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The Impact of Changes in the Electronic Traffic Law Enforcement Organizational Structure on the Increasingly Complex Responsiveness of Traffic

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Abstract

This study examines public service innovation through the implementation of Electronic Traffic Law Enforcement (ETLE) in Makassar City, with a particular focus on organizational and structural transformation within the police institution. The research aims to analyze how ETLE, as a technology-based innovation, reshapes service delivery, institutional arrangements, and governance mechanisms in traffic law enforcement. Using a qualitative research approach, data were collected through in-depth interviews, direct observation, and document analysis involving key stakeholders within the Makassar City Police Traffic Unit and the South Sulawesi Regional Police Traffic Directorate. The analysis is framed using the Types of Local Public Innovation framework proposed by Queyroi et al. (2022), complemented by institutional and management innovation perspectives. The findings indicate that ETLE implementation has driven significant structural innovation, characterized by the addition of functional roles without expanding personnel, the establishment of a dedicated back office as the core of digital verification, and a clearer division of labor between front office and back-office units. These changes have enhanced transparency, accountability, and operational efficiency by shifting law enforcement practices from discretionary, face-to-face interactions to standardized, evidence-based digital processes. However, the study also identifies persistent challenges, including ineffective public notification mechanisms, limited cross-agency integration, and unresolved incentive governance for personnel. Overall, the research concludes that while ETLE demonstrates strong potential as a public service innovation, its long-term sustainability depends on strengthening institutional integration, incentive structures, and governance alignment alongside technological advancement.

Introduction

Innovation refers to an idea, practice, or object perceived as new by an individual or other unit of adoption. In 1999, Rogers (Salah et al., 2021) outlined five characteristics that determine the level of innovation adoption: relative advantage, compatibility, complexity, trialability, and observability to individuals within a social system. Innovation in services plays a vital role in meeting the needs of communities demanding faster and more efficient services (Anttonen et al., 2013). Through innovation, service processes can be more effective and responsive to community demands.

However, to support innovation, a technology platform is needed, as explained (Shao et al., 2025; Gawer & Cusumano, 2014; Scholten & Scholten, 2012).), that innovation and technology must be supported by a platform, and innovation service platforms play a crucial

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role in pooling innovative capital, innovative resources, and innovative talent. Innovation collaboration has spread worldwide, along with advances in science and technology. Traditional innovation models are no longer sufficient to meet the development and innovation needs of small and micro enterprises (Faherty & Stephens, 2016; Mulibana & Rena, 2023; Halme & Korpela, 2014; Radicic et al., 2016).

The passage of time has led to the view that service innovation is seen as a catalyst for growth in activities in the tertiary sector, as well as in the primary and secondary sectors. Service innovation has become popular with the service transition strategy, described as "servicization," "servitization," "servicizing," or the "new service economy," and which, for manufacturing companies, no longer simply offers the sale of goods, but an integrated offering of products and services to increase their use value.

Service innovation also allows service companies to revitalize their competitive position (Merlin-Brogniart, 2021), further explained that In addition, service innovation can take various forms including: social innovation (related to positive social change), organizational innovation (which includes changes in organizational structures and processes), methodological innovation (involving the development of new methods), marketing innovation (focusing on new marketing strategies), innovation in external relations (involving changes in interactions with external parties), intangible process innovation (which includes improvements in intangible processes), and intangible product innovation (involving the development of intangible products).

Sometimes, other terms are used to refer to service innovation, such as non-technological innovation or invisible innovation (Merlin-Brogniart, 2021; Aboal & Garda, 2016). In Indonesia, four different studies have been conducted on public service innovation, as outlined in (Muluk & Pratama, 2021), including those by Pratama (2020). These studies provide several findings regarding innovation in Indonesian public services. First, the primary focus is on internal business processes rather than inter-organizational collaboration and interaction. Second, there is a lack of interest in professional development of human resources, which are considered drivers of public service innovation.

