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Effectiveness and Efficiency of Periodic Motor Vehicle Testing Through the Quality of Public Services on the Satisfaction of Service Users

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Abstract: This study aims to analyze the effectiveness and efficiency of periodic motor vehicle testing through the quality of public services and its impact on user satisfaction at the Cilincing Motor Vehicle Testing Unit (UPPKB). A quantitative survey design was employed, involving 95 service users selected through purposive sampling. Data were collected using a questionnaire measuring service quality (tangibles, reliability, responsiveness, assurance, and empathy), effectiveness, efficiency, and user satisfaction. Multiple linear regression analysis was used to examine the relationships between variables. The findings indicate that public service quality significantly influences user satisfaction, with responsiveness and assurance as the dominant factors. Effectiveness is reflected in the accuracy of testing procedures and results, while efficiency is evident in optimizing time and cost. However, challenges such as long queues and inadequate supporting facilities need improvement. This study recommends enhancing infrastructure, training staff, and implementing digital systems to improve service quality and user satisfaction at UPPKB Cilincing. The study results show that effectiveness and efficiency positively and significantly impact service quality and user satisfaction. Effectiveness, which is reflected in the smoothness, timeliness, and minimal obstacles in the testing process, has been proven to increase satisfaction and service quality. Similarly, efficiency through optimal resource management can accelerate services, reduce waiting times, and strengthen the public's positive perception of the quality of public services.

Keyword: Effectiveness, Efficiency, Public Service Quality, User Satisfaction, Motor Vehicle Testing.

INTRODUCTION

The Cilincing Motor Vehicle Testing Management Unit is part of the Department of Transportation that handles motor vehicle inspections. Based on Article 53 of Law Number 22 of 2009 concerning Road Traffic and Transportation, vehicles such as buses, freight cars, passenger cars, and trailers used on public roads must be inspected periodically. These inspections aim to assess the roadworthiness and technical specifications of vehicles. The main

purpose of these inspections is to ensure public safety, protect the environment, and provide services. Based on Article 56 of DKI Jakarta Provincial Regulation Number 5 of 2014 concerning Transportation, every owner of a motor vehicle used on public roads is required to meet roadworthiness standards to protect the environment and ensure traffic and road transport safety. Inspections, physical tests, and compliance with roadworthiness standards are part of the periodic testing that must be carried out at least twice a year.

Motor vehicles are crucial to contemporary mobility, especially for business travel. Motor vehicles must be tested periodically to ensure they remain in good condition and roadworthy. Because they enable the movement of people and/or goods from one area to another relatively fast, effective, and efficient, motor vehicles are an important part of a nation's economic, social, and cultural development (Indah et al., 2022). Technical specifications and roadworthiness thresholds for motor vehicles must be met to prevent adverse effects from driving them on public roads. Every six months, motor vehicle testing is mandatory for all owners of passenger and goods transport vehicles to ensure that these modes of transportation meet technical and roadworthiness criteria.

Based on Law Number 22 of 2009 concerning Road Traffic and Transportation (LLAJ). Regulation of the Minister of Transportation of the Republic of Indonesia Number 19 of 2021 concerning Periodic Testing of Motor Vehicles continues the implementation of this law, which is regulated in Government Regulation Number 55 of 2012 concerning Motor Vehicles. Article 1, paragraph 8 states, "Periodic testing is the periodic testing of motor vehicles, trailers, or semi-trailers operated on the road." This Regulation of the Minister of Transportation conducts periodic physical testing of motor vehicles per these provisions. Public service is the main function of the state apparatus in carrying out its role as a servant of the state and society (Rahayu, 2018). This obligation is detailed in the fourth paragraph of the 1945 Constitution, which discusses four main aspects of service to the community: protecting the entire nation and all of Indonesia's territory, improving the welfare of the people, and educating the nation. The concept of effectiveness is one method that can be applied to assess the performance of an organization; this concept highlights the extent to which the objectives set are achieved effectively. One way to measure effectiveness is to compare the results with the plans or objectives. Effectiveness is considered unsuccessful if the expected results are not achieved. In theory, effectiveness and time are closely related to achieving objectives.

