing the costs incurred in collecting parking fees with the actual amount of parking fees received. In this case, the local government is considered to have a good performance in managing the collection of parking fees, if the efficiency ratio is closer to 1% [4].

If we look at the data in tables 1 and 2 below, it can be seen that the Padang city government has "not yet" shown a satisfactory performance in managing parking retribution collection. In the last 3 years (2017-2019), the effectiveness ratio and the parking efficiency ratio of the city of Padang have always been in the "ineffective" and "inefficient" categories. The ineffectiveness of the Padang city government in collecting parking fees can be seen from the annual average realization of parking retribution receipts which is only 33.17% of the target. In addition, the annual average efficiency ratio is getting closer to and exceeding 100%, indicating that the parking retribution fee is the same, or even greater than the parking levy received. In this case, the Padang city

government is far behind compared to other local governments, such as the city of Kotomagu and the district of Ponorogo, which in the same period were able to achieve a parking effectiveness ratio of >100%

[5, 6], or with the city governments of Yogyakarta and Bandung which are able to achieve a parking efficiency ratio of <20% [7, 8].

**Table 1. Effectivity Ratio Parking Retribution in Padang During 2017-2019**

Year	Target (Rp)	(Rp)	Effectivity Ratio	Interpretation
2017	4.355.729.633	1.545.903.000	35,49%	<i>Not effective</i>
2018	5.153.130.132	1.611.254.000	31,51%	<i>Not effective</i>
2019	4.472.130.132	1.454.915.000	32,53%	<i>Not effective</i>
<b>Average</b>		33,17%		<i>Not effective</i>

Source: Padang City Regional Revenue Agency, 2020

**Table 2. Efficiency Ratio Parking Retribution in Padang During 2017-2019**

Year	Cost of Collection (Rp)	Realization (Rp)	Efficiency ratio	Interpretation
2017	1.412.500.000	1.545.903.000	8,63%	<i>Not efficient</i>
2018	1.541.400.000	1.611.254.000	4,33%	<i>Not efficient</i>
2019	1.666.200.000	1.454.915.000	(4,52%)	<i>Not efficient</i>
<b>Average</b>		100,52%		<i>Not efficient</i>

Source: Padang City Regional Revenue Agency, 2020

Previous research such as [9], [10], [11], [12], [13], [14], and [15] have confirmed that the low ratio of effectiveness and efficiency of parking is caused by a number of factors such as weak control by Transportation Service officers, limited parking attendants, occupancy of parking locations by street vendors, and inappropriate behavior of parking attendants. In the opinion of the research team, all of the research findings are more concerned with the problems that occur in the "downstream" part. Meanwhile, until the time this article was written, not much literature has been found that examines the "upstream" section, namely trying to examine whether the ticket system is still relevant to be used as an instrument to collect parking fees, when the realization of annual parking retribution receipts always fails to meet the target.

The willingness of local governments to accept alternatives other than the ticket system to optimize parking retribution receipts is increasingly finding its urgency, when the ticket system is criticized for having limitations in the form of being insecure, not transparent, and not accountable [16]. In addition, the initiation of the regional governments of DKI Jakarta, Surabaya, Solo, Bekasi and South Tangerang, to start implementing parkir meter (e-parking system) using both the parking application (JUKIR) and the electronic parking terminal machine (TPE), has proven significantly increase the amount of parking retribution receipts [17, 18; 19, 20, 21, 22]

This article describes (1) the procedure for collecting parking fees using the ticket system, along with its limitations, (2) the procedures for collecting parking fees using parkir meter (the e-parking system), and its advantages over the ticket system. For the Regency and City Transportation Offices, this article can be used as consideration in determining the policy

of switching parking retribution collections from the ticket system to parkir meter (e-parking system). For academics of accounting information systems and regional financial management, this article is expected to enrich the literature on the use of information and communication technology (ICT) to improve the quality of public services.