Third, leadership (charisma, commitment, and diverse experiences) and society (norms and values, civil society organizations, and history) help shape innovation in Indonesian governance. Fourth, successful public service innovation needs to be driven by a development process. Supporting factors include the political and legal framework, as well as technological readiness. Therefore, several challenges must be examined to understand the gap between developed and developing countries.

According to Article 23 paragraph (1) of Law Number 25 of 2009 concerning Public Services, a national-scale information system is required to support the provision of public services. Article 23 paragraph (4) of the same law emphasizes that service providers are required to manage an information system that covers various aspects such as provider profiles, implementer profiles, service standards, service information, complaint management, and performance evaluation. In the context of services that require speed, accuracy, and efficiency, technology-based innovation is the right solution.

The government must be responsive to changing community needs by presenting innovations in efficient and timely public services, which can be achieved through the use of appropriate technology in governance. The Indonesian government places great emphasis on innovation in public services. This is reflected in various policies and programs launched to improve the

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efficiency, openness, and quality of public services for the community. This serious attention to service innovation is outlined in various regulations, such as:

Regulation of the Minister of Administrative and Bureaucratic Reform of the Republic of Indonesia Number 89 of 2020 concerning the Implementation of the National Public Service Innovation Network (JIPP) is a regulation governing the coordination of the National JIPP carried out by the Ministry of Administrative and Bureaucratic Reform. The purpose of the National JIPP is to enhance collaboration and cooperation between institutions in developing public service innovation (PermenPan-RB/89, 2020).

Furthermore, Regulation of the Minister of Administrative and Bureaucratic Reform Number 7 of 2021 regulates public service innovation competitions at various agencies, including ministries and agencies, regional governments, state-owned enterprises, and regionally-owned enterprises. This regulation includes the requirements, criteria, themes, and categories related to the public service innovation competition (PermenPan-RB/89, 2020). In the context of ETLE Innovation with analysis of service innovation, organizational-structural, organizational-practical, technological, and strategic innovation and governance are interrelated to improve the effectiveness of ETLE Innovation enforcement in Makassar City.

The development of new services or improvements to existing services (Service Innovation) can be strengthened by new structures and new organizational modes (Organization-Structural) such as efficient grouping and organized project modes. The implementation of new managerial techniques (Organization-Practical) such as dashboards and cost accounting can be supported by the use of new technologies (Technology) such as digitalization to improve operational efficiency. In addition, the development of partner-based relationships and changes in governance (Strategic and Governance) can strengthen local public policy and the economic model of traffic law enforcement. With good coordination between these various aspects of innovation, traffic law enforcement can be improved comprehensively.

Methods

This research uses a qualitative approach to explore, describe, and analyze in-depth public service innovations in Electronic Traffic Law Enforcement (ETLE) in Makassar City. A qualitative approach was chosen because it allows researchers to gain a comprehensive, contextual understanding of the dynamics, processes, and impacts of ETLE implementation, particularly through exploring the perceptions, experiences, and perspectives of involved stakeholders. This method is considered appropriate for studying the digitalization of public services because it captures the complexity of organizational change, law enforcement practices, and the interaction between technology and governance within the context of the Electronic-Based Government System (SPBE). The research focuses on ETLE public service innovations in Makassar City using the Types of Local Public Innovation framework (Agarwal & Selen, 2011), which encompasses five main dimensions: service innovation, structural innovation, practical innovation, technological innovation, and strategic and governance innovation. The analysis aims to assess how ETLE impacts the quality of traffic law enforcement services, changes in institutional structure and capacity, the efficiency and transparency of operational practices, the reliability of technological systems, and the sustainability of policies within the governance framework. This research was located at the Makassar City Police Traffic Unit and the South Sulawesi Regional Police Traffic Directorate, which were chosen because of their role as key institutions in the formulation and implementation of ETLE policies at the regional level.

