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Strategies for Strengthening Management Information Systems to Improve Customer Satisfaction in Motor Vehicle Type Testing Services at BPLJSKB Bekasi

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Abstract: Digital transformation in vehicle type approval services at Balai Pengujian Laik Jalan dan Sertifikasi Kendaraan Bermotor (BPLJSKB) Bekasi is reflected in the use of Vehicle Type Approval (VTA) Online. This study aims to analyze management information system strengthening strategies to improve customer satisfaction in motor vehicle type testing services. A qualitative descriptive approach was applied through document analysis and literature review using the DeLone and McLean Information System Success Model and SERVQUAL. The results indicate that VTA Online supports broader access, faster administrative processes, clearer status monitoring, and better service documentation. However, service performance has not been fully optimized because manual and digital procedures still operate in parallel, laboratory data are not fully integrated, information technology infrastructure remains uneven, and the digital competence of service personnel needs further improvement. The proposed strategies include laboratory data integration, platform and procedure standardization, digital competency development, infrastructure modernization, customer-oriented helpdesk services, and periodic monitoring and evaluation. These strategies are expected to strengthen service reliability, transparency, data accuracy, and sustainable customer satisfaction.

Keywords: Customer Satisfaction, Management Information System, Public Service Quality, Vehicle Type Approval Online, Vehicle Type Testing.

INTRODUCTION

Balai Pengujian Laik Jalan dan Sertifikasi Kendaraan Bermotor (BPLJSKB) Bekasi plays an important role in the implementation of motor vehicle type testing and roadworthiness certification. Service digitalization through Vehicle Type Approval (VTA) Online is part of the online motor vehicle type testing service policy, which is directed at accelerating the process, improving the measurability of service time, and strengthening administrative transparency (Kementerian Perhubungan Republik Indonesia, 2023). The development of the BPLJSKB

proving ground also indicates that national testing capacity is being strengthened so that technical motor vehicle services can become more independent and competitive (Kementerian Keuangan Republik Indonesia, 2022).

Based on the BPLJSKB service recapitulation for 2023–2025, Full Type Testing and Sample Testing were the most dominant types of services. Full Type Testing increased from 553 services in 2023 to 645 services in 2024 and 674 services in 2025, while Sample Testing increased from 199 services in 2023 to 354 services in 2024 and 375 services in 2025 (BPLJSKB, 2025). This pattern indicates the high demand of industry for testing services that are fast, accurate, and transparently trackable.

Although VTA Online has opened space for service modernization, the document analysis identified several main problems, namely manual and digital processes that still run in parallel, laboratory data that have not been fully integrated, limited human resource competence in information technology, and the absence of uniform information system standards. These conditions may reduce data consistency, extend the time needed to consolidate test results, and weaken the service user experience.

Conceptually, a management information system (MIS) is understood as a system that connects technological resources, people, data, and organizational procedures to support decision-making and process control (Laudon & Laudon, 2017). In the context of public services, MIS quality is related to service speed, information accuracy, ease of access, accountability, and user satisfaction. Studies in the Indonesian public sector also show that MIS, service leadership, and process governance can influence the public satisfaction index (Aji & Abdurachman, 2011; Laia et al., 2022; Septiandini, 2020).

This study uses the DeLone and McLean Information System Success Model and SERVQUAL as the analytical basis. The DeLone and McLean model emphasizes the relationship among system quality, information quality, service quality, use, user satisfaction, and net benefits (DeLone & McLean, 2003; Petter et al., 2008; Wixom & Todd, 2005). Meanwhile, SERVQUAL assesses service quality through the dimensions of tangibles, reliability, responsiveness, assurance, and empathy (Parasuraman et al., 1985). In digital public services, website quality, trust, perceived ease of use, and service maturity are also important factors in e-government adoption (Carter & Bélanger, 2005; Papadomichelaki & Mentzas, 2012; Shareef et al., 2011; Zeithaml et al., 2002).