According to Rahma & Sihombing (2023), the process of testing and/or inspecting various parts of motor vehicles, trailers, and attached trailers to ensure that they meet roadworthiness and technical criteria is known as motor vehicle testing. Regarding the objectives of motor vehicle testing, this is in line with the quote from (Noviana & Noor, 2021) regarding Minister of Transportation Regulation Number 19 of 2021, which states that motor vehicle testing should provide safety guarantees before allowing motor vehicles to operate on public roads, help practice environmental conservation by limiting the possibility of pollution from the use of motor vehicles on roads, and offer public services to the wider community.

The periodic motor vehicle testing process still faces various obstacles, including the number of stages that must be passed by the public, resulting in long service times, even lasting until the afternoon due to long queues. At the Cilincing Motor Vehicle Testing Management Unit (UPPKB), vehicle queues often occur from morning to afternoon, especially large vehicles waiting for their turn, parked along the road shoulder. This condition causes traffic congestion around the Motor Vehicle Testing Management Unit (UPPKB) area, where large trucks and other vehicles fill the roads, causing inevitable traffic jams. Based on these conditions, the problem of queues in the implementation of vehicle testing remains a major challenge at the Cilincing Motor Vehicle Testing Management Unit (UPPKB). In addition, the testing capacity at the Cilincing UPPKB is also an important factor that affects the smooth running of services. Based on operational data, the Cilincing UPPKB can serve an average of around 300-400 vehicles per day with an annual testing target of tens of thousands of vehicles, particularly from

the freight and container truck segments. However, the high demand is often not matched by the availability of human resources (HR) who serve as vehicle testers and administrative staff. The limited number of testers causes the inspection process to take longer, especially during peak hours. This condition is exacerbated by the limited parking capacity available at the Cilincing UPPKB, where the parking area can only accommodate a small portion of the vehicles that arrive each day. As a result, vehicles undergoing inspection are forced to wait on the side of the road or along the access road to the location, causing long queues and potential traffic disruptions. These factors indicate that, in addition to regulations and procedures, aspects such as service capacity, HR efficiency, and supporting facilities such as parking areas also greatly determine the effectiveness and efficiency of periodic motor vehicle inspections at the Cilincing UPPKB.

At the Cilincing Motor Vehicle Testing Management Unit (UPPKB), vehicles that must undergo periodic testing include public passenger transport vehicles, freight transport vehicles, buses, trucks, trailers, and operational service vehicles used on public roads. Based on the provisions stipulated in Law Number 22 of 2009 and Government Regulation Number 55 of 2012, all vehicles operating for public purposes, whether privately owned, owned by agencies, or by transportation companies, must undergo periodic testing at least twice a year. In the Cilincing area, a strategic area with high logistics and distribution activity, the number of vehicles that must be tested is relatively high, especially from the freight and container truck sectors. This makes the Cilincing UPPKB one of the vehicle testing points with the highest workload in DKI Jakarta. These vehicles must meet all technical and administrative requirements before being declared roadworthy, contributing to improved traffic safety and environmental protection. Many drivers and vehicle testers complain about this. Every region in Indonesia implements these vehicle tests in accordance with the provisions of the Law on Traffic and Public Transportation. To meet the public's need for fast, accurate, precise, transparent, and accountable services, the Cilincing Motor Vehicle Testing Management Unit (UPPKB) strives to create excellent public services, such as Periodic Motor Vehicle Testing, by visiting trucking companies that have large fleets or special areas for periodic testing.

The gap in this study is that previous studies have focused more on vehicle testing techniques, operational standards, or only on vehicle safety aspects and regulatory compliance (Law No. 22 of 2009, Government Regulation No. 55 of 2012, Minister of Transportation Regulation No. 19 of 2021). Much research has not directly linked the effectiveness and efficiency of motor vehicle testing services with user satisfaction, particularly at regional Motor Vehicle Testing Management Units (UPPKB) such as UPPKB Cilincing. Research on the impact of long queues on service and user satisfaction, as well as innovative efforts such as pick-up services, has been minimally studied in a structured and empirical manner. The novelty of this study is that it combines the approaches of effectiveness and efficiency as evaluative variables of vehicle testing service performance, which has not been the main focus in similar studies. A public service quality approach (such as service speed, ease of access, transparency, and accountability) is used to measure the satisfaction of vehicle testing service users. The focus on a strategic area (UPPKB Cilincing) that experiences long queues and congestion due to testing activities makes this research contextual and relevant to the challenges of urban transportation services.