## 2. RESEARCH METHOD

This research is a qualitative research in the form of a phenomenological study, namely research conducted to gain an in-depth understanding of the phenomenon from the point of view of the research subject [23]. The research was conducted in the city of Padang. Research data consists of primary data and secondary data. Primary data were obtained through in-depth interviews with 2 parking attendants on Permindo road and Muaro Lasak Purus beach, Padang city as key informants. The interview material covers the collection process to the accountability of receiving parking fees. While secondary research data in the form of procedures for collecting and depositing parking fees, obtained from the Padang City Transportation Service. The research data is then processed using interactive model analysis developed by [24], which consists of data reduction, data presentation, data reduction, and drawing conclusions.

## 3. RESULT AND DISCUSSION

### 3.1 Procedure for Collection of Parking Retribution Based on the Ticket System

Padang City Regional Regulation number 12/2011 concerning public service fees is a legal product that regulates the procedures for collecting parking fees. In the regional regulation, there are 2 important activities related to the collection of public street parking fees,

namely (1) printing of Regional Retribution Determination Letters (SKRD) in the form of parking retribution tickets, and (2) procedures for collecting and depositing parking retribution receipts into regional treasury accounts. In this case, [25] revealed that the printing and perforation of parking retribution tickets was carried out by the local Regional Revenue Agency. The printed and perforated parking tickets are then handed over to the Transportation Service Receipt Treasurer to be recorded, and then handed over to the local parking attendance coordinator. The parking attendance coordinator is then responsible for distributing the parking tickets to the parking attendants

The procedure for collecting and depositing parking fees begins with vehicle owners entering and parking their vehicles at the parking location. When

leaving the parking location, the vehicle owner pays the parking fee to the parking attendant according to the applicable rate, and then the parking attendant is required to submit a parking fee ticket after the parking fee payment is received. The parking attendant then submits the parking deposit that has been collected along with the torn ticket to the parking attendant coordinator, which officially appointed by the Department of Transportation. The parking attendant coordinator then handed over the parking deposit money along with torn retribution tickets to the Transportation Service treasurer. The treasurer of the Department of Transportation then deposits the parking levy money into the regional treasury account through the appointed perception bank using the Regional Retribution Deposit Letter (SSRD) [26; 27].

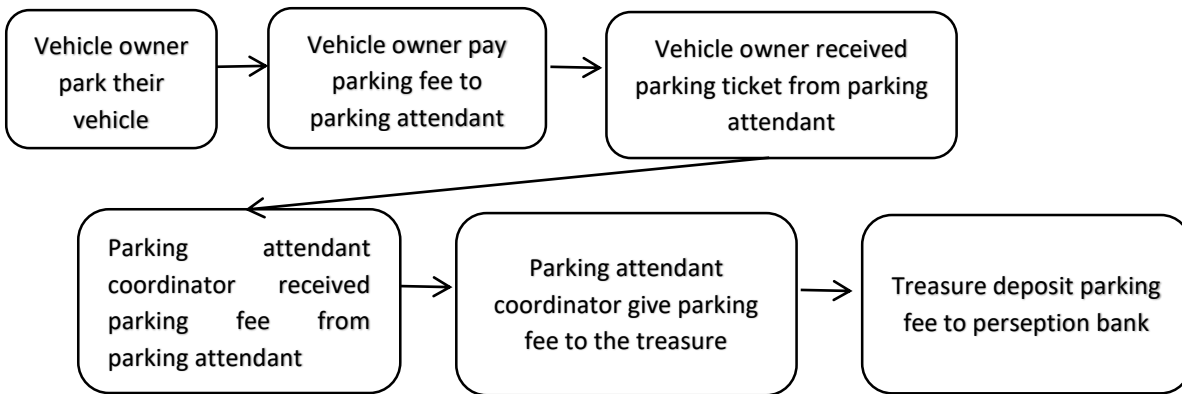


Figure 1. Procedure for Collection of Parking Retribution Based on the Ticket System

