RESEARCH PAPER

# Development of Electronic Traffic Law Enforcement (ETLE) Services and Their Impact on Improving Traffic Compliance in Makassar City

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## ABSTRACT

*The rapid advancement of information and communication technology has driven significant transformations in public service delivery, including traffic law enforcement. In Indonesia, the Electronic Traffic Law Enforcement (ETLE) system represents a major public service innovation aimed at improving transparency, accountability, and traffic compliance through digital mechanisms. This study examines the implementation of ETLE in Makassar City as a form of local public innovation, focusing on its processes, institutional dynamics, technological integration, and service outcomes. Using a qualitative research approach, data were collected through in-depth interviews with key stakeholders within the Traffic Directorate of the South Sulawesi Regional Police and the Makassar City Police, complemented by document analysis. The analysis is guided by the Type of Local Public Innovation framework proposed by Queyroi et al., which conceptualizes innovation across service, organizational, practical, technological, and governance dimensions. The findings reveal that ETLE has successfully enhanced procedural accountability and transparency in traffic law enforcement by minimizing direct interaction between officers and motorists and relying on objective digital evidence. However, the study also identifies a significant paradox: while upstream enforcement integrity has improved, downstream service processes remain fragmented. Delays in notification, complex fine payment procedures, and weak inter-agency system integration have created new administrative burdens for citizens. This study concludes that ETLE represents an important step toward data-driven governance but requires stronger service integration, user-centered design, and inter-institutional coordination to fully achieve its transformative potential in improving traffic compliance and public trust*.

**Keywords:** *Electronic Traffic Law Enforcement, Public Service Innovation, Traffic Compliance, Digital Governance, Transparency and Accountability*

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## Introduction

The development of information technology has brought about changes in mindsets that directly impact human behavior (Ringberg et al., 2019). This begins with daily life, which is heavily influenced by the need for significant information developments. Technological developments have transformed the way government programs are implemented, making them more efficient and effective. Advances in technology, information, and communication have also brought rapid changes to people's lives (Ramos et al., 2023).

However, on the other hand, the growth of technology and connectivity can also have negative effects, influencing public perceptions of less positive things (Lee et al., 2005; Hsu & Lin, 2016). Rapid change and complexity in technology and information can also have negative impacts. Complexity, transparency, and accountability are functions of a global situation that is increasingly responsive to needs and realities (Widhiasthini et al., 2024).

Innovation in public services to address the challenges of increasingly complex societal development is crucial, especially in this fast-paced era where information technology is crucial for public service implementation (Kamara, 2025). This development is unavoidable in Indonesia, which is now entering the Industrial Revolution 4.0 era with many new, disruptive discoveries. Technology continues to advance rapidly, and if not utilized, it can threaten the survival of institutions that are reluctant to change, including the government.

One of the key elements in facing the Industrial Revolution 4.0 is efficiency in services and internal

processes. According to Bappenas data from 2018 (Ariesmansyah et al., 2024), public services are a crucial sector for transformation, where the digitalization of public administration and automation of business processes, known as Government 4.0, are vital mechanisms to implement. In this regard, service providers must be responsive to technological developments and adhere to the values of transparency and accountability in carrying out their duties. Transparency is based on the provision of government information (Cucciniello et al., 2015).

Maintaining public trust and ensuring that technological developments are used for positive interests and the welfare of society is crucial. In an era of ever-evolving technology, it is crucial for the government and all stakeholders to carry out effective monitoring and control to ensure that negative impacts are minimized and that the benefits of technology are enjoyed by all parties. However, Preissl (2000) elaborates differently, explaining that in services, innovation is not solely related to technological advancements. Innovation activities involve other non-technological aspects. Therefore, the separation between product and process in analyzing the impact on employment does not always apply to the service sector.

However, public service innovation can be interpreted as the process of updating, utilizing, and developing new ideas, frameworks, and activities that are different from those previously established. As outlined by Ledingham & Bruning in (Sanders & Gutiérrez-García, 2020), public service innovation must emphasize the importance of establishing and maintaining relationships between organizations and the public. Public services and the development of e-government are strongly correlated.

Reports on e-government indicate that information and communication technology (ICT) has the potential to increase efficiency and maximize public benefits while reducing the risk of irregularities (Teryima & Sunday, 2015; Yang & Rho, 2007). The government must be able to provide optimal services due to public demand for fast, effective, and efficient services. A bureaucracy must demonstrate a spirit of service with a more flexible approach oriented towards effective, efficient, and flexible services, as well as a more practical and realistic approach.

Service innovation can be defined by the following core principles: (1) Focus on outcomes rather than development processes; (2) Services must be truly new, not simply improvements to existing ones; (3) Must create economic or non-economic value for stakeholders. Overall, service innovation is a new process or offering that is implemented and creates value for stakeholders (Jonas & Roth, 2017). In addition, innovation requires collaboration, as explained in the following: Collaborative innovation has the potential to generate improvements in systems and processes within a city.

Typically, products and services purchased by cities from companies are already in the commercial stage, meaning they are ready for use. With collaborative innovation, the role of cities changes from being mere purchasers to drivers and regulators of innovation. This may be due to the fact that product and technology innovation have attracted the attention of researchers (Di et al., 2012).

