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Effectiveness of service quality on the level of electronic parking terminal use in parking of the Bandung City Transportation Service

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Abstract

Purpose: This study aims to analyze the effectiveness of service quality on the level of use of Electronic Parking Terminals (TPE) at the Regional Public Service Agency (BLUD) Parking Technical Implementation Unit (UPT) of the Bandung City Transportation Agency. The background of this study is based on the problem of low TPE utilization despite being implemented since 2017 as an effort to modernize the parking system.

Methodology: The research method used is a qualitative approach with descriptive methods, through interviews with BLUD employees, parking attendants, and the public using parking services.

Findings: The results of the study indicate that the implementation of TPE is quite effective in increasing transparency, accountability, and optimizing parking fees. However, obstacles are still found in the form of technical machine problems, limited number of devices, and low public adaptation to technology. In terms of service quality, in general, the public assesses it as quite good, especially in the dimensions of assurance and empathy, although weaknesses still exist in the aspects of reliability and physical evidence (tangibles). The level of TPE utilization tends to increase in certain areas, but is not evenly distributed across all parking points. This study concludes that service quality plays an important role in determining the effectiveness of TPE, and this effectiveness has a direct impact on the level of use by the public.

Originality: This study provides a specific analysis of how service quality dimensions influence the effectiveness of electronic parking systems in Bandung City. It highlights both the benefits and limitations of TPE implementation within the context of a local government's effort to modernize parking management, offering practical recommendations such as improving service quality, machine maintenance, user education, and officer training—contributions that are rarely discussed in previous studies on electronic parking systems in Indonesia.

Keywords: Effectiveness, service quality, electronic parking terminal

1. Introduction

Bandung, as one of Indonesia's major cities, faces significant challenges in parking management, particularly in busy centers and commercial areas. The high volume of private vehicles, such as cars and motorcycles, makes the need for an effective and efficient parking system increasingly crucial. To address congestion and parking irregularities, the Bandung City Government, through the Transportation Agency and related units such as the Public Service Agency (BLUD) Parking UPT (Parking Unit), has begun implementing electronic parking terminals as a modern solution for parking management. This system aims to simplify the parking process with cashless payments, expedite service, and reduce revenue leakage.

In addition, parking management in Bandung City also involves arranging parking zones, assigning trained parking attendants, and public outreach to ensure optimal and orderly parking use. However, challenges such as lack of public awareness, limited parking facilities, and the need for technological improvements remain a key focus for the government to address. In general, efforts to modernize and improve the parking system in Bandung are expected to support smooth traffic flow, increase local revenue, and provide better services to the public. Electronic parking in Bandung City is part of the government's efforts to modernize the parking system and increase Local Revenue (APD).

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One of the main initiatives is the implementation of Electronic Parking Terminals (TPE) and a cashless payment system through QRIS. Since its introduction in 2017, TPEs have facilitated automated parking payments. These red parking machines are designed to increase transparency and efficiency in parking fee collection. However, in practice, TPE usage remains limited. Some users and parking attendants admit to preferring cash payments due to limited understanding and access to technology. This results in parking machines often being underutilized. To address the limitations of TPEs, the Bandung City Government, through the Department of Transportation (Dishub), began implementing a QRIS parking payment system. Trials began in October 2024 on several roads, including Jalan ABC, Banceuy, and Suniaraja. Parking attendants are equipped with vests with QRIS codes, allowing users to make cashless payments through digital payment apps. The system aims to simplify transactions, reduce revenue leakage, and improve efficiency in parking management.

Effectiveness is a measure of the extent to which an activity, program, or policy achieves its stated objectives. This concept emphasizes the attainability of results, not just the processes or resources used. An activity is considered effective if the resulting output meets or even exceeds planned targets. In practice, effectiveness is often associated with the precise achievement of objectives, whether within an organization, government, or individual activity. For example, in a public service program, effectiveness can be measured by the extent to which the service meets community needs according to expected standards. Effectiveness can be measured through relevant performance indicators, such as target achievement, stakeholder satisfaction, and resulting impact. In the modern era, effectiveness has become a crucial benchmark for organizational success, especially in the face of competition and the demands of rapid change. Effectiveness comes from the word "effective," which comes from the English word "effective." *effective* which means success or something done successfully. Effective also means achieving a predetermined goal. A popular scientific dictionary defines effectiveness as the accuracy of use, effectiveness, or support for a goal. Effectiveness is a key element in achieving predetermined goals or objectives in any organization, activity, or program. Effectiveness comes from the root word "effective." According to the Big Indonesian Dictionary (KBBI) (2007) ^[11], the word "effective" means having an effect, influence, consequence, or the ability to produce results. Moore D. Kenneth (in Sumantri, 2015) defines effectiveness as a measure that assesses the extent to which targets (quantity, quality, and time) have been achieved. The greater the percentage of target achievement, the higher the effectiveness. (Zafar & S, 2020)