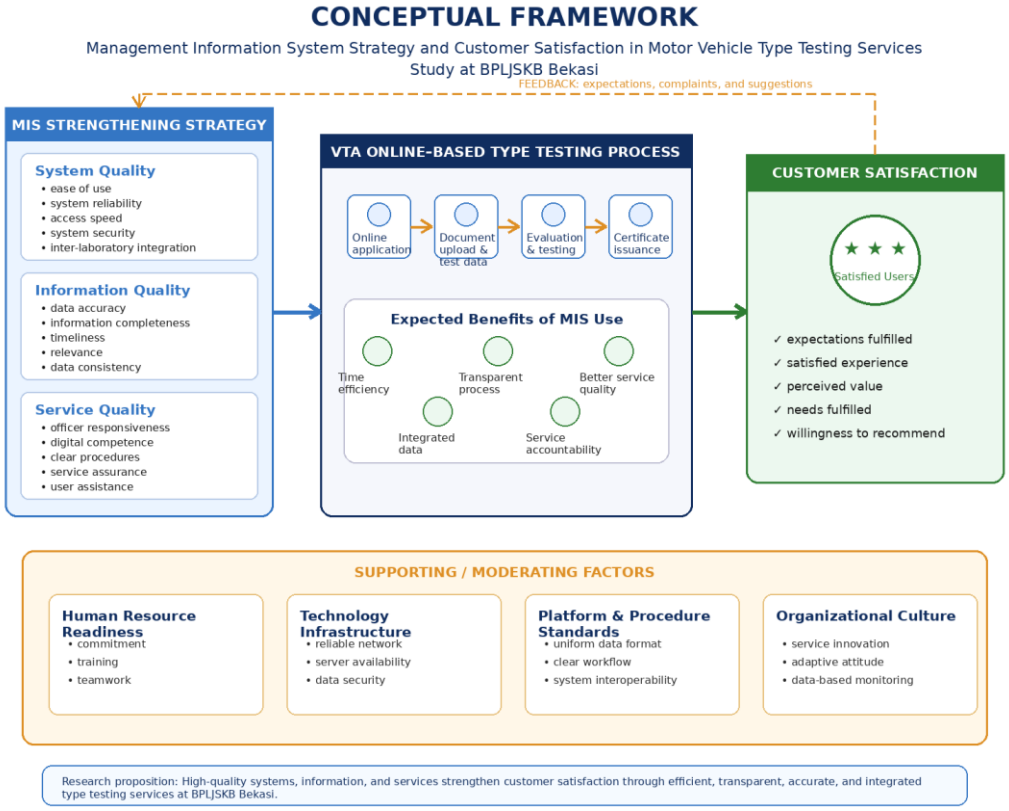
The novelty of this article lies in the use of an integrative approach between the DeLone and McLean model and SERVQUAL to examine MIS strengthening in motor vehicle type testing services, rather than only in general administrative services. This approach is consistent with studies on public sector digital transformation, which position technology as a driver of process change, service value, and the way organizations generate public benefits (Mergel et al., 2019; Twizeyimana & Andersson, 2019; Vial, 2019). Therefore, this study aims to analyze the condition of MIS implementation, assess the contribution of VTA Online to service quality and customer satisfaction, and formulate strategies for strengthening MIS at BPLJSKB Bekasi.

METODE

This study employs a qualitative descriptive approach based on literature review and document analysis. The qualitative approach was selected because the purpose of the article is not to test statistical relationships, but to interpret the condition of MIS implementation and develop strengthening strategies based on theory, policy documents, internal data, and relevant literature (Creswell & Creswell, 2023).

The data sources include the initial research manuscript, the BPLJSKB service recapitulation data for 2023–2025, VTA Online policy documents, and scientific articles on MIS, information system success, SERVQUAL, e-government, and digital transformation in public services. Document analysis was conducted to examine the content, context, and relationship of the data to the service issues being studied (Bowen, 2009).

The analytical stages consisted of data reduction, data display, and conclusion drawing. Data reduction was carried out by selecting information relevant to system quality, information quality, service quality, customer satisfaction, and MIS strengthening strategies. Data display was presented in narrative form and thematic tables. Conclusions were drawn by linking the document findings with the DeLone and McLean framework, SERVQUAL, and digital transformation literature (Miles et al., 2014).



Source: Processed by the authors based on the DeLone and McLean Model, SERVQUAL, and data from BPLJSKB (2025).

Figure 1. Conceptual Framework for MIS Strengthening and Customer Satisfaction

RESULTS AND DISCUSSION

Condition of Type Testing Services and the Need for MIS Strengthening

The service data show that the workload of motor vehicle type testing at BPLJSKB Bekasi is dynamic and tends to follow the development of the automotive industry's needs. The increase in the number of Full Type Testing and Sample Testing services during 2023–2025 indicates that BPLJSKB's core services are increasingly needed by applicants, both for new vehicle certification, component testing, and compliance with roadworthiness technical requirements. This condition shows that the service process can no longer rely solely on ordinary administrative systems, but requires a management information system capable of connecting all service stages in an integrated manner, from application submission, document verification, test scheduling, and laboratory result recording to certificate issuance. Thus, MIS functions not only as an administrative recording tool, but also as an instrument for process control, technical data integration, service status monitoring, and service accountability strengthening.