## Methods

### Research Approach and Type

This study adopts a qualitative research approach. The selection of this approach is based on the research objective, which seeks to explore, describe, and analyze the innovation of Electronic Traffic Law Enforcement (ETLE) in Makassar City. A qualitative approach is considered the most appropriate method as it allows the researcher to gain an in-depth understanding of the context and dynamics involved in this phenomenon. Through qualitative inquiry, the study is able to capture the complexity of public service innovation within a real-world institutional setting. The strength of the qualitative approach lies in its capacity to explore perceptions, viewpoints, and experiences of stakeholders involved in the implementation of ETLE. By emphasizing the collection of objective and accurate data, qualitative methods enable the researcher to elaborate on variations, dynamics, and impacts of public service digitalization in a more nuanced manner. Accordingly, the qualitative approach provides a robust analytical framework for understanding public service innovation within the context of electronic-based government systems, particularly in the implementation of ETLE in Makassar City.

### Research Focus and Focus Description

The research focus is designed to clearly define the scope of the study and ensure that the analysis remains aligned with its core objectives. This research examines public service innovation through the implementation of Electronic Traffic Law Enforcement (ETLE) in improving traffic compliance in Makassar City, with the focus formulated based on the research questions, conceptual framework, and contextual characteristics of the innovation. The study aims to analyze the processes, dynamics, and transformative impacts of ETLE on service delivery, institutional structures, operational practices, technological systems, and governance strategies. The analysis is guided by the Type of Local Public Innovation framework proposed by Queyroi et al. (2022), which conceptualizes innovation across five interrelated dimensions: service innovation, organizational or structural innovation, practical innovation,

technological innovation, and strategic and governance innovation. Through this framework, the study seeks to provide a comprehensive understanding of how ETLE functions as an integrated public service innovation within local government institutions and contributes to more efficient, accountable, and sustainable traffic law enforcement.

**Research Location**

The research was conducted at the Traffic Police Unit Office of Makassar City Resort Police and the Directorate of Traffic of the South Sulawesi Regional Police. The selection of these locations is based on the growing scholarly interest in public administration studies, particularly in the field of Electronic-Based Government Systems (SPBE) and public service innovation related to the implementation of ETLE in Makassar City. These institutions serve as central actors in the management and execution of traffic policies at the city and provincial levels. The Directorate of Traffic in Makassar City represents a strategic research site as it functions as the primary authority responsible for traffic law enforcement and policy implementation. Data and information obtained from these locations are expected to provide a comprehensive and in-depth understanding of the application of ETLE innovation in Makassar City, particularly in terms of institutional practices, technological integration, and governance dynamics.

**Data Sources**

The data sources in this study are divided into two main categories: primary and secondary data. Primary data were obtained through interviews with relevant stakeholders at the Traffic Directorate of Makassar City Police. These interviews were designed to collect firsthand information from key actors directly involved in the implementation and operation of ETLE in Makassar City, allowing the researcher to capture experiential insights and institutional perspectives. Secondary data were collected from various documents relevant to the research focus, including images, photographs, records, reports, and written materials related to ETLE innovation in Makassar City. These documents serve to support, enrich, and corroborate findings derived from primary data sources. By integrating primary and secondary data, the study aims to achieve a comprehensive and holistic understanding of ETLE implementation, thereby strengthening the validity and interpretative depth of the research findings.

**Data Analysis Techniques**

Data analysis in qualitative research occurs concurrently with other parts of qualitative research development, namely data collection and writing up findings while interviews are ongoing. For example, researchers can analyze previously collected interviews and write memos that are eventually incorporated into the narrative in the final report. This process involves analyzing the information and finally writing the report (Creswell & Poth, 2016). In accordance with the research problem and objectives, the research used a qualitative research approach, presenting the findings and conclusions of the analysis in descriptive narrative form. After data collection, data simplification was carried out and then qualitative analysis was conducted. The data analysis technique in this study used the Spiral Model, popularized by Creswell. The use of the Spiral Model in data analysis is shown in the following figure:

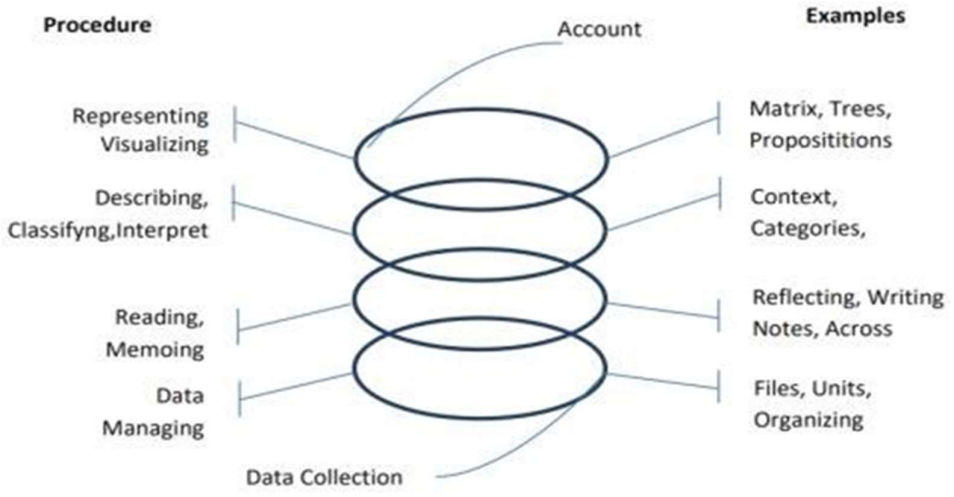


Figure 1. Spiral Model Data Analysis Technique

In the initial step, data collection was conducted, including primary and secondary data, in both text and image form. The second step involved reading and recording notes as a reflection of the various answers to the research questions. Next, in the third

