

Optimizing the Electronic Ticketing System to Build a Culture of Orderly Traffic in Semarang City

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Abstract. *The transformation of traffic law enforcement through Electronic Traffic Law Enforcement (ETLE) is a form of digitalization of law enforcement aimed at creating a more objective, transparent, and accountable traffic monitoring system. However, the implementation of ETLE in Semarang City still faces various structural and cultural challenges that affect the effectiveness of establishing a culture of orderly traffic. This study aims to analyze the implementation of the ETLE system in Semarang City, identify obstacles that reduce its effectiveness, and formulate optimization strategies in building a culture of orderly traffic in a sustainable manner. This study uses an empirical juridical method with a socio-legal approach and analytical descriptive research specifications. Data were obtained through in-depth interviews with the Traffic Police Unit of Semarang Police and literature studies on primary, secondary, and tertiary legal materials, then analyzed using qualitative methods through deductive-inductive reasoning. The results show that the ETLE system has succeeded in increasing the effectiveness of traffic monitoring through broader, faster, and more accurate violation detection capabilities compared to conventional systems. However, this effectiveness has not been able to produce substantive legal compliance due to structural obstacles such as limited back-office verification capacity, inaccurate vehicle databases, and low levels of public confirmation responses. In the cultural aspect, the dominance of instrumental-pragmatic compliance patterns was found, which gave rise to the phenomenon of spatial compliance, subversive actions against the system, and high violations among young people and online transportation workers. The novelty of this research lies in the formulation of an integrative ETLE optimization model through strengthening the administrative structure, expanding dynamic supervision based on mobile ETLE and drones, and transforming legal culture through a procedural justice approach and participatory education to realize normative and sustainable traffic compliance in the City of Semarang.*

Keywords: City; Electronic; Optimization; System; Traffic.

1. Introduction

Traffic law cannot essentially be reduced to merely a coercive instrument for imposing administrative sanctions, but must function as a manifestation of the state's responsibility in maintaining order and protecting public safety rights on the highway (Amin, 2018). In the legal sociology paradigm, traffic regulations are a means of social engineering (law as a tool of social engineering) that is actively directed at changing the behavior, habits, and collective mentality of society towards a more orderly civilization. To accelerate this social engineering process in the digital era, the Indonesian National Police is transforming law enforcement through the implementation of Electronic Traffic Law Enforcement (ETLE). This cyber-based law enforcement innovation is designed to eliminate the weaknesses of manual enforcement that is prone to subjectivity and transactional practices, towards an automated monitoring system that is objective, transparent, non-discriminatory, and accountable.

As a metropolitan city that is the epicenter of economic movement and community mobility on the north coast of Java, Semarang City faces a chronic challenge in the form of a high volume of vehicles that is directly proportional to the high ratio of violations and fatalities of traffic accidents. Responding to this urgency, the Traffic Unit (Satlantas) of the Semarang City Police has pioneered and delegated its supervisory authority to the ETLE camera system at various crucial points in the city. Mechanically, this electronic system is claimed to be able to detect and record thousands of violation data quickly, precisely, and continuously without requiring direct physical interaction between law enforcement officers and violators in the field. The implementation of this digital instrument is theoretically expected to provide a constant deterrent effect so that public legal awareness can be built independently.

However, field observations demonstrate a stark gap between the ideals of the law and the reality of its implementation. The presence of surveillance camera infrastructure in Semarang City has not been fully aligned with the creation of a substantial culture of orderly traffic, but instead has given rise to various structural obstacles (Ismail, 2025). The main obstacle lies in the bottleneck in the verification unit (back office) due to the imbalance between the high volume of violation data captured by the machine and the limited number of personnel. This systemic dysfunction is further exacerbated by the chaos of the vehicle registration and identification database at the SAMSAT, where the prevalence of vehicles that have not been transferred to new owners often causes ticket confirmation letters to be misdirected (error in person), thus reducing the effectiveness of the enforcement itself. (Fauziah et al., 2025).

In addition to facing administrative obstacles, the implementation of ETLE also clashes with highly corrosive cultural barriers. Camera-based surveillance in Semarang City has only succeeded in producing "spatial compliance," an anomaly

in which people only demonstrate orderly behavior when passing through areas visually within the camera lens (Arujisaputra & Rachman, 2025). Public legal compliance has not yet reached the level of normative awareness, but remains trapped in an instrumental-pragmatic compliance order, where drivers comply solely out of economic calculations to avoid financial fines. More extreme, this cultural resistance manifests itself in acts of legal subversion, such as manipulating vehicle identities through the use of fake license plates or deliberately removing vehicle registration plates to deceive the ETLE sensor algorithm.