Data Collection Techniques

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The data collection technique in this study was conducted using a qualitative approach that placed the researcher as the primary instrument, relying on three main techniques: interviews, observation, and documentation. In-depth interviews were conducted with informants selected through relevant sampling procedures to obtain comprehensive information regarding the implementation of the Electronic Traffic Law Enforcement (ETLE) innovation. A structured interview protocol was used to assist in data recording, organizing the interview flow, and drawing systematic conclusions (Creswell et al., 2007). Direct observations were conducted using an observation protocol that included descriptive and reflective notes to capture the field context, activities, interactions, and dynamics of ETLE implementation. Furthermore, documentation techniques were used to supplement primary data through the review of written and archival documents, such as laws and regulations, institutional reports, scientific articles, and online documents relevant to the ETLE innovation in Makassar City, thus enabling data triangulation to increase the validity of the research findings.

Data Analysis Techniques

The data analysis technique in this study was conducted qualitatively and took place simultaneously with the data collection process and writing up the findings, as stated by Creswell et al. (2007). The analysis is presented in descriptive narrative form through a process of simplifying, organizing, and interpreting the data systematically. This study uses a spiral data analysis model that includes the stages of collecting primary and secondary data, reading and recording data as an initial reflection, classifying and interpreting data based on the research context and categories, and presenting and visualizing the findings in the form of matrices, diagrams, and proposition formulations. This model allows researchers to understand the meaning of the data in depth and formulate comprehensive conclusions in accordance with the research objectives.

Result and Discussion

The second focus shifts to the internal organizational realm, analyzing structural innovation changes triggered by the adoption of ETLE technology. The changes examined include organizational restructuring, adjustments in roles and functions between units, and coordination mechanisms between the units involved. This analysis focuses on human resource capacity and institutional adaptation in supporting the operationalization of digital systems.

From a theoretical perspective, the typology of local public innovation (Walker, 2008) provides specific categories for examining organizational-structural changes (e.g., transversality or project modes in coordination) and changes in practices (new managerial techniques, new workflows) triggered by ETLE. These structural changes will also be viewed through the lens of institutional theory (Scott's Institutional Theory). This theory analyzes the challenges of restructuring resulting from bureaucratic tendencies toward old patterns (path dependency) and the need for institutional reconfiguration.

The core of this discussion is to examine the level of system and data integration between institutions, changes in workflow, and the availability of digital competencies among staff as prerequisites for successful structural implementation. Management innovation (Indarti et al., 2025) provides a direct framework for measuring role adjustments, inter-unit functions, and staff digital competency enhancement. Furthermore, dynamic capabilities theory serves as the backbone for analyzing how organizations manage change in an integrated manner, align resources, and strengthen information systems to sustain innovation.

Introducing the information and communication technology that underpins e-ticketing requires structural adjustments that enhance control and coordination, ultimately improving competitive

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performance. An organizational framework that supports and integrates various innovative practices is essential for the successful implementation of e-ticketing innovations. For innovations in police services, such as e-ticketing, to be more efficient, changes to the organizational structure are crucial. These changes facilitate adaptive management, enhance community engagement, and leverage modern technology. In the context of ETLE in Makassar City, the following summarizes the findings.

Table 1. Data Reduction of Organizational/Structural Innovation

Stakeholder	Key Quotations (Data Reduction)	Findings Classification
Police (AT – ETLE Officer, South Sulawesi Regional Police)	• Organizational adjustments emphasize the addition of functional roles rather than increasing personnel numbers. • The organizational structure must accommodate new stages, such as data validation conducted by the back office.	Structural Adjustment: Addition of functional roles (data validation).
Police (MD – Back Office, Makassar City Police)	• The main change is the establishment of a new organizational structure within the back office. • The addition of a back office unit is required to support the operation of the electronic ticketing system.	Structural Change: Establishment of the Back Office as the core of the system.
Police (MD – Traffic Officer)	• The ETLE system is considered ideal because it has two main structures: Front Office and Back Office.\ • This division supports a more structured and effective handling of traffic violations.	Task Division: Front Office (confirmation services) and Back Office (verification/administration).
Police (F – Traffic Personnel)	• Unlike the manual ticketing system, which provides incentives for officers, the ETLE Handheld system does not offer rewards for personnel.	Structural Challenge: Issues related to personnel incentives and motivation.