### 3.2 Procedure for Collection of Parking Retribution Based on Parkir Meter (E-parking System)

To date, there are 2 alternative e-parking system schemes that have been widely used by a number of local governments in Indonesia to collect parking fees. The first scheme is to use a parking apps. DKI Jakarta is an example of a role model in Indonesia for this alternative through a parking apps called "JUKIR". JUKIR is a multi-functional parking apps, created based on the collaboration of the UPTD Parkir DKI Jakarta with PT. Aplikasi Digital Nusantara. There are a number of features inside the JUKIR apps to make it easier for people to get parking certainty. For example, JU PARK n RIDE (goods storage at parking locations), JU VALET (parking reservations at hotel and mall valets), JU BUY (drive thru reservations for retail stores and restaurants), and JU SPACE (information on vacant parking locations). In addition, the JUKIR apps can also be used to carry out various digital financial transactions such as purchasing credit, concert tickets, boat tickets, and electricity tokens [28, 29].

The JUKIR parking app is easy to use. The JUKIR apps is used in parking locations where an electronic parking terminal (TPE) machine cannot be installed. When a vehicle enters the parking location, the parking attendant will take a photo of the vehicle's license plate using the MITRA JUKIR apps that was pre-installed on the parking attendant's cellphone. After the photo is entered into the JUKIR MITRA apps, the parking attendant then categorizes whether the vehicle is a motorcycle, car, truck, or bus. In the MITRA JUKIR apps, the details of the progressive rates that apply to each category of vehicles have been programmed according to regional regulations. For example Rp. 5000/hour for car and Rp. 2000/hour for motorcycle. When the vehicle owner wants to leave the parking location, the parking attendant will show the value of the parking fee that must be paid, and the parking fee ticket can be printed and given to the vehicle owner after they pay the parking fee to the jukir in cash, bank transfer, deduct the deposit balance, or use digital wallet [28].

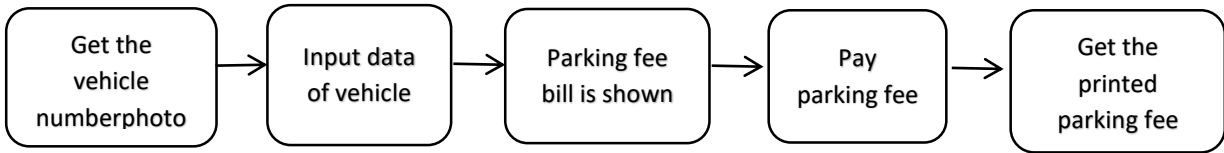


Figure 3. How the E-parking system works using the parking application

The second scheme is to use an electronic parking terminal machine (TPE). At the time of writing this article, TPE machines have been used by a number of local governments in Indonesia. For example, Surabaya, Bandung, Bekasi, South Tangerang, Makassar, and Palembang [30, 31, 32, 20, 33, 34, 35]. In general, the TPE machine is installed by the local government on the sidewalk of the parking lot. Unlike the JUKIR parking apps, which is mobile and multi-functional, the TPE machine is static and mono-functional, which is only for paying parking fees.

Using the TPE machine is very simple and not much different from the JUKIR application. When

arriving at the parking location, the vehicle owner goes to the TPE machine, then inputs the type of vehicle (car, motorcycle, truck, or bus), inputs the vehicle number plate (eg B 1234 AO), then sets the parking duration time (eg 1 hour) via keyboard available on the machine. After data input is complete, the TPE machine will show the nominal parking fee that must be paid by the vehicle owner. The owner of the vehicle then pays the parking levy according to the alternatives provided by the TPE machine before they leave the parking location. For example using coins or parking deposit cards. After the payment is confirmed, the TPE machine then issues a ticket as proof of confirmation of payment of parking fees [27, 36].