step, the recorded data was explained, classified, and interpreted based on context and categories. The final step involved data representation and visualization by drawing conclusions, summarized in the form of matrices, tree diagrams, and developing propositions based on the research findings.

## Results and Discussion

The Electronic Traffic Law Enforcement (ETLE) Public Service Innovation is an initiative of the Indonesian National Police (Polri) aimed at increasing the use of technology and adapting to modern changes. The National Electronic Traffic Law Enforcement (ETLE) System, implemented by the Indonesian National Police Traffic Corps (Korlantas POLRI), uses technology to electronically document traffic violations. The system's goal is to improve traffic safety, comfort, and security. Accident data mapping shows a significant correlation between the frequency of violations and fatal road accidents (Korlantas, n.d.). From an academic perspective, the field of innovation studies has grown alongside rapid technological advances. The use of IT in governance processes is viewed as one of the most significant innovations of the 21st century. To maintain public satisfaction and improve government performance, various service processes, governance practices, and government initiatives focused on prioritizing excellent public service have been implemented. To address increasingly complex challenges and adapt to changes perceived by society, the use of information technology is crucial. In this regard, the Indonesian National Police, which is tasked with acting as a law enforcement agency in handling traffic violations, has introduced an electronic ticketing system known as Electronic Traffic Law Enforcement (ETLE) in various regions in Indonesia.

Public service innovation, particularly through the adoption of technologies such as ETLE, is a crucial dimension of modern, citizen-centered public administration. The primary focus of this discussion is analyzing how technological innovation impacts the design, delivery, and quality of public services related to traffic law enforcement. Emphasis will be placed on improving the accessibility, speed of response, and user experience of ETLE digital services. The success of this innovation must be measured in terms of creating more efficient, transparent, and citizen-centered services, which can be specifically measured through service time efficiency, stakeholder satisfaction levels, and ease of citizen interaction with the new system.

To examine this aspect, a framework such as Rogers' diffusion of innovation theory is highly relevant. This theory outlines innovation adoption factors such as relative advantage (convenience, user satisfaction), compatibility (suitability to needs), and complexity (ease of understanding/user-friendliness), which are relevant for measuring stakeholder satisfaction and ease of interaction. Furthermore, the typology of local public innovation provides an operational classification framework for analyzing ETLE as a service innovation (development of new services) and a technological innovation (digitalization of the ticketing process), aimed at increasing efficiency and effectiveness.

Essentially, this discussion of service innovation aims to determine the extent to which ETLE meets the criteria for transformative innovation. These criteria include novelty (introduction of new technology or service concepts) and effectiveness (achieving tangible results), which align with measures of time efficiency and service quality. Furthermore, this innovation is understood as part of the theoretical foundation of electronic-based public service innovation (e-government) and electronic-based government systems (SPBE). The following is a summary of the research data obtained regarding ETLE service innovation in Makassar City.

Table 1. ETLE Public Service Innovation

| **Stakeholders** | **Data Reduction** | **Findings Classification** |
|---|---|---|
| Police (AT – Traffic Law Enforcement Directorate, South Sulawesi Regional Police) | ETLE ensures traffic law enforcement based on objective visual evidence. It reduces direct interaction between officers and motorists, thereby minimizing the potential for illegal levies. The system enhances transparency and accountability in law enforcement and strengthens public trust in the police institution. ETLE also promotes modern and integrity-based law enforcement practices. | Primary Objective: Accountability and Transparency |
| Police (AT – Traffic Law Enforcement Directorate, South Sulawesi Regional Police) | ETLE functions as the most transparent mechanism for handling traffic violations. The enforcement process is based on digital evidence, making it more objective and accountable. It minimizes opportunities for bribery, collusion, and nepotism in law enforcement and supports a clean and professional legal culture. | Mechanism: Elimination of Direct Interaction |

| | | |
|---|---|---|
| Police (MD – Back Office, Makassar City Police) | ETLE is implemented to suppress potential corrupt practices in traffic law enforcement. The system reduces direct contact between officers and violators, thereby decreasing the risk of abuse of authority. This measure aims to maintain institutional integrity and improve the public image of the Indonesian National Police. | Background: Minimizing Direct Contact and Corruption |
| Public (AA) | Traffic violations are sometimes only discovered a year later during vehicle tax renewal. ETLE notifications are not optimally delivered, and the fine payment process is complicated and inefficient. | Constraints: Lack of Notification and Complex Post-Ticket Procedures |
| Public (FEL) | The process of resolving traffic fines is highly complicated. Violators must repeatedly visit the SAMSAT office, the regional police office, and the bank. The enforcement workflow is excessively long and burdensome for users. | Constraints: Inefficient Traffic Violation Settlement Process |
| Public (DM) | Transparency has increased because the public can directly access and view evidence of traffic violations. | Positive Impact: Increased Transparency |