Source: Data Reduction, 2025

Based on the table above, the findings indicate that the success of ETLE is not solely determined by sophisticated equipment (cameras, verification systems, data integration), but more substantively by institutional reconfiguration accompanied by the implementation of technology. In other words, to transform manual work logic (which relies on direct interaction and field discretion) into a process chain based on reliable, standardized, and accountable digital evidence, digitalization in law enforcement must be accompanied by organizational/structural innovation. The reduced data confirms this shift through three main axes: (a) adding functions without expanding personnel, (b) establishing and strengthening the

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back office as the system's core, and (c) a clear division of labor between the FO and BO departments; along with one unfinished corrective axis: (d) incentive governance.

The statement by the Head of the ETLE Law Enforcement Unit (AT Gakkum) of the South Sulawesi Regional Police that adjustments focus more on improving functions (especially data validation) than increasing the number of personnel demonstrates a capacity efficiency strategy. This represents a form of functional deepening: the organization fulfills existing tasks (such as verifying digital evidence, checking the quality of violations, determining file requirements) without creating numerous new positions. On the one hand, this action aligns with the principles of lean bureaucracy which aim to minimize fiscal burdens and avoid structural bloat. On the other hand, it establishes new requirements regarding competencies and workflows, and each additional function must be accompanied by more detailed standard operating procedures (SOPs), capable work tools (dashboards, case management systems), and realistic workload allocations to prevent bottlenecks at the verification stage.

Conceptually, this is a process of innovation that intersects with structural innovation: the validation function plays a crucial role in visual evidence (upstream) and administrative decisions (downstream). Without designing this function based on clear quality criteria, evidence assessment matrices, and control risks, the potential for disruption or public complaints will persist even if direct contact in the field has been eliminated. Reduced data on the implementation of ETLE in Makassar indicates an organizational transformation that marks structural innovation in the public sector. In the literature on local public innovation, innovation is defined as changes in the division of functions, work processes, and institutional design to support more effective, efficient, and locally tailored public service practices. Structural innovation in this context focuses not only on technology but also on role restructuring, cross-unit coordination, and changes to organizational work mechanisms to ensure optimal technology function. As explained in the following interview:

> *"The organizational structure of the South Sulawesi Regional Police Traffic Directorate (Ditlantas Polda Sulsel), which handles electronic ticketing in Makassar, specifically on Jalan Andi Pangeran Pettarani, has been established. However, with the introduction of the electronic ticketing system, structural adjustments need to be made, focusing more on expanding functional tasks rather than adding personnel. The enforcement process is now more open than with the manual system, where after a violation is recorded, vehicle data must be validated, and back-office services provide information to violators. Although the structure remains the same, each division experiences additional tasks, similar to the addition of new services at a bank that impacts various departments. (Interview with AT - Monday, December 2, 2024)"*

In the case of Makassar's ETLE, findings indicate that the police institution made structural adjustments by adding new functions without a significant increase in personnel. This reflects a strategic capacity expansion within local public innovation, where organizations strengthen capabilities through task redistribution and functional enrichment. This move aligns with the view that public innovation often emerges from incremental internal changes (incremental structural change), rather than through large-scale resource expansion. By adding digital evidence validation and processing functions, institutional function diversification is evident, a key characteristic of structural innovation, which aims to strengthen data accuracy and ensure compliance with electronic law enforcement systems.

The establishment of a back office unit as part of the core structure reflects the concept of structural modularity in organizational innovation, with the aim of designing a dedicated unit to handle digital processes that can no longer be handled by traditional bureaucratic models.