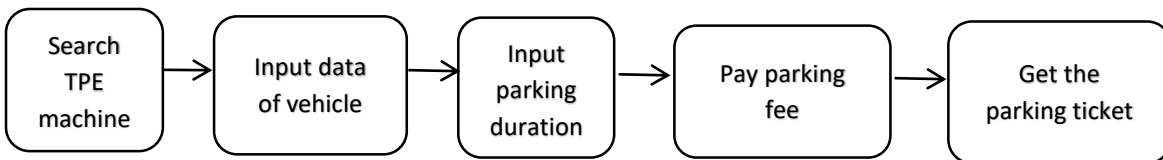


Figure 2. How the E-parking system works using Electronic Parking Terminal Machine

### 3.3 Review Comparison of Ticket System with Parkir Meter (E-Parking System)

The two models of parking retribution collection above (the ticket system and the e-parking system) have both advantages and limitations. The advantage of the ticket system lies in its **relatively low operating costs and easy implementation**. The operating costs of the ticket system are relatively low because local government expenditures are only for printing parking ticket. In addition, because the collection is carried out using a target system with local community leaders or local community organizations, local governments do not need to allocate a budget to pay parking attendants' salaries [27].

Meantime, the weakness of the ticket system lies in 3 aspects, namely not real-time, lack of transparency, and lack of accountability. First, it's **not real-time**. There is a time lag between paying the parking levy from the vehicle owner to the parking attendant, handing over the parking levy money to the parking coordinator and to the treasurer of the transportation office, and depositing the parking levy money into the local government treasury account. Although the parking fee payment process occurs every day, unfortunately the parking fee does not automatically enter the regional treasury account on the same day. The excerpt from the interview of the

research team with 2 parking attendants in the city of Padang below confirms this.

*".....ambo setor pitih parkir ko kalau koordinator lah telpon ambo se nyo pak...paling capek tu pitih parkir kini ambo setor bisuak ka koordinator..."*  
(Jon, juru parkir Jl. Permindo, kota Padang)

*".....dak mungkin pitih parkir dapek kini setor lo kini pak...awak kan karajo sampai malam, karano pantai purus ko kalau lah malam makin rami...tentu bisuak paling cepat ambo agih pitih parkir ko ka bos..."* (Pen, juru parkir pantai purus, kota Padang)

Second, **lack of transparency**. The ticket system does not provide an instrument that provides data recording the real number of vehicles entering and leaving the parking location every day. And unfortunately, the Padang city government has not installed CCTV as a means of monitoring activities that occur around strategic parking locations such as Permindo Street (as a representation of the business district) and Muaro Lasak Purus beach (as a representation of tourist area). This causes it is not

known with certainty how many vehicles enter and exit the parking location, as well as the amount of parking retribution received and must be deposited into the local government cash account. The excerpt from the interview of the research team with 2 parking attendants in the city of Padang below confirms this.

*“.....jumlah pasti bara kendaraan yang keluar masuk di siko yo dak tau ambo do pak...Dak lo ambo hitung do....untuk kana dihitung bana ? yang jaleh pak, permindo ko kalau pagi langang, siang baru mulai rami nyo....sampai malam...” (Nof, juru parkir Jl. Permindo, kota Padang)*

*“.....mano tau awak pak...itungan nyo rami jo dak rami se yang jaleh ambo nyo...mungkin oto jo honda samo banyak jumlahnyo, kalau bus sabtu minggu acok tibo disiko, ....sore mulai rami disiko, malam apalagi... Kalau sabtu minggu, rami bana pak...” (Pen, juru parkir pantai purus, kota Padang)*

Third, **lack of accountability**. The ticket system provides a relatively weak instrument for providing data on the amount of parking retribution that the vehicle owner has paid to the parking attendant every day. The absence of CCTV that can monitor the activity of paying parking fees from the vehicle owner to the parking attendant, causes the torn ticket left in the ticket book to be the only medium to confirm the payment of parking fees. In the hands of a dishonest and unprofessional parking attendant, it can be misused for personal gain, in the form of a parking fee ticket that is intentionally not given to the vehicle owner, even though they have paid the parking fee. The more and more parking attendants perform these unscrupulous acts, the more parking retribution fees will not be deposited into the local government cash account. The excerpt from the interview of the research team with 2 parking attendants in the city of Padang below confirms this.