This research is expected to benefit stakeholders in the research, academic, and practitioner communities, provide input for related companies, serve as a reference for other qualitative researchers, add to the knowledge of the Cilincing Motor Vehicle Testing Management Unit, and provide additional information, data, and knowledge, as well as the development of knowledge in the field of transportation, and contribute ideas to companies and related fields within the Company to improve the effectiveness and efficiency of periodic motor vehicle testing through mobile motor vehicle testing services.

This study aims to analyze and prove that the effectiveness and efficiency of periodic motor vehicle testing through the quality of public services can increase user satisfaction with the service. A conceptual model (Figure 1) and research hypotheses can be developed based on several descriptions of the theoretical basis and previous studies.

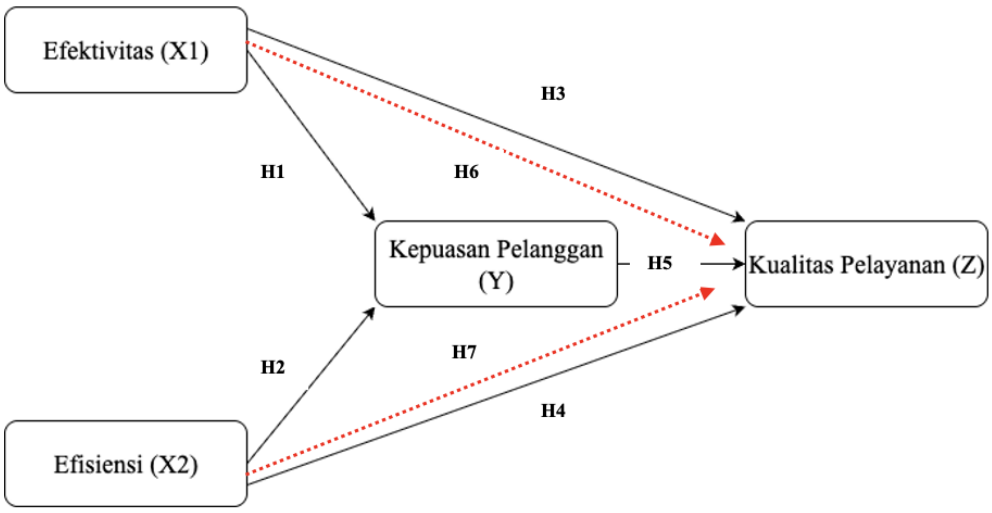

Figure 1: Conceptual Model

Effectiveness refers to the extent to which organizational activities achieve their stated objectives. In the provision of public services, effectiveness is often measured by the accuracy of procedures, timeliness, and the extent to which the outputs are aligned with the stated objectives. In vehicle testing, effectiveness can be evaluated through the accuracy of testing procedures and the reliability of test results in ensuring roadworthiness. Previous studies (Wiryawan & Nur, 2017) show that service effectiveness significantly affects user satisfaction, as users consider accurate and timely service indicators reliable and trustworthy. Efficiency emphasizes the optimal use of resources, including time, costs, and human capital, to achieve desired results.

Efficient services are characterized by shorter waiting times, lower operational costs, and more efficient administrative processes. In public sector services like vehicle testing, efficiency is critical because long queues and resource constraints directly affect users' perceptions of service quality. According to (Sawir, 2020) and (Hasan & Sabitah, 2023), efficiency is achieved when service inputs are minimized while maintaining or improving output quality.

Service quality is a multidimensional construct generally evaluated using the SERVQUAL model, which includes the aspects of tangibles, reliability, responsiveness, assurance, and empathy (Berry & Parasuraman, 1998). The tangible aspect reflects physical facilities, equipment, and staff appearance. Reliability refers to the ability to provide promised services reliably and accurately. Responsiveness highlights the willingness to help customers and provide services quickly. Assurance includes staff competence, friendliness, and the ability to instill trust. Empathy emphasizes personal attention and care for service users. In motor vehicle testing, physical factors include inspection facilities and parking areas, while responsiveness and assurance relate to staff performance in effectively handling large vehicles. Research shows that responsiveness and assurance often emerge as dominant dimensions influencing customer satisfaction in public service environments (Alam et al., 2024).

User satisfaction is an emotional response to comparing service expectations with actual experiences (Tafonao et al., 2024). Satisfaction is achieved when service performance meets or exceeds expectations, while dissatisfaction occurs when performance does not meet

expectations. In public services, user satisfaction is an important indicator of service quality and organizational performance, often associated with trust, loyalty, and compliance with regulations (Rustanti et al., 2023).