In this context, VTA Online can be understood as the main gateway to the digitalization of motor vehicle type testing services. This system enables applicants to access services, upload documents, monitor process developments, and obtain information more transparently. However, the effectiveness of VTA Online depends heavily on the system's ability to connect with technical units within BPLJSKB, especially testing laboratories that produce the primary data in the certification process. If inter-laboratory data are still managed separately, the

consolidation of test results may still experience delays, format differences, duplicate inputs, and risks of administrative errors. Therefore, inter-laboratory integration is an important prerequisite so that test result data can be processed quickly, accurately, consistently, and traceably. In addition, the increasing service workload also requires a system that can maintain service quality on an ongoing basis. The higher the volume of applications, the greater the need for efficient workflows, uniform data standards, and stronger inter-unit coordination. An integrated information system can help reduce dependence on manual processes, accelerate information delivery to applicants, and strengthen customer trust in BPLJSKB services. Accordingly, MIS strengthening through VTA Online optimization, laboratory database integration, and service procedure standardization is a strategic step toward improving service speed, process transparency, testing-result accuracy, and sustainable customer satisfaction.

Table 1. Summary of the Dynamics of BPLJSKB Main Services in 2023–2025

Service type	2023	2024	2025	Service meaning
Full Type Testing	553	645	674	Core services increased; a stable digital workflow is required.
Sample Testing	199	354	375	Data consolidation needs to be faster.
Total services	-	1.720	1.428	Peak in 2024; service types shifted in 2025.
Prototype	-	-	161	The need for testing vehicle innovation has begun to emerge.

Source: BPLJSKB (2025), processed by the authors

These findings indicate that customer satisfaction cannot be built merely through the availability of a digital application. In technical services involving many laboratories, customer satisfaction is more strongly determined by the system's ability to provide accurate data, measurable service time, certainty of application status, document security, and the speed of officers in resolving digital problems experienced by users. This means that VTA Online needs to be supported by system integration, clear procedural standards, and human resource readiness so that digital services truly provide benefits to customers. If an application is available but data are not synchronized, officer responses are slow, or service status information is not updated consistently, customer perceptions of service quality may still decline.

This condition is consistent with findings in e-government studies, which emphasize that the acceptance of digital services is influenced not only by technological aspects, but also by user trust, perceived usefulness, ease of use, and organizational readiness to manage digital change (Al-Hujran et al., 2015; Carter & Bélanger, 2005; van Dijk et al., 2008; Venkatesh et al., 2003). In the context of motor vehicle type testing services, digital systems need to be supported by clear procedures and responsive service officers so that users can experience easier, faster, and more transparent services.

Therefore, increasing customer satisfaction in motor vehicle type testing services should be directed toward strengthening the overall service ecosystem, including system quality, information quality, officer competence, and service consistency. These aspects are important to ensure that technological innovation is not only functional, but also able to improve user confidence and service experience.