*Source: 2025 reduction data*

The data reduction table displays the network of key actors involved in the implementation of ETLE (Electronic Traffic Law Enforcement) at the regional level, primarily the police (AT Gakkum Polda Sulsel; MD Back Office Polrestabes) and citizens/the public (AA, FEL, DM). The table above demonstrates that ETLE was implemented by the police as an innovation focused on accountability and transparency, primarily by eliminating direct interaction between officers and drivers to reduce incentives for corruption. On the other hand, community experience highlights two aspects of ETLE: (a) increased transparency due to the immediate availability of visual evidence (DM), but (b) post-ticket procedural burdens (AA, FEL), particularly late notification and complicated fine payment procedures, are sources of dissatisfaction that erode service effectiveness. These findings conceptually demonstrate a paradox in the implementation of digital public sector innovations: while technology has effectively improved the integrity of law enforcement processes (both ex-ante and on-the-spot), this has not been matched by adequate downstream (ex-post) process reforms, particularly at the cross-organizational interface (Police–Samsat–Banks–Bapenda–PT Pos). Therefore, the main issue is not the rationality of ETLE as a tool, but rather the fact that institutional design and process orchestration have not been fully integrated. Furthermore, the police are implementing an electronic ticketing system (ETLE). As stated in the interview,

*"The manual ticketing system often creates negative perceptions related to the potential for bribery and a lack of transparency, thus damaging the image of the police force. Therefore, a camera-based ETLE system was implemented to digitally record violations, provide publicly verifiable visual evidence, and minimize direct interaction between officers and violators. This approach is seen as capable of increasing objectivity, accountability, and reducing the opportunity for extortion in traffic law enforcement." (AT Interview / Monday, December 2, 2024)*

Therefore, ETLE, which utilizes surveillance camera technology and image analysis software, is a significant innovation in traffic law enforcement. This system makes a real contribution to improving road safety, reducing accidents, and creating a sense of justice for the public by automatically and electronically detecting and transmitting evidence of violations. The ETLE process, when compared to the manual ticketing system, is more transparent, efficient, and objective (South Sulawesi Regional Police Traffic Directorate). In Makassar City, Electronic Traffic Law and Enforcement (ETLE) has been used since March 2021 in response to the direction of the Indonesian National Police leadership. As The Head of the South Sulawesi Regional Police's Traffic Law Enforcement Unit (GAKKUM PJR) stated,

*"In my opinion, the implementation of Electronic Traffic Law Enforcement is the most transparent form of traffic enforcement. This system automatically detects and records every violation, and then the data is verified by officers before a confirmation letter is sent to the violators' homes. Because the process is based on digital evidence and without direct interaction in the field, the potential for bribery, collusion, and nepotism can be minimized." (Interview with AT - Monday, December 2, 2024)*

The ETLE (Electronic Traffic Law Enforcement) service can be considered a concrete manifestation of the new service development idea proposed by Kristanto et al. (2024). In addition to improving the system, it also creates a new paradigm in traffic law enforcement. ETLE provides an automated, impartial enforcement method based on visual evidence from cameras, unlike conventional

methods that rely on physical interaction. This fundamental change eliminates subjectivity and minimizes the potential for conflict in law enforcement.

This change is driven entirely by technological advances. Statistical cameras placed in strategic locations serve as a continuous intelligence element. With this technical capability, operational enforcement can be carried out continuously and reach areas wider than the capabilities of field personnel. Mechanisms that were previously reactive have now evolved into proactive ones integrated into digital platforms. In terms of service, this innovation also increases transparency by providing accountable visual evidence and building public trust in the legal process.

Taking these various aspects into account, ETLE represents a comprehensive innovation that aligns with Queyroi's definition. This system not only brings structural reforms to the enforcement process but also improves the overall quality of legal services. The transformation shifts the law enforcement paradigm from a confrontational model to a more orderly, open, and data-driven administrative mechanism, supported by the integration of surveillance technology and intelligent information systems.

Once a violation is detected by the ETLE camera, the violation data is then verified by officers before a confirmation letter is sent to the offender. This process eliminates direct interaction between violators and officers in the field, thereby minimizing the risk of bribery, collusion, and nepotism. With clear records and an objective process, ETLE increases transparency in traffic law enforcement and reduces the potential for corruption.

*"In leading the ETLE program, we provide clear direction to all personnel. After the camera captures a violation, the back office is responsible for verifying and validating the data electronically. Meanwhile, the front office serves the public, including providing information on ticket status and fine payment procedures through BRI Bank, an official partner. (Interview with AT - Monday, December 2, 2024)*

The electronic ticketing program is implemented through a structured and coordinated system. The back office team is responsible for ensuring the accuracy of violation data, while the front office team focuses on providing friendly and informative public service. Collaboration with BRI Bank for fine payments makes it easier for the public to fulfill their obligations. With easy access to ticket status information and fine payments, this program increases transparency and convenience for the public. Overall, this electronic ticketing program demonstrates a commitment to enforcing traffic regulations in an efficient, transparent, and accessible manner.