Research Hypotheses:

1. It is hypothesized that effectiveness influences user satisfaction with services at UPPKB Cilincing.
2. It is hypothesized that efficiency affects user satisfaction with services at UPPKB Cilincing.
3. It is hypothesized that effectiveness affects service quality at UPPKB Cilincing.
4. It is hypothesized that efficiency affects service quality at UPPKB Cilincing.
5. Service quality is suspected of affecting user satisfaction with UPPKB Cilincing services.
6. Effectiveness is suspected to affect user satisfaction with services through service quality at UPPKB Cilincing.
7. It is suspected that efficiency affects user satisfaction with services through service quality at UPPKB Cilincing.

METHOD

This study uses a quantitative approach with a survey design to analyze the effect of effectiveness, efficiency, and service quality on user satisfaction in periodic motor vehicle testing. This design was chosen based on the need to statistically measure the relationship between variables and test hypotheses. The research population included all periodic motor vehicle testing service users at the Cilincing UPPKB in North Jakarta. Given the high volume of service users daily, a purposive sampling technique was applied to select respondents who had directly experienced the vehicle testing process. Ninety-five respondents participated in this study, which was considered sufficient for regression analysis and hypothesis testing.

Primary data were collected using a structured questionnaire. The questionnaire items were developed based on the established dimensions of service quality (tangibles, reliability, responsiveness, assurance, empathy) and the constructs of effectiveness, efficiency, and user satisfaction. Responses were measured using a five-point Likert scale, ranging from 1 ("strongly disagree") to 5 ("strongly agree"). Secondary data were also used, including operational records from the Cilincing UPPKB and relevant government regulations such as Law No. 22 of 2009, Government Regulation No. 55 of 2012, and Ministerial Regulation No. 19 of 2021.

The questionnaire was pre-tested to ensure its validity and reliability. Construct validity was evaluated through factor analysis, while reliability was tested using Cronbach's Alpha, with a coefficient exceeding the threshold of 0.70, indicating acceptable internal consistency. The data were analyzed using multiple linear regression to explore the direct relationship between effectiveness, efficiency, service quality, and user satisfaction. Mediation analysis was also conducted to test the indirect effect of effectiveness and efficiency on user satisfaction through service quality. Before hypothesis testing, classical assumption tests, including normality, multicollinearity, and heteroscedasticity, were conducted to ensure the validity of the regression results.

RESULTS AND DISCUSSION

This survey involved 95 respondents who use periodic motor vehicle inspection services at the Cilincing UPPKB. Most respondents were truck and container drivers, reflecting the types of vehicles that predominantly undergo inspection at this unit. Most respondents had repeated experience with vehicle testing, indicating familiarity with the testing procedures. Regarding education level, respondents varied from high school graduates to college graduates, indicating that perceptions of service quality were not limited to a particular educational background.

Respondents generally rated service quality as moderate to high. The tangible dimension received mixed responses due to limited parking facilities and waiting areas. In contrast, the responsiveness and assurance dimensions received higher scores, indicating that staff were helpful and capable of providing reliable service. The empathy dimension received relatively lower ratings, reflecting a lack of personal attention given to users due to high workloads and long queues. Effectiveness was rated positively, particularly concerning the accuracy of inspection results, which ensured that vehicles declared roadworthy met technical standards. However, long waiting times were identified as a factor that reduced overall effectiveness. Efficiency was rated moderate, as time and resources were not always optimized due to congestion and inadequate digital systems.

Regression analysis showed that service quality significantly positively impacted user satisfaction. Among the five dimensions, responsiveness and assurance emerged as the strongest predictors, confirming that timely assistance and staff competence were crucial factors in shaping user perceptions. Additionally, effectiveness significantly affects user satisfaction, as accurate and timely test results increase user trust in the system. Efficiency also shows a positive and significant impact, with faster service and lower costs contributing to higher satisfaction levels. When service quality is included as a mediating variable, both effectiveness and efficiency indirectly affect user satisfaction through service quality. This indicates that improvements in effectiveness and efficiency will only result in higher satisfaction levels if accompanied by improvements in service quality. The model's explanatory power (R^2) is high, indicating that the three independent variables collectively explain a significant proportion of the variation in user satisfaction.