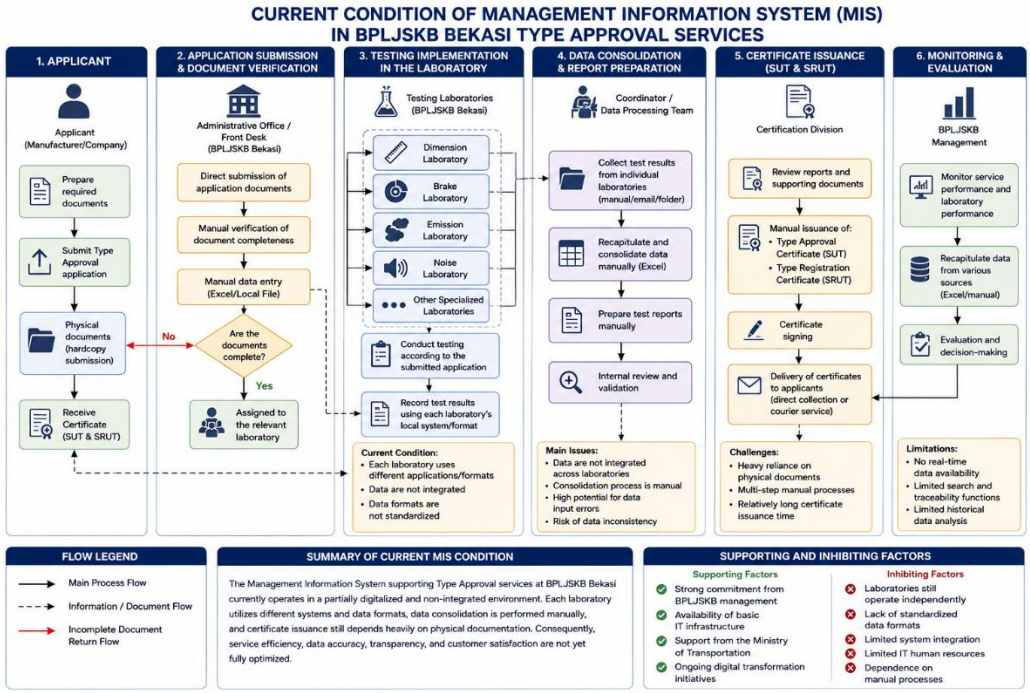


Figure 2. MIS Flowchart in BPLJSKB Type Testing Services

Comparison between Conventional Services and VTA Online

The shift from conventional services to VTA Online reflects a transition from face-to-face interactions, physical documents, and manual verification toward a web-based process. This change is relevant to the principle of digital transformation because technology changes workflows, patterns of customer interaction, and the way organizations generate service value (Mergel et al., 2019; Vial, 2019). However, if manual processes continue to operate alongside digital processes, the organization may face duplicated work and the risk of data inconsistency.

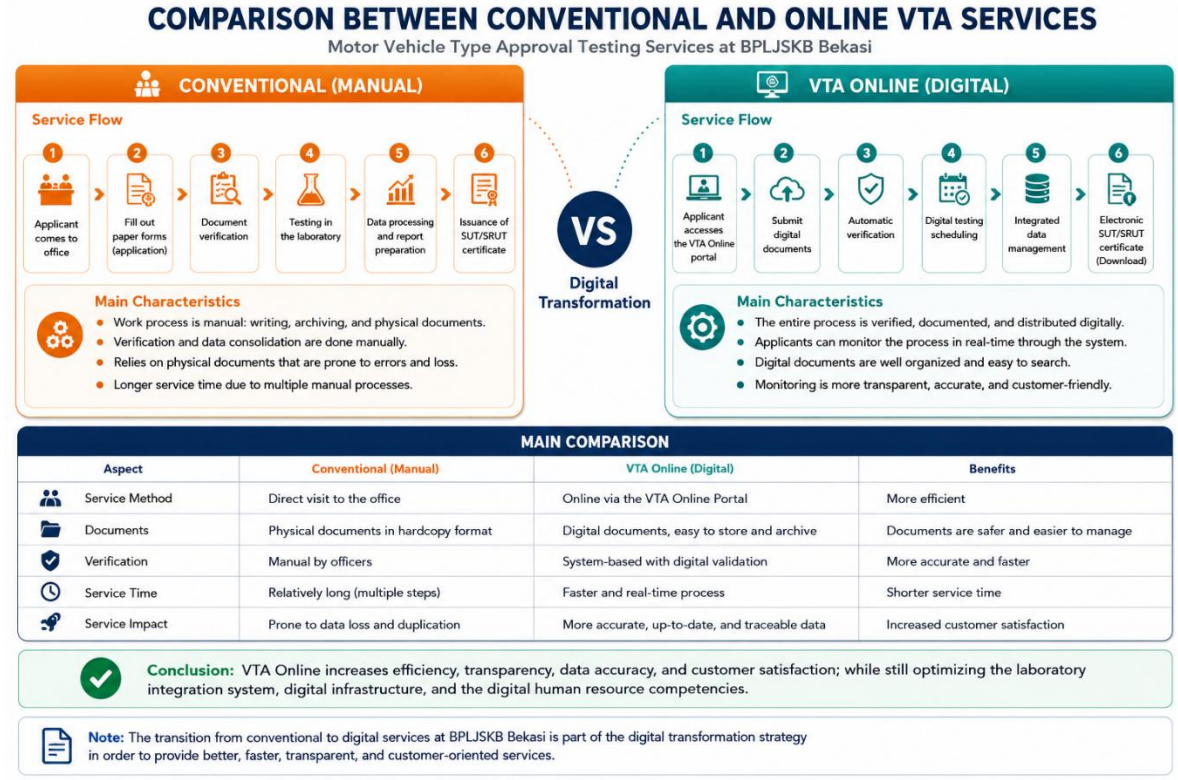


Figure 3. Visualization of Comparison between Conventional Services and VTA Online