With the introduction of ETLE, the ticketing process experiences differences in enforcement and service delivery, as follows:

Table 2. Comparison of Conventional Ticketing And Electronic Ticketing (ETLE)

| **Aspect** | **Conventional Traffic Ticketing** | **Electronic Traffic Law Enforcement (ETLE)** |
|---|---|---|
| Process | Manual process: All procedures are conducted manually, starting from on-site ticket issuance to fine payment. | Automated process: Most procedures are carried out automatically by the system, from violation detection to enforcement actions. |
| Officer Involvement | Police officers directly stop violating vehicles and issue traffic tickets. | Minimal human interaction: Violators do not need to interact directly with police officers. |
| Potential for Error | High risk of human error: There is potential for errors in data recording, fine calculation, and other administrative processes. | High accuracy: Violation data are digitally recorded, minimizing errors. |
| Efficiency | Low efficiency: Conventional ticketing processes tend to be time-consuming and impractical. | High efficiency and transparency: All processes can be tracked and monitored, minimizing the potential for irregularities. |

*Source: 2025 reduction data*

The ETLE procedure, which is the national standard, with more detailed and sequential steps, can be seen in the following illustration. This initiative aims to increase public compliance with traffic regulations and raise awareness of the importance of road safety by presenting a visual service flow for traffic violators. The cultural shift required to achieve this is crucial, as it plays a crucial role in reducing accidents and fostering more responsible driving habits. Thus, this initiative is expected to contribute to increased safety compliance and improved safety levels for all road users.

This comprehensive approach addresses not only immediate exposure but also a long-term commitment to road safety. This approach ensures that future generations prioritize responsible driving habits. This holistic strategy will ultimately create a safer environment, fostering a community where every road user feels empowered to contribute to road safety. The Head of the Makassar City Police

Traffic Unit expressed a similar sentiment, emphasizing the promotion of ETLE as a service innovation effort to maintain the accountability, effectiveness, and efficiency of police services to the public.

*"The implementation of Electronic Traffic Law and Enforcement (ETLE) in Makassar City has been in effect since March 2021. This step is an initial initiative by the Indonesian National Police, specifically the Makassar City Police, to support traffic compliance and reduce the risk of various incidents on the highway" (MR Interview / Thursday, August 22, 2024)*

As the ETLE program develops, ongoing public education and transparent communication will play a crucial role in fostering trust and understanding among citizens. As the program develops, it is also important to gather feedback from the public to ensure that the implemented measures are effective and address the concerns of all stakeholders. The implementation of Electronic Traffic Law Enforcement (ETLE) in Makassar City is driven by two main objectives. First, to prevent corruption by designing a system that reduces direct interaction between violators and officers, thereby minimizing the risk of bribery and maintaining police integrity. Second, to adapt to the modern era by utilizing the latest technology to increase efficiency and transparency in enforcing traffic violations, as well as to facilitate public access to ticketing services.

Conventional ticketing offers advantages in terms of educational opportunities and direct problem resolution, but it also has disadvantages such as The potential for officer bias, administrative complexity, and potential abuse of authority can damage the police force's image. In contrast, electronic ticketing offers objectivity, efficiency, and transparency, but also relies heavily on technology, has the potential for technical errors, and is limited in its accessibility for those less familiar with technology. The social impacts of both systems include their impact on officer-community relations, compliance with traffic regulations, and driver behavior.

The legal aspects of both systems also require attention, including regulations that ensure fairness and transparency in the enforcement process. Furthermore, recommendations for optimizing both systems to be more effective and fair in handling traffic violations are crucial. Interviews with police officers confirmed that the use of technology in the ticketing process can reduce various risks faced by road users and increase compliance with traffic regulations. Cases frequently encountered by the police, such as violators who deny their guilt using various excuses and bribery transactions between the public and officers, can be minimized by utilizing CCTV and mobile phone technology. This can be seen from the relatively high number of traffic violations in Makassar, as shown below:

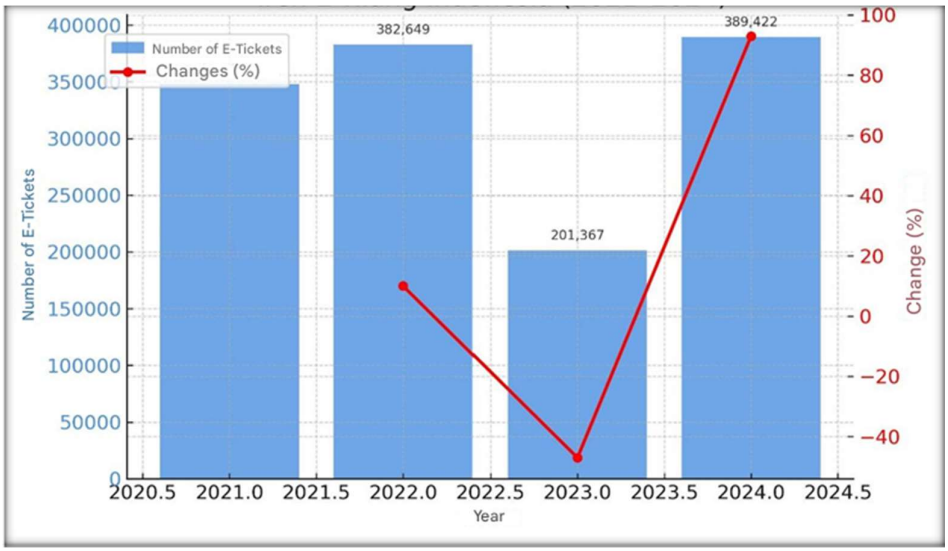


Figure 3. Graph of e-ticketing trends in Makassar City 2021-2024

*Source: Makassar City Police*

The number of e-ticketings in Makassar City shows significant fluctuations from year to year. In 2022, there was a 10% increase compared to the previous year, which may indicate an increase in the effectiveness of the e-ticketing system or public awareness of the importance of orderly traffic. However, in 2023, there was a drastic 47% decrease, which could be due to several factors, such as the COVID-19 pandemic reducing public mobility or changes in policies regarding enforcement of traffic violations. 2024 recorded a very significant 93% increase compared to the previous year, indicating a trend of increasing traffic violations again after a previous decline. Furthermore, documents obtained

during research at the South Sulawesi Regional Police Traffic Directorate office show that several roads in Makassar City have ETLE cameras managed by various police agencies.

Several interesting findings reflecting the effectiveness and challenges of traffic law enforcement were uncovered in the analysis of data from the Electronic Traffic Law Enforcement (ETLE) system. One key finding indicates that JL.A.P. Pettarani-Dpn Kemenag recorded the highest number of arrests, with a total of 1,877,660 violations recorded. Pettarani Street was among the top five locations for the number of arrests, indicating that this area is a hotspot for traffic violations that requires increased attention from authorities. Furthermore, the analysis shows that data validity is also a critical aspect of the ETLE system. The Makassar City Police recorded the highest number of valid arrests, at 7,888, followed by the Makassar City Police's GOSIGAP with 1,531 valid arrests.

Despite the high number of arrests, the validation ratio from captures to valid arrests was quite low in several locations in Pettarani. In terms of data delivery, the majority of valid arrests were successfully sent, as seen in the Makassar City Police, which recorded 7,888 valid arrests and 7,504 received arrests. These findings indicate that the delivery system is functioning well and efficiently, allowing for prompt processing and action on violation data. However, concerns remain regarding the violation confirmation method, where confirmation is conducted offline, while only a small portion is processed through the website. This suggests the need for improvements to the online system to facilitate public access.

Regarding the payment and collection process, locations such as JL.A.P. Pettarani-Dpn Kemenag have a relatively high collection rate, with 811 violations collected and 597 paid, resulting in a payment rate of 73.6%. Meanwhile, the REKLAME JL. BULU SARAUNG location recorded better results, with 148 violations collected and 130 paid, resulting in a payment rate of 87.8%. This high payment rate indicates that the public is beginning to comply with the established consequences for violations.

Finally, the data shows a significant number of blocking violations, with the JL.A.P. Pettarani-Dpn Kemenag recording 6,292 blocked violations and the Makassar City Police with 7,427 blocked violations. This high blocking rate may indicate a high level of non-compliance in the area, despite these locations being located in strategic locations. Therefore, authorities need to take further action to increase public awareness and compliance with applicable traffic regulations. Therefore, this analysis provides a clearer illustration of the traffic conditions and efficiency of the ETLE system, as well as areas that require greater attention for improvement.

The data generated by the Electronic Traffic Law Enforcement (ETLE) system in Makassar illustrates a paradox. On the one hand, the high number of recorded violations reflects the system's success in optimizing traffic violation detection. This indicates that surveillance technology has been effective in identifying various violations occurring on the highway. However, on the other hand, the high number of violations actually indicates that the level of compliance with traffic regulations in Makassar remains very low. This fact raises fundamental questions about the effectiveness of ETLE in achieving its primary goals, namely reducing violations and improving traffic safety.

This paradox reveals a more complex and profound challenge in changing driver behavior in Makassar. The ETLE system, despite improvements in detecting violations, appears to have failed to provide a significant deterrent effect for most drivers. This is likely due to various factors, ranging from low public awareness of the importance of traffic safety to a lack of understanding of the consequences of violations. Research on the implementation of Electronic Traffic Law Enforcement (ETLE) in Makassar demonstrates the complex dynamics of local public innovation, where local governments and police are attempting to drive change in law enforcement through digital services. Local public innovation theory views public innovation not simply as the adoption of new technology, but as a socio-organizational process encompassing structural adaptations, changes in work patterns, and role adjustments among local actors to meet the specific needs of the community and the regional context.