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This step reflects what is known in the literature as organizational layering, the addition of new functional layers to meet the technical and administrative needs of digital systems. The back office unit serves as a key element in ensuring that evidence of violations is objectively verified. Thus, digital innovation is not merely cosmetic but is supported by institutional mechanisms responsible for process reliability.

The principle of dividing the structure into front office and back office aligns with structural differentiation, which in organizational innovation theory is considered essential for reducing task complexity and increasing the efficiency of service flows. The front office manages interactions with the public, while the back office concentrates on administrative and technical processes. This separation represents a form of workflow specialization that allows for improved interaction quality within public services while maintaining the integrity of the violation verification process. Therefore, the ETLE structure demonstrates a combination of technological innovation and institutional innovation—two elements that must coexist in local public innovation so that change is not merely symbolic but also substantive.

However, findings related to the lack of incentives for handheld ETLE officers highlight structural components that do not fully align with the principles of sustainable public innovation. Innovation literature highlights the importance of performance incentives and motivational alignment in ensuring the long-term success of innovation. When innovation requires changes in work patterns and increases in cognitive load without commensurate imbalance, risks can arise, including innovation fatigue, decreased motivation, and internal resistance to digital system consolidation. These results suggest that although structures have undergone changes, mechanisms supporting innovation are still not fully in place.

Thus, the implementation of ETLE not only demonstrates the ability of local governments and the police to adopt technology but also reflects the organization's adaptive capacity in building new institutional structures that support digital law enforcement practices. However, to ensure the sustainability of innovation, strengthening the incentive system, optimizing cross-unit collaboration, and developing performance assessments based on innovation indicators as an integral part of the future ETLE institutional design.

National Police Chief Regulation Number 8 of 2023 concerning the Implementation of Electronic System-Based Traffic Management not only regulates technical operational aspects but also has a direct impact on the organizational structure within the Indonesian National Police Traffic Corps (Korlantas). The essence of this correlation lies in the National Police's efforts to digitally integrate and modernize traffic law enforcement, which ultimately requires adjustments to its organizational framework. Specifically, this regulation accommodates the need to establish a task force for managing electronic ticketing (ETLE). The formation of this task force is a structural response to the complexity and scope of new tasks that arise with the digitalization of the ticketing process. This demonstrates that the Traffic Corps (Korlantas) is no longer relying solely on traditional structures but is instead creating a more dynamic, specialized organizational framework focused on handling electronic systems.

Regulation No. 8/2023 clarifies the relationship between this regulation and organizational structure in specific articles. The duties, responsibilities, and scope of work of the ETLE task force are clearly outlined in these articles. Therefore, Regulation No. 8 of 2023 demonstrates that operational innovations need to be accompanied by adjustments to the organizational structure. With the establishment of the ETLE task force under the Traffic Corps through this regulation, a strategic step is taken to ensure that digital transformation in the traffic sector is supported by a robust, responsive institutional framework capable of withstanding the challenges of law enforcement in the modern era.

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Table 2. Correlation Summary

Provisions of Police Regulation No. 8/2023	Correlation within the Traffic Organizational Structure
Traffic Function	National Traffic Corps (Korlantas Polri), Regional Traffic Directorate (Ditlantas Polda), Traffic Unit at District Police (Satlantas Polres)
Appointment by the Head of Korlantas	Personnel of the National Police Headquarters Traffic Corps (ICT / Operations Division)
Placement in Data Processing Offices	Traffic Management Center (TMC), ETLE Unit, Data and Information Center (Pusdatin)
Software and Data Analysis Competence	Core qualifications for technical personnel in data processing units
Data Analysis Certification	Professional standards issued through Police Training Institutions or Professional Certification Bodies (LSP)