Table 2. Comparison between Conventional Services and VTA Online

Aspect	Conventional	VTA Online	Implications for customers
Application	Conducted directly through counters and physical files.	Conducted through an account and digital document uploads.	Access is more flexible and reduces the need to come to the counter.
Verification	Depends on manual checking.	Checked through the system with a digital trail.	The process is more transparent and easier to trace.
Service status	Applicants must contact officers.	Applicants can monitor progress online.	Information certainty improves.
Documentation	Documents are prone to being misplaced or stored in different formats.	Documents are stored in a digital database.	Security and service history are better maintained.
Main constraints	Queues and lengthy manual processes.	Laboratory integration and HR readiness remain uneven.	Optimal satisfaction requires systemic improvement.

Source: Processed by the authors based on research data (2025)

Table 2 shows that VTA Online has the potential to strengthen the customer journey from application submission, verification, and testing to certificate issuance. Nevertheless, the benefits of digitalization can be fully realized only when the laboratory, administrative, and certification systems operate within a single data flow. Without such integration, digital services merely transfer part of the activity to an online platform without completely removing manual barriers.

Analysis of System and Information Quality Based on DeLone and McLean

In the DeLone and McLean model, MIS success is assessed through system quality, information quality, service quality, use, user satisfaction, and net benefits. In the case of BPLJSKB, system quality relates to VTA Online stability, ease of navigation, security, and connectivity with laboratories. Information quality relates to the accuracy of service status, completeness of technical data, timeliness of updates, and consistency of information across units (DeLone & McLean, 2003; Petter et al., 2008).

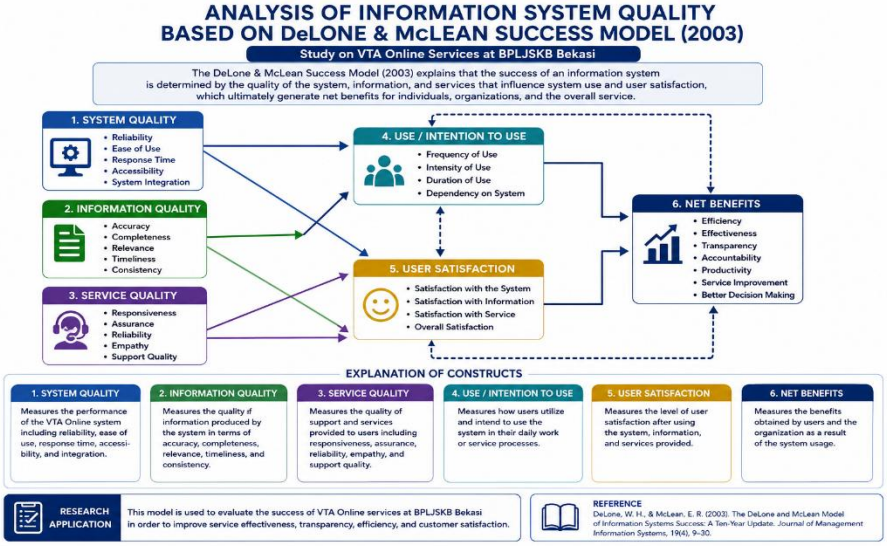


Figure 4. Visualization of System and Information Quality Analysis Based on the DeLone and McLean Model

Table 3. MIS Analysis Based on the DeLone and McLean Model

Dimension	Observed condition	Impact	Improvement direction
System quality	VTA Online facilitates registration, but it is not yet fully connected to all laboratory databases.	Efficiency improves, but subsequent processes may still be delayed by manual work.	Application and inter-laboratory database integration.
Information quality	Service status is easier to monitor, but technical data are not always consolidated automatically.	Transparency increases, but the risk of information delays remains.	Standardized data formats, automated validation, and real-time updates.
Service quality	Officers assist with digital processes, but technological competence remains uneven.	Service responses are not always consistent.	Digital training, helpdesk services, and SOPs for responding to problems.
Net benefits	Digitalization reduces physical documents and accelerates part of the administration.	Customers gain an easier and more measurable experience.	Periodic evaluation based on satisfaction and service performance indicators.