Data shows that the police view the use of the ETLE system as an innovation that can increase transparency, accountability, and integrity of public services in traffic law enforcement. This is evident in efforts to eliminate direct interaction between officers and drivers and move verification functions to a digital-based back office. In the context of local public innovation, this step reflects a process of functional adaptation, where organizational functions are transformed to support a more modern service model free from personal intervention. This transformation is a response to local challenges, such as public perceptions of allegedly opaque practices in conventional law enforcement. Furthermore, the division of roles between the back office (digital verification) and the front office (public service) illustrates a strategy of organizational reconfiguration, a key feature of local public innovation, where the bureaucracy adapts its internal structure to support innovation.

This reflects institutional awareness to reorganize roles and workflows as part of the transition to technology-based governance. However, data from citizens indicates innovation frictions, where digital innovation has not yet fully resulted in a seamless public service experience. Delays in notification of violations, multi-layered ticketing procedures, and the need to navigate between agencies (Samsat, Polrestabes, BRI) indicate a gap between innovation design and operational implementation. From the perspective of local innovation failure points, this situation reflects integration capacity challenges, namely the misalignment of systems between the local organizations involved. In other words, innovation only operates at the level of detection and verification technology, but not fully at the level of process management and public service delivery to citizens.

This finding also suggests a co-production tension mechanism. As end users, citizens recognize increased transparency but also experience new administrative burdens as a side effect of the innovation. This suggests that top-down public innovation must be accompanied by feedback mechanisms and continuous improvement based on user experience (user-centered innovation). Innovation, while aimed at combating corruption and improving integrity, can create content overload if not accompanied by service design that prioritizes user convenience. Overall, the implementation of ETLE in Makassar reflects the early stages of local public innovation, marked by success in the technological aspects of enforcement (front-end innovation), but still facing challenges related to the integration of services between agencies and user convenience (back-end system orchestration). These findings confirm that local public innovation depends not only on technology, but also on the ability of local institutions to harmonize processes, build inter-agency coordination, and design services that are responsive to citizen experiences.

The public faces several challenges in implementing electronic ticketing. First, there is a lack of public awareness about the use of electronic tickets or the digitization of tickets. As a result, the public lacks understanding of the flow and mechanisms of the service process and legal resolution related to electronic tickets. Second, interviews and observations indicate that some individuals did not receive confirmation via email due to differences in vehicle ownership. Furthermore, the information provided by the recipient of the verification code was invalid due to differences in vehicle identity and vehicle information. This resulted in miscommunication and disruptions in information access between the public and the police, resulting in the public not knowing the BRIVA code for payment.

Third, sending ticket confirmation letters to traffic violators via their website was also ineffective. People who received tickets did not pay their fines because they did not receive information via the ticket confirmation letter. To clarify the differences between the phenomena occurring in the field and the mechanisms or processes established by the police, the following presents common phenomena experienced by the public when identified as violators through the ETLE system. The illustration below shows the repetitive steps that are often misunderstood by those outside the ETLE procedure, from violation detection to the mandatory payment of fines, which must be completed before renewing the vehicle registration certificate (STNK).

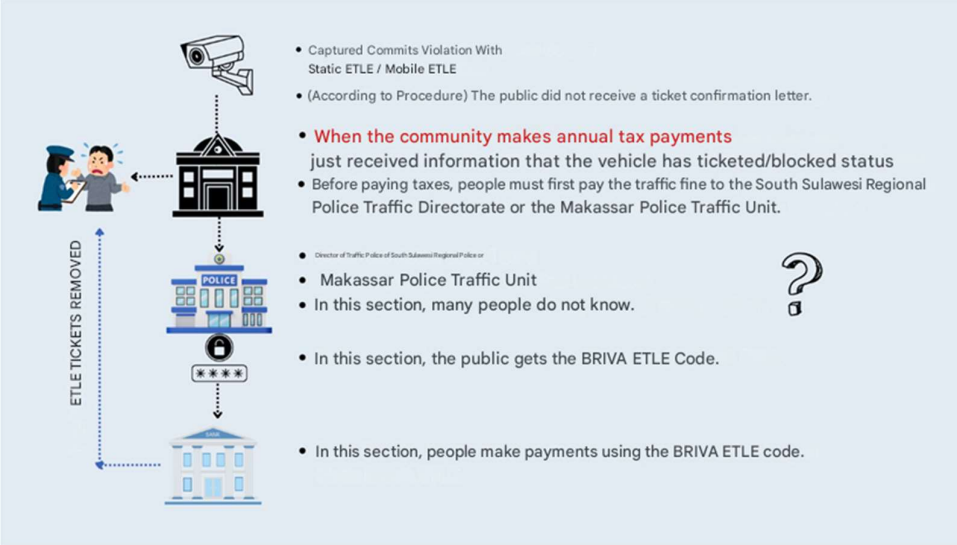


Figure 4. Traffic flow for traffic violators

*Source: Author's analysis*

This image illustrates the problematic procedure for removing electronic ticketing (ETLE) in Makassar. The ETLE system, both stationary and mobile, records traffic violations. However, instead of receiving a direct notification in the form of a letter, many residents only learn of the ticket when paying their annual tax, as their vehicle is blocked. To remove the block and ticket, they must pay the fine at a specific police station (Dirlantas Polda Sulsel or Satlantas Polrestabse Makassar) using the BRIVA ETLE payment code. This lack of understanding of the procedure causes confusion and demonstrates a lack of public information in the form of adequate public education and outreach regarding the ETLE system in Makassar. For further clarification, here are some of the author's findings:

**Problems Receiving ETLE Ticket Confirmation Letters**

Often, residents only learn that their vehicle has been subject to an electronic ticketing (ETLE) when they are about to pay their annual tax. However, according to proper procedure, residents should first receive a ticket confirmation letter from the police. Both the South Sulawesi Regional Police Traffic Unit (PJR) handles violations on Jalan A.P. Pettarani using four static cameras, and the Makassar City Police Traffic Unit handles static ETLE (Electric Vehicle Registration) at several locations along Makassar City roads, as well as mobile ETLE used by police personnel.

**ETLE Fine Payment Process**

When people arrive at the Samsat (Vehicle Tax Office) office to pay their annual taxes and discover their vehicle has been ticketed or blocked, they are required to pay the fine first. To make the payment, the police will provide the BRIVA ETLE code. This code is then used to pay the fine at the South Sulawesi Regional Police Traffic Unit or the Makassar City Police Traffic Unit, depending on the location of the ETLE camera that recorded the violation.

**Clearing the Ticket Status After Payment**

After the ticket payment is complete, the police will clear the ticket or blocked status on the vehicle. This allows people to continue with the annual tax payment process. The ETLE ticketing process ideally begins with the issuance of a ticket confirmation letter to the vehicle owner. However, many people only discover their violations when they are about to pay their annual taxes. As explained by a community informant:

*"I feel very confused by this process. I never knew my vehicle had been ticketed. I also never received any notification, either a ticket or an electronic notification, regarding the 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 seven times, as explained by the front office officer." (SP Interview - Thursday, March 6, 2025)*

To address this issue, people are required to pay the ticket fine before they can proceed with paying their taxes. Once payment is made, the ticket status will be deleted, allowing them to proceed with paying their taxes. In conclusion to the discussion of service innovation, the author concludes that ETLE in Makassar City shifts the paradigm of traffic law enforcement from a confrontational and subjective model, which relies heavily on direct interaction between officers and drivers, to an administrative, objective, and digitally evidence-based enforcement model. Visual evidence from 20 static cameras and 10 handheld cameras forms the main foundation of enforcement, significantly reducing the space for denial and illegal negotiations on the roadside. From a police institutional perspective, ETLE is seen as an innovation that strengthens accountability and transparency, minimizes the potential for corruption, collusion, and nepotism, and supports efforts to build a more professional and modern institutional image.

However, at the downstream service level, this study uncovered a paradox in the public's experience as service users. Several informants reported that they only discovered violations when they were about to pay their annual vehicle tax and discovered that their vehicle registration (STNK) status was blocked due to outstanding ETLE fines. Ticket confirmation letters were often not received on time, or never at all, either due to distribution issues or due to a lack of synchronization of vehicle ownership data. The process of settling fines required residents to travel back and forth between the Samsat (Vehicle Registration Agency) and the police station (PJR Traffic Directorate of the Regional Police/City Police) to obtain and pay the BRIVA ETLE code at the bank (BRI), creating a long and convoluted process. Limited access to and understanding of online confirmation platforms further widened the digital divide, so that innovations that at the upstream level improved integrity at the downstream level actually created new procedural burdens for the public.

**Discussion**

The implementation of ETLE in Makassar marks a new phase in the transformation of the Indonesian bureaucracy toward a data-driven government. Efficient technology is combined with the spirit of public administration reform aimed at transparency and accountability within the system. The Makassar City Government, in collaboration with the Indonesian National Police (Polri) through a collaboration between the Traffic Directorate and the Regional Government, has created a digital

mechanism that can address many of the conventional practices that have been vulnerable to retrenchment. ETLE essentially reflects a form of bureaucratic modernization based on the principle of instrumental rationality, namely, organizing work systems based on calculation efficiency, data-based oversight, and law enforcement without direct interaction. Through this approach, the bureaucracy not only reorganizes administrative procedures but also builds a new value system that utilizes technology as a tool of legitimacy and justice. The law is no longer enforced solely through the physical presence of officers, but rather through a digital system capable of enforcing rules automatically, quickly, and objectively. Behind this progress, a fundamental question arises: to what extent can this technological rationality be incorporated into the work culture and social behavior of citizens? Public behavior does not always align with bureaucratic modernization. The success of a digital system such as ETLE is not only determined by technological sophistication, but also by institutional maturity and the social readiness of the community to adopt the new logic of public service, as demonstrated by this paradox.

## Conclusion

The New ETLE Service Innovation has successfully created significant instrumental traffic compliance by strengthening technology-based deterrence mechanisms. This innovation significantly increases procedural accountability in law enforcement and reduces the risk of moral hazard (corruption) by eliminating discretionary interactions between officers and the public. This success confirms ETLE's function as a smart regulatory instrument in public services.

### Suggestion

Strengthening cross-institutional coordination: Regional governments and the police need to establish more integrated collaboration mechanisms to reduce fragmentation and accelerate digital policy responses.

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