(Zafar & S, 2020) ^[10] Stated that effectiveness can be said to be a measurement to be able to assess the suitability of achievements with predetermined targets. If the specified target is achieved successfully, the implementation can be said to be effective. Conversely, if the target achievement is not achieved optimally or does not meet the target, the implementation is said to be ineffective. (Susanto, 2005) ^[13] also said that effectiveness is a measurement of how planned goals are achieved and provide impacts and results in accordance with the expected. Likewise, as stated by James L Gibson *et al.* in (Psalong, 2013) ^[12], effectiveness

is defined as achieving the goals of a joint effort. From this explanation, it can be interpreted that effectiveness is the achievement of goals in an activity according to expectations. Therefore, to assess the level of effectiveness, a comparison is used between targets or objectives with the realization or results that have been obtained. The more realized the expected goals, the more effective the activity. Effectiveness refers to achieving goals according to plans and requirements, whether in terms of data, resources, or time. Effectiveness is a measure of goal achievement as a result or effect of an activity. (Rahmawati & Suryadi, 2019) (Natika & Karimah, 2020) ^[7, 9] Effectiveness is the correspondence between output and established objectives. Similarly, Subagyo (Natika & Karimah, 2020) ^[7] also argues that effectiveness is the relationship between output and objectives. The greater the contribution of output to achieving objectives, the more effective the organization, program, or activity. Effectiveness focuses on *outcome* (results), a program or activity is considered effective if the output produced can meet the expected objectives, which defines effectiveness as the suitability between the output and the objectives set. Effectiveness is always linked to the relationship between achieved results and established objectives. According to Aprilia *et al.* (2020) ^[1], effectiveness is a measure of how far targets (quantity, quality, and time) have been achieved. Effectiveness, in a general sense, refers to the level of achievement of results. Simply put, local government effectiveness refers to the extent to which the goals of the local government can be achieved in accordance with planned needs. Effectiveness reflects the local government's ability to realize planned regional taxes compared to targets set based on the region's actual potential.

According to (Astuti, 2017) ^[2] "it is the opinion that effectiveness is related to the completion of work on time that has been previously determined or it can be said whether the implementation of something is achieved according to what was previously planned." According to Pierre and Simar, quality is the achievement of predetermined goals or conformity to predetermined standards. Bourke, on the other hand, defines quality as a reflection of a product or work result. Therefore, quality encompasses various aspects related to the criteria or characteristics of work or activity outcomes. (Study Results of Research Methodology and Statistics on Thesis Quality, Zirmansyah & Nita Noriko, 2011) ^[5].

According to (Endarwita, 2018) ^[3], quality is the totality of the features and characteristics of a product/service in terms of its ability to meet predetermined needs, and in other words, the quality of a product/service is the extent to which the product/service meets its specifications. Products are also defined as anything that can be offered to the market to get attention, be owned, used, or consumed, which includes physical goods, services, personalities, places, organizations and ideas or thoughts. Quality can be defined as the ability of a product to perform its function, which includes durability, reliability or progress, strength, ease of packaging and product repair and other characteristics (Ge *et al.*, 2007) ^[4].