Source: Traffic Directorate, South Sulawesi Regional Police

Furthermore, National Police Chief Regulation Number 2 of 2025 clearly stipulates the organizational structure responsible for overseeing the Electronic Traffic Law Enforcement (ETLE) system. This structure is designed to create a clear, integrated, and hierarchical chain of command. Specific officials are appointed as ETLE operational controllers at each police level. At the Regional Police level, the Head of the Violations Section is tasked with liaising between National Police Headquarters policies and technical implementation in the field, as well as overseeing and controlling ETLE operations within their jurisdiction. At the Resort Police level, the Head of the Law Enforcement Unit is directly responsible for ETLE operations, including overseeing back-office staff who validate the electronic ticketing process. The expanded back-office and front-office structures support the efficiency of the electronic ticketing system in Makassar, making the process faster and more accurate. The following chart illustrates the organizational structure of the South Sulawesi Regional Police Traffic Directorate.

The author emphasizes in the image above that the back office is a crucial component responsible for data accuracy and verification. The back office serves as the backbone, ensuring that all information received and processed maintains a high level of accuracy, supporting informed and fair decision-making. Meanwhile, the front office serves as the frontline, directly interacting with the public. Their task is to receive reports regarding ETLE (Electronic Traffic Law Enforcement) tickets for vehicles blocked by the police. This structure is crucial for building an efficient and integrated system. By dividing duties between the front office and the back office, services become more focused, faster, and reduce errors. The front office emphasizes excellent service to the public, while the back office is responsible for ensuring that all incoming data is carefully processed before further processing. Meanwhile, interviews with the public regarding changes to the organizational structure providing services revealed:

> *"I feel very confused by this process. I never knew my vehicle had ever been ticketed. I also never received any notification, either a ticket or an electronic notification, regarding any violations my vehicle has committed over the past two years. It was only when I was about to renew my tax that I was informed that my vehicle had been caught on camera for seven tickets, as explained by the front office officer." (SP Interview - Thursday, March 6, 2025)*

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Therefore, this structure not only makes work more effective but also fosters public trust in the existing service system. Collaboration between these two parties is crucial to producing a satisfactory service experience for all parties involved. The innovation of electronic traffic law enforcement (ETLE) in Makassar City is not simply a technological shift but reflects a profound institutional transformation. The author concludes that the success of ETLE as a public service innovation is largely determined by the organization's capacity to undertake structural reconfiguration to accommodate the new work logic based on digital evidence. The findings confirm that technology implementation must be supported by organizational/structural innovation that enables the development of a reliable, standardized, and accountable law enforcement system.

Electronic traffic law enforcement (ETLE) in Makassar City has driven significant structural transformation within the police organization. This structural adjustment pattern prioritizes additional functions over personnel expansion, reflected in the establishment of a dedicated back office unit as the core of the system. This unit serves as a safeguard for accuracy through digital evidence verification, while the front office focuses on public service. This specialized division of labor creates an internal checks and balances mechanism, supported by the legal umbrella of Police Regulations No. 8/2023 and 2/2025, which regulate competency standardization and command flow. However, this transformation has not been fully optimized due to gaps between structural design and field implementation. The public continues to experience ineffective notification issues, while aspects of officer incentive management have not been adequately addressed, potentially creating procedural weaknesses in innovation in the long term.

Overall, the implementation of ETLE in Makassar City demonstrates significant capacity for structural innovation within the public sector. The police have successfully reconfigured their institutions through deepening their functions without expanding personnel, establishing a back office as the core of the system, and a more structured division of labor between the front office and back office. However, this transformation remains partial and not yet fully holistic. The main challenge lies in strengthening incentive governance and enhancing cross-agency integration so that the structural innovations that have been built can consistently translate into quality and equitable service experiences for the public.