Source: Processed by the authors based on research data (2025)

This analysis confirms that system quality and information quality cannot be separated. A system that is easy to use but does not produce accurate data will still reduce customer trust. Conversely, complete information will not have a significant effect if the system is slow, unstable, or disconnected from operational processes. This finding is consistent with the study by Wulansari et al. (2024), which shows that the DeLone and McLean model is relevant for assessing the success of digital services and user satisfaction.

Service Quality Analysis Based on SERVQUAL

SERVQUAL is used to assess the gap between user expectations and perceptions of the service quality received. In the context of VTA Online services, this approach is important because digital service quality is not assessed only from the availability of an application, but also from the extent to which the system can provide an easy, fast, secure, and trustworthy service experience for applicants. The tangibles dimension refers not only to physical facilities such as service rooms, computers, internet networks, and other supporting facilities, but also to the quality of the system interface, ease of navigation, readability of information, and readiness of information technology infrastructure that supports VTA Online operations. If the system interface is not sufficiently informative, access is slow, or supporting devices are inadequate, user perceptions of digital service quality may decline even though the system is already available.The reliability dimension refers to the ability of services to operate accurately, consistently, and in accordance with procedures. In motor vehicle type testing services, reliability is reflected in the accuracy of document verification, conformity of test schedules, accuracy of laboratory test result recording, and certainty of certification document issuance. Meanwhile, the responsiveness dimension relates to the speed and readiness of officers in responding to questions, complaints, and technical problems experienced by applicants when using VTA Online. The faster officers provide solutions, the greater the possibility that customers will feel assisted and satisfied with the service.

Furthermore, the assurance dimension relates to officer competence, data security, procedural clarity, and the ability of service providers to give users a sense of safety and trust. This dimension is important because type testing services involve technical documents and vehicle data that must be managed accurately and securely. The empathy dimension emphasizes service providers' attention to applicants' needs, particularly through assistance, system-use guidance, easy-to-understand communication, and support for users who are not yet familiar with digital services. Therefore, the application of SERVQUAL to VTA Online services can help identify service aspects that are already functioning well while also revealing areas that still need strengthening, especially infrastructure readiness, procedural reliability, officer

responsiveness, security assurance, and assistance for applicants (Parasuraman et al., 1985; Zeithaml et al., 2002).