These findings are consistent with previous studies that emphasize the central role of service quality in determining user satisfaction in the context of public services (Alam et al., 2024; Masili et al., 2022). The strong influence of responsiveness and assurance highlights the importance of staff performance and competence in service delivery. This indicates that investment in staff training and professional development is essential to maintaining user trust and satisfaction. The positive impact of effectiveness on satisfaction highlights the need for accurate and reliable testing procedures. Users appreciate the assurance that their vehicles are properly tested and meet safety standards before being declared roadworthy. Similarly, the role of efficiency shows that users are highly sensitive to waiting times and costs; therefore, simplifying administrative processes and adopting digital platforms can significantly improve service delivery.

However, operational challenges such as limited facilities, long queues, and inadequate parking remain significant obstacles at the Cilincing UPPKB. These constraints hinder efficiency and weaken perceptions of tangible and empathetic aspects. Integrating digital systems such as online scheduling, electronic payments, and automated inspection records can address these issues. These initiatives align with global trends in digitizing public services to improve transparency, accountability, and user satisfaction. This study proves that effectiveness, efficiency, and service quality are interrelated factors shaping user satisfaction with motor vehicle testing services. Improvements in one aspect alone are not enough; instead, a holistic approach that combines operational effectiveness, resource efficiency, and high-quality service delivery is needed to meet users' ever-increasing expectations.

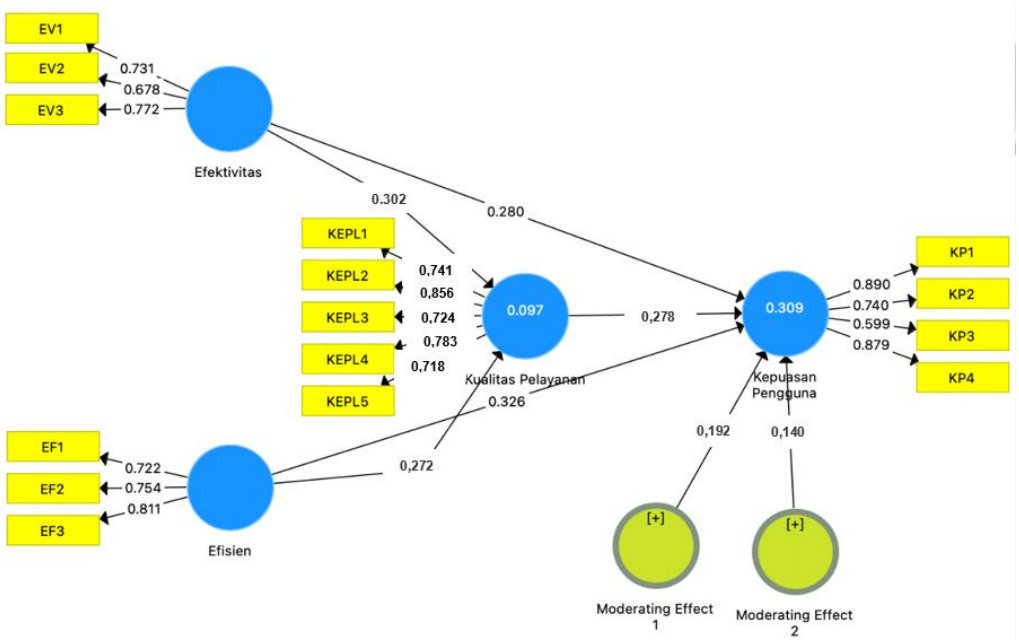

Figure 2: Mediation Effect

Based on testing the direct effect hypothesis, the first hypothesis is that effectiveness significantly impacts service user satisfaction, which can be confirmed. The direct impact coefficient is 0.280, and the P-value is 0.004, both below the significance threshold of 0.05. These results indicate a strong and positive correlation between effectiveness and service user satisfaction.

Based on the test results of the direct effect hypothesis, the second hypothesis can be concluded that efficiency significantly affects service user satisfaction. This is evidenced by a direct effect coefficient value of 0.326 and a P-value of 0.000, below the significance threshold of 0.05. These results indicate a significant positive relationship between efficiency and service user satisfaction. Third hypothesis, the direct effect hypothesis testing results show that effectiveness significantly influences service quality. The P-value of 0.002 and the direct effect coefficient of 0.302, both below the significance level of 0.05, support this. These results indicate a strong and positive correlation between effectiveness and service quality.