The findings show that the implementation of Electronic Traffic Law Enforcement in Makassar City is not merely a technological reform, but a structural transformation in traffic law enforcement. ETLE changes the enforcement process from direct officer driver interaction into a digital, evidence based, and administratively verified system. This finding is in line with Queyroi et al. (2022), who argue that public innovation becomes meaningful when it changes organizational structures, work processes, and service performance. In this study, the establishment of a back office, the separation between front office and back office, and the addition of functional roles show that ETLE has created a new institutional arrangement within the police organization.

This structural change reflects what Haug et al. (2024) describe as digitally induced organizational change in the public sector. Although the police did not significantly expand personnel, the institution added new functions, especially digital evidence validation and administrative verification. This means that ETLE creates an incremental structural change, but with a substantial impact on how authority and accountability are practiced. The back office becomes the center of technical verification, while the front office becomes the public service interface. This division supports greater efficiency, but it also requires clear procedures, competent personnel, and reliable coordination.

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The role of the back office is crucial because ETLE depends on data accuracy. Kuhlmann et al. (2023) explain that local digital transformation often fails when digital systems are not supported by adequate administrative structures and citizen service mechanisms. The Makassar case confirms this point. Although the back office strengthens verification, public complaints about delayed or absent notification show that digital accuracy alone is not enough. A digital enforcement system must also ensure that citizens receive timely information, understand the violation process, and have access to complaint mechanisms.

The findings also support Mergel et al. (2024), who emphasize that digital transformation in public organizations does not remove human responsibility, but redistributes it into new administrative and technological roles. In ETLE, officers still make important decisions in validating images, checking vehicle data, and processing violations. Therefore, personnel competence remains central. The absence of clear incentives for ETLE officers is a serious issue because additional digital responsibilities may increase workload without equivalent institutional recognition. If this problem is not addressed, innovation fatigue and weak motivation may affect the sustainability of ETLE.

The Makassar case also reflects the challenges identified by Narendroputro and Rusfian (2023), who found that ETLE in Indonesia is constrained by infrastructure, siloed organizational culture, and uneven public compliance. In this study, the main challenge is not only internal police structure, but also cross agency integration involving the police, Samsat, and Bapenda. ETLE cannot operate effectively if vehicle data, tax administration, violation records, and public notification systems are fragmented. This shows that ETLE should be understood as an inter institutional governance reform, not only as a police based digital innovation.

From a public service perspective, Latupeirissa et al. (2024) argue that digital public services can improve efficiency and transparency, but they may also create confusion and distrust when communication and accessibility are weak. This is clearly reflected in the finding that a citizen only discovered accumulated ETLE tickets during vehicle tax renewal. Such a case shows that procedural fairness becomes problematic when citizens are sanctioned without receiving timely notification. Therefore, ETLE responsiveness should not only be measured by how quickly violations are detected, but also by how clearly and fairly the state communicates with citizens.

The implementation barriers found in this study are consistent with Kitsios et al. (2023), who explain that digital transformation in the public sector is often constrained by weak coordination, limited digital competence, and unclear strategy. ETLE in Makassar already has a clearer organizational division, but it still requires stronger integration between detection, verification, notification, payment, complaint handling, and administrative clearance. Without this integration, digital enforcement may simply reproduce old bureaucratic fragmentation in a new electronic format.

The findings also correspond with Chung (2022), who states that mature digital governance requires policy alignment, institutional learning, and administrative continuity. The existence of Police Regulation No. 8 of 2023 and Police Regulation No. 2 of 2025 provides a formal basis for ETLE operations, but regulation alone is not sufficient. The system also needs operational standards, interoperable databases, regular evaluation, and feedback mechanisms. This means that ETLE maturity depends on the ability of institutions to learn from implementation gaps and continuously improve service procedures.

In terms of traffic safety, Alobaidallah et al. (2025) show that automated traffic enforcement can improve compliance when it is perceived as accurate, fair, and consistently applied. This

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is relevant to Makassar because ETLE has the potential to reduce discretionary enforcement and increase transparency. However, automated enforcement may lose public legitimacy if citizens do not understand how violations are recorded, validated, notified, and processed. Public trust therefore depends on the transparency of the entire enforcement chain.