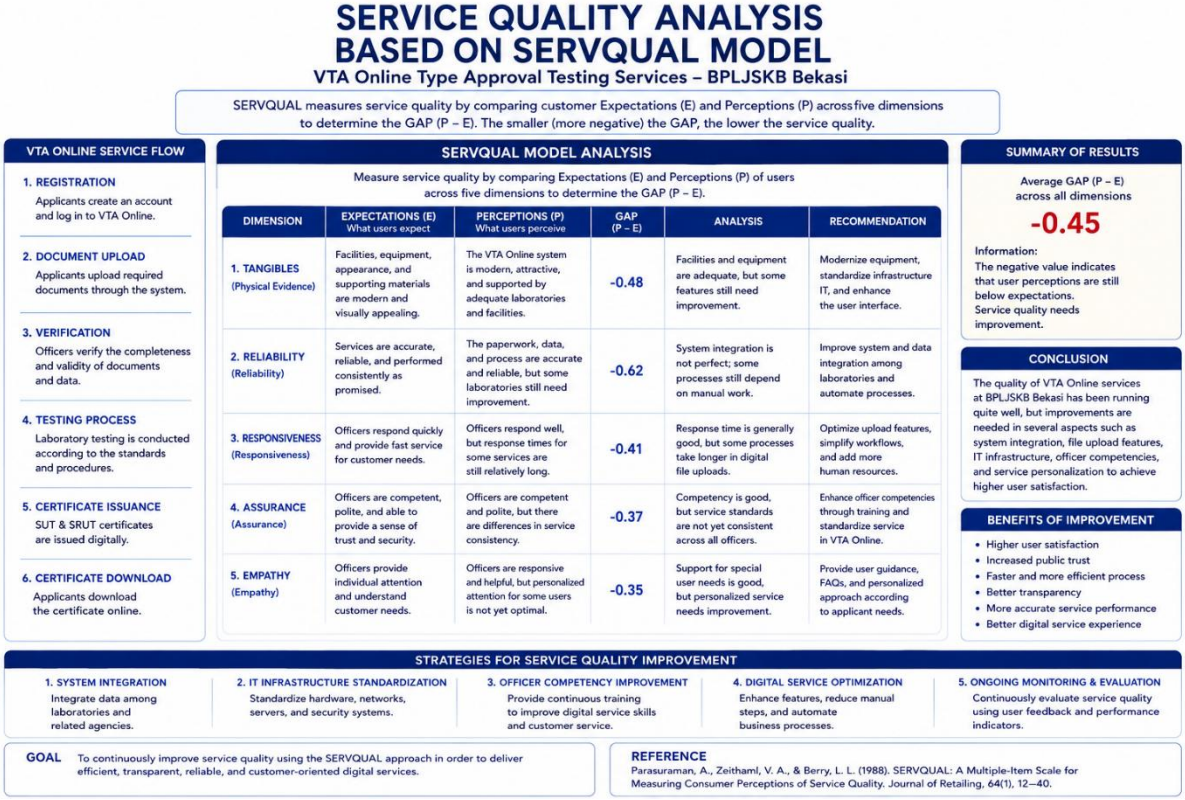


Figure 5. Visualization of Service Quality Analysis Based on SERVQUAL at BPLJSKB

Table 4. Analysis of VTA Online Service Quality Based on SERVQUAL

Dimension	Main findings	Risks to satisfaction	Priority improvements
Tangibles	The system is available, but device and network support remains uneven.	Users perceive that digital services are not always stable.	Modernization of devices, networks, and the interface display.
Reliability	Test results require data consolidation from many laboratories.	Delays and data inconsistencies may arise.	Data integration and automated validation of test results.
Responsiveness	Officers assist users, but workload and technical issues affect response speed.	Digital complaints are not always resolved quickly.	Online helpdesk and response-time standards.
Assurance	Technical service competence has been established, but digital competence needs strengthening.	User trust may decline when procedures are unclear.	Training, data security, and service guidance.
Empathy	Online access helps applicants, but new users still need assistance.	Some customers have difficulty following the digital workflow.	Interactive guides, consultation channels, and proactive communication.

Source: Processed by the authors based on research data (2025)

SERVQUAL is used to assess the gap between customer expectations and their perceived experience after using the service. In the context of VTA Online, this approach is important because customer satisfaction is influenced not only by the presence of a digital system, but also by the quality of the overall service experience. The tangibles dimension refers not only to physical facilities such as service rooms, computers, and internet networks, but also to the system interface, ease of navigation, availability of supporting devices, and readiness of information technology infrastructure. If the system is difficult to access, the interface is not

sufficiently informative, or the network is unstable, users may perceive that the digital service has not fully facilitated the service process.The reliability dimension refers to the ability of services to provide accurate, consistent, and procedural processes, especially in document verification, test scheduling, laboratory result recording, and certificate issuance. In motor vehicle type testing services, reliability is very important because data errors or delays in test results can directly affect the certainty of service for applicants. Furthermore, the responsiveness dimension relates to the speed and willingness of officers to provide assistance, answer questions, and resolve technical problems that arise during the use of VTA Online.

The assurance dimension relates to officer competence, data security, procedural clarity, and the organization's ability to build user trust in the service. Meanwhile, the empathy dimension emphasizes the importance of attention and assistance for applicants, especially users who are not yet accustomed to digital-based services. Thus, applying SERVQUAL to VTA Online helps identify service aspects that already work well while also finding areas that still need improvement, particularly infrastructure readiness, procedural consistency, officer responsiveness, service security, and customer support (Parasuraman et al., 1985; Zeithaml et al., 2002).