BLUD UPT Parking is part of the Bandung City Transportation Agency located at Jl. Babatan Number 4, Kebon Jeruk Village, Andir District, Bandung City. BLUD UPT Parking has the task of implementing part of the Bandung City Transportation Agency's duties within the

scope of parking. The implementation of BLUD UPT Parking's duties has the function of preparing planning and technical implementation, improving and developing parking management, implementing operations and implementing monitoring, evaluation and reporting of parking management activities. The following is the number of transactions carried out by BLUD UPT Parking Bandung for the period 2020 to 2024

Table 1: Number of Transactions of BLUD UPT Parking Bandung 2020-2024

Year	Number of transactions	%
2020	608.298	-
2021	231.058	17,07%
2022	229.984	16,99%
2023	169.736	12,54%
2024	114.285	8,44%
Total	1.353.361	

Source: BLUD UPT Parking, Bandung City Transportation Agency 2024

Based on these data, it is suspected that the use of electronic parking machines decreases every year because the quality of service is not yet optimally carried out by the BLUD UPT Parking, so the author is interested in conducting research with the title "effectiveness of service quality on the level of use of electronic parking terminals at the Regional Public Service Agency (BLUD) Parking Technical Implementation Unit (UPT) of the Bandung City Transportation Service". With the aim of knowing the real causes of service quality and finding appropriate solutions for BLUD so that the level of parking machine service increases through service quality.

2. Research Method

This study uses a qualitative approach with a descriptive method. The qualitative approach was chosen because this study focuses on an in-depth understanding of the "effectiveness of quality on the level of use of electronic parking terminals at the Regional Public Service Agency (BLUD) Parking Technical Implementation Unit (UPT) of the Bandung City Transportation Agency. The descriptive qualitative research method is a research approach that aims to describe systematically, factually, and accurately the facts, characteristics, and relationships between the phenomena being studied. This research does not focus on numbers, but rather on the meaning, understanding, and interpretation of research on a social phenomenon. The main objective of this approach is to provide an in-depth description of the phenomena occurring in the field, so that the context, process, and meaning can be understood from the perspective of research participants.

According to (Maryono & Budiono, 2020) [6], descriptive research is the most basic research aimed at describing existing phenomena, whether natural or man-made. This activity examines the form, activity, characteristics of change, relationships, similarities, and differences in other phenomena. The subjects of this study were BLUD UPT parking employees and parking attendants. The researchers found problems during the study, namely the low use of electronic parking machines and the lack of socialization between parking attendants and users.

Qualitative research is an activity related to the act of observation, trying to study something naturally, understand

it in depth, or interpret, give meaning to phenomena by describing, decoding, translating, and understanding the context naturally (Nugraha, 2024). According to (Nugraha, 2024) [8], qualitative research attempts to delve deeper into the social context being studied, emphasizing deep and specific, interpretative and comprehensive meaning in a particular context and time.

3. Results and Discussions

This study aims to analyze the effectiveness of quality on the level of use of electronic parking terminals at the Regional Public Service Agency (BLUD) Parking Technical Implementation Unit (UPT) of the Bandung City Transportation Agency. Based on the results of the study, it was found that the quality of the level of use of electronic parking machines has a significant impact on increasing regional revenue, although there are various challenges that must be faced in its implementation. This discussion will outline the main findings of the study, analyze the factors that influence the effectiveness of quality on the level of use of electronic parking terminals, and discuss the implications of this study's results for BLUD UPT Parking management and the development of marketing strategies in Bandung City.

Effectiveness of Implementing Electronic Parking Terminals

One of the key findings of this study is how the implementation of electronic parking terminals at the Bandung City Transportation Agency's Parking Unit (PUPT Parkir) is an innovation in improving parking management effectiveness. The primary goal of this system is to create more transparent and accountable services and minimize parking fee leakage, which has often occurred in manual systems.

In this case, the researcher conducted an interview session regarding the scope of the level of use of the Electronic Parking Terminal (TPE) by parking service users to informants who were divided into 2 parts, namely part 1 included informants from Parking Attendants and Informants from the Community who use Parking Services and part 2 included informants from Agencies (Institutions). For part 1, the first informant from the Parking Attendant stated that:

- "Often the excuse is that if you use a complicated machine, you can direct it, but if you use a machine, you don't want to, you want to just do it manually because it's complicated."
- Next, the second informant from the Parking Attendant gave a statement as below:
- "Whenever there is a customer, whether it's a 2-wheeled vehicle or a 4-wheeled vehicle, I always ask, 'Sir, do you have a car? *E-Money* or *E-Toll*?' If there is a sir, you can tap on the TPE machine," I always direct that to every customer who rides a 2-wheeled or 4-wheeled vehicle."
- Next, the third informant from the Parking Attendant gave a statement as below:
- "Often there are just card-related issues, for example, if you have a BCA card and can't use it, you'll be directed to make a payment to the TPE with assistance."
- Furthermore, the first informant from the parking user community provided a statement as below:

- "Rarely, I usually park in places without parking, but if there is a parking, I have used it."
- Next, the second informant from the parking user community gave a statement as below:
- "I've never used this machine before, because I didn't know how to do it. Every time I parked my motorbike, I'd just pay cash to the parking attendant. I'm used to paying cash."
- Next, the third informant from the parking user community gave a statement as below:
- "I rarely use it, because I don't know about it and have never tried it."
- Next, the fourth informant from the parking user community gave a statement as below:
- "I've never done it before, but I'd give it directly to the parking attendant, who would fill it in. I don't know how to do it, so I'd give the money to the parking attendant, and he'd put it in. I've never tried it myself."
- And for part 2, the informant from the first Agency (Institution), the Head of BLUD UPT Parking stated that:
- "At the beginning of TPE, its use was still minimal because some people still did not know much about TPE, however, in the following year there was a significant increase of around 180% and currently the use of TPE has decreased due to the lack of potential for TPE placement, damage to TPE."
- Next, part 2 of the informant from the second agency (institution), Public Relations BLUD UPT Parking, gave a statement as below:

"Since the implementation of this TPE, the community is still in the adaptation phase, because this change is also quite surprising for some people who are not used to technology, especially in the parking sector. The process of transitioning from a manual to a digital system also takes time, both in terms of user understanding and readiness from the Government itself, this condition also has an impact on the level of use of this TPE which has decreased significantly there, because not all elements of the community understand how to use it. Over time, it is also hoped that public understanding will increase along with the socialization and system improvements that we continue to make."

- Furthermore, there are still two informants from the third Agency (Institution), namely the Maintenance and Repair Manager, who gave the following statement:
- "In terms of revenue, it's primarily in the city center, as parking rates vary. Monthly and annual revenue varies, as parking lots are sometimes busy and sometimes not, so revenue fluctuates, sometimes rising and sometimes falling. Weather factors also influence the likelihood of rain, especially if the shopping center is closed on Saturdays and Sundays."

Based on interviews with managers and field officers, the effectiveness of the electronic parking system can be seen from several aspects. First, in terms of achieving its objectives, the system has helped improve the regularity of the parking payment process. The public is no longer disadvantaged by incorrect rates because the payment amount is clearly printed on the parking machine terminal. This demonstrates improved transparency and service

certainty. Second, in terms of integration, the implementation of electronic parking terminals requires coordination between the Public Service Agency (BLUD) Parking UPT (Integrated Service Unit), the Bandung City Transportation Agency, and field officers. Based on field findings, coordination has been quite good, although there are still obstacles related to the limited number of officers and the uneven distribution of terminal equipment. Third, in terms of adaptation, some people still experience difficulties in using electronic parking terminals. Some users are more accustomed to manual systems and feel awkward using the machines. Technical obstacles such as problems with the receipt printer or network connection also add to the challenges of this adaptation. Therefore, although overall effectiveness has been achieved, further efforts are needed to improve technological readiness and user assistance. Service quality in electronic parking systems can be analyzed using the five dimensions of SERVQUAL

Tangibles (Physical Evidence).

Electronic parking terminals are available in several strategic locations in Bandung. The parking machines are designed with a simple interface for ease of use. However, the number of machines remains limited compared to the vast area they manage. Some machines also require regular maintenance to ensure optimal functionality.

Reliability

Electronic parking terminals are generally reliable for automatically recording transactions. However, observations have revealed occasional technical glitches, such as receipts not printing or machine errors. This reduces the public's perception of service reliability.

Responsiveness (Responsiveness)

Field officers demonstrated responsiveness in assisting customers experiencing difficulties. For example, when a machine malfunctioned, officers immediately assisted users to ensure transactions continued. However, the limited number of field officers meant that responsiveness was uneven across all parking locations.

Assurance (Guarantee)

People feel safer using electronic parking services because the fees paid comply with applicable regulations. Printed receipts serve as valid proof of transactions, fostering user confidence in the system. The presence of electronic parking terminals also fosters confidence that parking fees are properly channeled into regional coffers.