*“.....kalau awak tergantung yang punyo oto jo honda pak...inyo minta karcis ambo kasih....kalau mereka gak minta, ambo dak lo kasi do...rasonyo sejak dulu pun saketek nyo pa, dak bara bana urang yang minta karcis parkir ko do...” (Nof, juru parkir Jl. Permindo, kota Padang)*

*“.....sejak karajo disiko rasonyo ciek duo se nyo pak urang yang minta karcis parkir ko kalau lah selesai bayia parkir...biasonyo yang minta karcis parkir tu urang luar daerah pak,.....yang pai ka siko pake bus pariwisata atau plat bukan BA...kalau urang siko dak ado*

*minta do...abis bayia langsung se nyo pai...” (Pen, juru parkir pantai purus, kota Padang)*

The advantage of the e-parking system lies in its ability to overcome 3 limitations in the ticket system. First, **real-time**. Both the TPE machine and the JUKIR apps work with systems that are connected to the internet. This causes no time lag between payment and deposit of parking fees to the Padang city government treasury account. Both the TPE machine and the JUKIR apps have been programmed to be directly linked to the regional treasury bank account. So that when the TPE machine and the JUKIR apps have confirmed receiving the parking levy payment, at the same time there is an addition of cash to the local government cash account. Second, **minimal bureaucracy**. The role of parking coordinator and treasurer that previously existed in the ticketing system is reduced or no longer needed in the e-parking system. This is because the TPE machine and the JUKIR application are able to process online, both payment of parking fees and depositing parking fees to local government cash accounts.

Third, **transparent and accountable**. The existence of a chip/memory and video image in the TPE machine as well as the JUKIR apps causes the system operator (local government or private sector) to have a database or record of all vehicles entering and leaving the parking location as well as an invoice/ticket for parking retribution which is printed when the vehicle owner pays the parking levy before they leave the parking location. The data from the chip/memory can be printed, so that it can be compared with the print out of the recapitulation of the parking retribution deposit provided by the local government perception bank of the city of Padang. Fourth, **minimize the potential for fraud**. The synchronization between data on parking retribution payments, printed parking retribution tickets, and print outs of recapitulation of parking receipts from perception banks causes room for fraud, such as embezzlement or engineering the amount of parking retribution deposit, not only more difficult but also easier to trace.

On the other hand, the weakness of the e-parking system lies in the aspect of large operational costs. Anyone appointed as an e-parking system operator (local government or private sector) must allocate a large investment fund to purchase and install TPE machines and JUKIR apps, maintain TPE machines and JUKIR applications regularly, train parking attendants to be able to operate TPE machines and the JUKIR application, install CCTV around parking locations, and maintain the e-parking system website.

#### **4. CONCLUSION**

The very poor efficiency ratio and parking effectiveness ratio in the last 3 years (2017-2019)

should be a "wake up call" for the Padang city government, to evaluate whether the ticket system is still relevant to be maintained as an instrument for collecting parking fees. Although the operating costs are relatively low and easy to operate, the ticket system has a number of limitations such as not real time, not transparent, not accountable, and very bureaucratic. All of these limitations are vulnerable to being misused by irresponsible persons to commit fraud, thus affecting the amount of parking levy collection receipts.

The use of the internet and ICT devices such as electronic parking terminal machines (TPE) and parking applications (JUKIR) causes parking retribution collections to be done electronically. In order to maximize the receipt of parking fees, it is very important for the Padang city government to consider these things as an alternative to replace the current ticket system. Despite having weaknesses in the form of relatively high operational costs, TPE machines and parking applications (JUKIR) have advantages in the form of real time processing, minimal bureaucracy, very transparent and accountable, and also able to minimize fraud. Trials of collecting parking fees electronically using both TPE machines and parking applications (JUKIR) in DKI Jakarta, Bekasi, Surabaya, Solo, and South Tangerang, were proven to be able to significantly increase parking retribution receipts, compared to when the ticket system was still in use.

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