Strategies for Strengthening Management Information Systems at BPLJSKB Bekasi

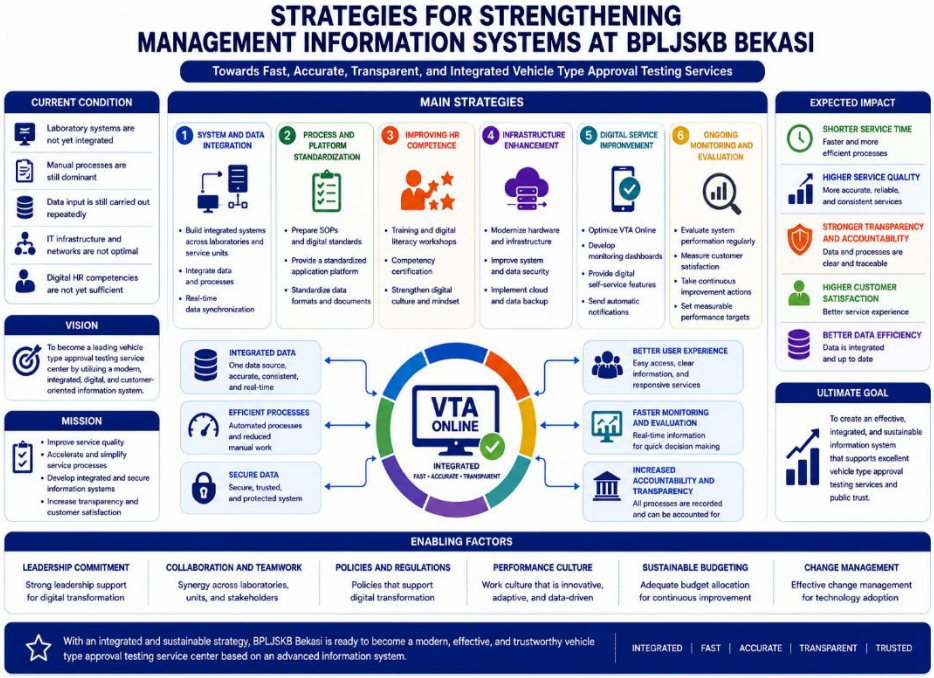


Figure 6. Visualization of Management Information System Strengthening Strategy at BPLJSKB

MIS strengthening strategies need to be directed toward comprehensive change, not merely application improvement. Strengthening should include data integration, process standardization, human resource competency development, infrastructure modernization, customer experience management, and monitoring and evaluation. This approach is important because the success of digital services is influenced by the alignment among technology, organizational processes, users, and service benefits (DeLone & McLean, 2003; Laudon & Laudon, 2017).

Table 5. MIS Strengthening Strategies to Improve Customer Satisfaction

Strategy	Implementation focus	Expected output	Satisfaction impact
System integration	Unifying administrative, laboratory, certification, and monitoring data.	One accurate and real-time source of service data.	Applicants receive more certain information.

Strategy	Implementation focus	Expected output	Satisfaction impact
Platform standardization	Standardizing data formats, input SOPs, access rights, and validation workflows.	Processes are more consistent across units.	The risk of administrative errors decreases.
Digital HR strengthening	Training on VTA Online, data security, service analytics, and disruption handling.	Officers become more independent and responsive.	Customer trust increases.
Infrastructure modernization	Improving networks, devices, servers, backups, and system security.	The system becomes more stable and secure.	Waiting time and service disruptions decrease.
Customer experience	Helpdesk, interactive guidance, automatic notifications, and complaint channels.	Users receive support at every service stage.	The service experience becomes more positive.
Monitoring and evaluation	System audits, satisfaction evaluation, and periodic service performance data analysis.	Data-based and continuous improvement.	Service quality can be maintained consistently.

Source: Processed by the authors based on research data (2025).

These strategies need to be implemented gradually, with priority placed on data integration and procedure standardization, because both aspects form the foundation for information quality and service reliability. Once integration is established, human resource strengthening, infrastructure improvement, and customer experience management can accelerate the formation of type testing services that are transparent, accurate, and oriented toward customer satisfaction. Thus, MIS can function as an instrument of public service governance, not merely as a digital administrative system.

CONCLUSION

The implementation of the Management Information System through VTA Online at BPLJSKB Bekasi has contributed to improving service access, process transparency, status monitoring, and digital document management. However, customer satisfaction cannot be optimized if manual processes continue to run in parallel, laboratory data are not integrated, technological infrastructure remains uneven, and officers' digital competence is not systematically strengthened. Based on the DeLone and McLean analysis, system quality, information quality, and service quality are the main prerequisites for system use, customer satisfaction, and organizational net benefits. Based on SERVQUAL, improvements need to focus on the reliability, responsiveness, assurance, and empathy of digital services. Therefore, the most relevant strategies are to build inter-laboratory data integration, standardize platforms and procedures, improve digital human resource competence, modernize infrastructure, develop helpdesk services and interactive guidance, and conduct periodic monitoring and evaluation. Future research is recommended to use customer satisfaction surveys and in-depth interviews with applicants and officers so that MIS strengthening strategies can be empirically tested.

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