Empathy (Empathy)

In general, electronic parking attendants strive to provide friendly service. However, in certain situations, officers still lack communication skills. Further training is needed to improve communication skills and provide empathy-based service.

Overall, the quality of service has been good, although there are still weaknesses in terms of machine reliability and the availability of officers in the field.

Electronic Parking Terminal Usage Rate

The use of electronic parking terminals in Bandung City shows an increasing trend, although not evenly distributed across all parking locations. Documentation data shows a

monthly increase in the number of electronic parking transactions. Parking users generally report greater satisfaction due to the faster, more transparent, and clearer payment process.

However, some people are still reluctant to use electronic parking terminals. Reasons cited include unfamiliarity with technology, inconvenience when the machines malfunction, and the perception that manual systems are more practical. These factors indicate that the level of use of electronic parking terminals is significantly influenced by the quality of service and the effectiveness of system implementation.

Conclusion of Observation Results

Based on the results of observations carried out regarding the implementation of electronic parking terminals at the BLUD UPT Parking of the Bandung City Transportation Service, several things can be concluded as follows:

Effectiveness of Implementation

The implementation of electronic parking terminals has generally been quite effective. The system is able to record transactions automatically and transparently, minimizing the potential for revenue leakage. However, in practice, obstacles remain, such as occasional machine glitches and the public's lack of familiarity with the technology.

Quality of Service

The quality of service provided by electronic parking attendants was deemed quite good. Officers strive to provide friendly service and assist users in any difficulties. In terms of facilities, electronic parking terminals are available at several strategic locations, but their number is still limited, resulting in queues at certain times. This indicates that tangibles and responsiveness still need improvement.

Usage Level

Observations show an increase in the number of people using electronic parking terminals, particularly in areas with high economic activity. People feel more confident because their parking payments are recorded and they receive receipts. However, some users are still reluctant to use this system due to their familiarity with manual parking and limited technological understanding.

The Relationship between Effectiveness, Service Quality, and Level of Use

The analysis concludes that there is a close relationship between effectiveness, service quality, and the level of use of electronic parking terminals. Good service quality, characterized by adequate facilities, a reliable system, responsive officers, guaranteed transaction security, and empathy for users, will increase system effectiveness. This effectiveness then has a direct impact on increasing the level of public use. Conversely, if the service is suboptimal, for example, if the machine frequently has problems or officers are unresponsive, service effectiveness will decrease and the public will be reluctant to use the electronic parking terminals. Therefore, improving service quality is a key factor in maintaining the sustainable effectiveness of the electronic parking system in Bandung City.

Research Implications

The findings of this study have several implications

1. For BLUD UPT parking: it is necessary to improve the

maintenance of electronic parking terminal machines and increase the number of devices at busy parking points.

2. For Field Officers: training on empathy-based public services needs to be improved so that the public feels more comfortable.
3. For the Community: ongoing education and outreach is needed so that the community becomes more accustomed to using the electronic parking system.
4. For the Bandung City Government: the results of this study can be the basis for evaluating policies in expanding the implementation of electronic parking terminals throughout the city.

4. Conclusions

Based on the research results, the author concludes that the effectiveness of the implementation of electronic parking terminals at the BLUD UPT Parking Bandung City is quite good in achieving the goals of increasing transparency, accountability, and optimizing parking fees. However, there are still obstacles in the aspect of community adaptation and technical problems with the terminal machines that need to be addressed immediately. Furthermore, the quality of electronic parking terminal services is generally considered positive by the community. This is reflected in aspects of physical evidence (tangibles), reliability, responsiveness, assurance, and empathy. However, weaknesses still exist in the limited number of devices, machine maintenance, and the availability of field officers who are not evenly distributed. Regarding the level of use of electronic parking terminals by the people of Bandung City shows an increasing trend. People feel more satisfied with the transparent system, clear rates, and faster payment processes. However, some users are still reluctant to switch from the manual system due to limited understanding of technology and technical problems with the machines. Therefore, it can be said that the relationship between effectiveness, service quality, and the level of use shows a strong relationship. Good service quality drives system effectiveness, and the effectiveness perceived by the community has a direct effect on increasing the level of use of electronic parking terminals.

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