Fourth hypothesis, the direct effect hypothesis testing shows that efficiency significantly affects service quality. This is supported by a direct effect coefficient value of 0.272 and a P-value of 0.019, below the significance threshold of 0.05. Thus, there is a positive and significant effect between Efficiency and Service Quality. Fifth hypothesis, the direct effect hypothesis test results show that service quality significantly influences customer satisfaction. The direct impact coefficient of 0.278 and the p-value of 0.025, both below the significance level of 0.05, indicate this. These results show that user satisfaction and service quality correlate strongly and positively.

Sixth hypothesis, the results of the indirect effect hypothesis testing show that Service Quality is a mediator in the relationship between Effectiveness and Service User Satisfaction. The indirect effect coefficient is 0.214, and the P-value is 0.014, both below the significance level of 0.05. Therefore, a significant relationship exists between effectiveness and service user satisfaction mediated by service quality. Seventh hypothesis, the results of testing the indirect effect hypothesis show that service quality is a mediating variable in the relationship between efficiency and user satisfaction. This is indicated by an indirect effect coefficient of 0.192 and a P-value of 0.025, below the significance threshold of 0.05. Thus, the effect of efficiency on user satisfaction through the mediation of service quality is positive and significant.

CONCLUSION

The findings of this study provide a comprehensive understanding of how effectiveness, efficiency, and service quality affect user satisfaction in periodic motor vehicle testing at the Cilincing UPPKB. The results show that effectiveness significantly impacts satisfaction, as users highly value testing procedures' accuracy and inspection results' reliability. When vehicles are declared roadworthy based on proper evaluation, users develop trust in the testing system and consider the service to be credible. Similarly, efficiency plays an important role in shaping user perceptions. The testing unit's ability to optimize time, reduce waiting times, and manage operating costs contributes positively to satisfaction levels, as users appreciate services that minimize disruption to their daily activities and business operations.

Service quality emerged as the most dominant factor influencing satisfaction among the variables analyzed. Specifically, responsiveness and assurance were the strongest dimensions, indicating that users are highly concerned with how quickly and effectively staff assist and how competent they are in providing reliable information. Tangible aspects such as physical facilities, parking availability, and the empathy shown by staff also contribute to user perceptions. However, their influence is relatively weaker due to existing infrastructure and resource limitations. The analysis shows that service quality mediates the relationship between effectiveness, efficiency, and user satisfaction. These findings highlight the reciprocal dependence between operational performance and service delivery quality, suggesting that improvements in effectiveness and efficiency will only result in higher satisfaction if supported by high-quality service practices.

Theoretically, this study contributes to the literature by integrating effectiveness and efficiency measures with the SERVQUAL model in the context of public transportation services. Empirical evidence shows that technical accuracy and resource optimization are insufficient to guarantee satisfaction unless accompanied by high service quality standards. This expands the existing discussion in the field of public service management, particularly related to transportation and vehicle testing, by showing how responsiveness and assurance function as key mediating mechanisms.

The research results indicate several areas that need improvement at the Cilincing UPPKB. Infrastructure remains a major challenge, as the limited capacity of parking areas, inspection lanes, and waiting rooms causes congestion and long queues. Expanding physical facilities will facilitate testing and improve perceptions of tangible aspects. In addition, human resource development is essential. Training programs that improve staff responsiveness, communication skills, and professionalism will strengthen trust and empathy, enhancing the user experience.

Furthermore, digital transformation offers promising solutions. Implementing online scheduling, electronic payments, and digital inspection records will reduce administrative barriers, increase transparency, and improve efficiency. Policy innovations, such as introducing mobile testing units (mobile testing), can also reduce the burden on centralized facilities and make services more accessible to users.

However, this study has several limitations. It is limited to one testing unit in Jakarta with a sample size of 95 respondents, which may limit the generalization of findings to other regions or contexts. Future studies can address these limitations by expanding the sample size, conducting comparative analyses across multiple testing centers, or using a longitudinal design to capture changes over time. Qualitative research could also be used to gain deeper insights into user expectations, perceptions, and experiences that quantitative approaches may not fully capture. In conclusion, this study emphasizes the importance of a holistic approach to improving periodic motor vehicle testing services. Effectiveness and efficiency remain vital, but without strong service quality, particularly in responsiveness and assurance, users may not fully recognize improvements in operational performance. UPPKB Cilincing and similar

institutions can increase user satisfaction, strengthen public trust, and contribute to a safer and more sustainable transportation system by addressing operational and service dimensions.

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