Adhitia (2025) similarly emphasizes that ETLE success in Indonesia depends on institutional readiness, public communication, and consistency of implementation. The Makassar findings show that public notification is not a minor technical issue, but a key element of responsiveness. If citizens are not informed promptly, they cannot respond, clarify, or contest the violation. Therefore, ETLE should use multiple notification channels, including postal letters, SMS, WhatsApp, email, and integration with vehicle tax platforms.

The findings also support Putri (2024), who found that ETLE implementation in Pekanbaru faces obstacles related to infrastructure, socialization, and public awareness. However, the Makassar case adds that public awareness alone is not enough. The internal structure and inter agency system must also work effectively. A well socialized ETLE system will still face resistance if notification is weak and administrative processes are fragmented. Thus, public education must go together with institutional strengthening.

Digital capability is another important issue. Atobishi et al. (2024) argue that digital capability improves organizational agility in public institutions. In the ETLE context, agility means the ability to process evidence quickly, respond to complaints, coordinate across units, and adapt procedures. The Makassar case shows that additional functions without additional personnel may improve efficiency, but it can also create workload pressure. Therefore, staff training, workload management, and competency standards are needed to sustain ETLE.

Digital leadership is also necessary. Adie et al. (2024) explain that digital leadership involves guiding technological change, managing people, and aligning innovation with public value. In Makassar, leadership is needed to ensure that front office and back office functions operate as one integrated system. Leadership is also required to solve incentive issues, strengthen personnel motivation, and ensure that digital reform does not become a burden for officers.

The broader value of ETLE is also connected to sustainable public service. Sanina et al. (2024) argue that digital government should contribute to transparency, accountability, and sustainable development goals. ETLE should therefore be evaluated not only by the number of tickets issued, but also by notification success, complaint resolution, data accuracy, public satisfaction, and reduction of repeated violations. These indicators are more useful for measuring whether ETLE truly improves public service quality.

Digital inclusion should also be considered. Djatmiko et al. (2025) warn that digital public services can exclude citizens when digital access and literacy are unequal. In ETLE, not all citizens may have updated addresses, stable digital access, or sufficient understanding of electronic ticketing procedures. Therefore, the front office remains important as an inclusive service channel for citizens who need clarification or assistance.

The importance of collaboration is emphasized by Pu et al. (2025), who argue that digital transformation becomes stronger when public service systems are supported by wider institutional ecosystems. For ETLE in Makassar, collaboration should involve the police, Samsat, Bapenda, local government, technology providers, and public communication units. Such collaboration is needed to improve data integration, notification systems, and public trust.

The findings support Muluk and Pratama (2021), who argue that Indonesian public service innovation often focuses on internal processes but remains weak in inter organizational

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collaboration and sustainability. The Makassar ETLE case confirms this pattern. Internally, the police have developed structural innovation through back office and front office separation. However, externally, cross agency integration and public communication still require improvement. Aldizar (2025) also notes that ETLE effectiveness depends on public awareness and enforcement consistency. Therefore, ETLE in Makassar should be seen as an ongoing governance transformation. Its long term success depends on stronger data integration, clear notification mechanisms, fair incentive systems, inclusive services, and continuous institutional evaluation.

Conclusion

Changes in the ETLE Organizational Structure demonstrate that structural changes in the ETLE system (data centralization and process automation) have optimized the efficiency of law enforcement processing times. However, increasing holistic responsiveness to complex issues remains hampered by bureaucratic segmentation between relevant agencies (the Police, Samsat, and Bapenda). This demonstrates that technological innovation needs to be accompanied by institutional reforms that can foster functional integration across sectors.

Suggestions

Simplification of digital bureaucratic procedures, Reformulation of ETLE procedures to be more efficient and user-friendly needs to be done to increase public trust and participation.

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