Academic discourse on the effectiveness of electronic ticketing has been extensively explored by various previous literature. Previous research by Basoeki et al., 2023, examined the effectiveness of the police force, but focused more on the technical weaknesses of cameras in detecting physical documents such as driver's licenses (SIM) and vehicle registration certificates (STNK). Meanwhile, research by Widayanti, 2026, focused more on theoretical elaboration of ETLE as a social engineering instrument in shaping legal consciousness in general, and research by Adhithia et al., 2025 highlighted the macro-readiness of the Indonesian National Police's human resources. The research gap and novelty of this article compared to previous studies lies in the integration of its analysis. This article not only captures technical weaknesses but also holistically unravels the correlation between structural barriers (backoffice validation errors) and cultural pathology (license plate subversion) in Semarang City. It then offers a hybrid strategy formulation that combines procedural justice, automatic SAMSAT blocking integration, and dynamic ETLE expansion.

Based on this rationalization, this study aims to comprehensively describe how the electronic ticketing system is implemented in Semarang City, critically evaluate the obstacles that reduce its effectiveness, and formulate a solution-oriented optimization strategy to build a sustainable culture of orderly traffic in the community.

2. Research Methods

This legal research uses an empirical (sociological) juridical research type that focuses on the effectiveness of law in social reality and directly observes how the law works in the road user community related to the existence of Electronic Traffic Law Enforcement (ETLE). The approach used is a socio-legal approach to critically analyze the behavioral patterns, levels of compliance, and psychological-cultural responses of the community to the intervention of electronic law enforcement technology. The research specifications chosen are descriptive analytical, which aims to provide an in-depth, systematic, and accurate picture of the implementation facts as well as structural and cultural obstacles of the ETLE system. This research took place and was centered at the Semarang City Police Traffic Unit (Satlantas) as a law enforcement institution and the main implementer of the electronic ticketing system in the Semarang City area. The data sources in

this study are a balanced combination of primary and secondary data. Primary data were obtained directly from the field (field research) through in-depth interviews with internal police officers as the legal structure, specifically the Bintara (National Police) for Traffic Ticketing Affairs (Baur) of the Semarang City Police Traffic Unit. Meanwhile, secondary data were obtained through library research to inventory primary legal materials such as Law Number 22 of 2009 concerning Traffic and Road Transportation and its implementing regulations, secondary legal materials in the form of legal textbooks and scientific journals, and tertiary legal materials in the form of legal dictionaries. All collected data were then processed and analyzed using qualitative analysis methods, where the data were systematized logically to draw deductive-inductive conclusions in order to comprehensively answer all research problem formulations.

3. Results and Discussion

3.1. Empirical Implications of the Implementation of the ETLE System on Traffic Violation Patterns in Semarang City

The transformation of traffic law enforcement architecture in the jurisdiction of the Semarang City Police (Polrestabes) through the operation of Electronic Traffic Law Enforcement (ETLE) marks a radical paradigm shift, from a conventional surveillance model that relies on the physical presence of police personnel to an integrated, automated digital surveillance system (Arabella, 2026). Normatively and instrumentally, the adoption of this technology is a legal emergency response to embody the principles of certainty, efficiency, and transparency of law enforcement as mandated by Law Number 22 of 2009 concerning Traffic and Road Transportation.

In its practical implementation, the Semarang City Police Traffic Unit conducted spatial mapping by placing static ETLE camera devices at 5 (five) strategic locations that are the epicenter of mobility as well as areas prone to non-compliance. These points include along Jalan Pandanaran (precisely in front of the Semarang City Health Office No. 79 and in front of Hermina Hospital), Jalan Brigjen Katamso (in front of SMP N 2 Semarang as a form of protection for the school's safe zone), Jalan Siliwangi (as the main artery for logistics distribution along the north coast), and Jalan Perintis Independen (as the main entrance gate from the south/suburban). The deployment of these cyber sensors empirically drastically changed the volumetric landscape of traffic violation recording in Semarang City.

Based on operational data and the results of in-depth interviews with the Semarang Police Traffic Inspectorate (Aipda Rio Sasongko, 2026), empirical facts were found that reflect a large imbalance between the capture capacity of information technology and the execution capabilities of the law enforcement bureaucracy. The average number of raw data violations recorded by the electronic surveillance system (traffic violation log) at strategic points in Semarang

City reaches a fantastic figure, namely around 5,000 violations per day. However, of the total potential of thousands of daily violations, the number of cases successfully validated and converted by operators in the ETLE Backoffice room into legal ticket products is only around 200 violations per day. This condition creates a legal enforcement gap of 96% of the reality of actual violations on the highway. This low data conversion ratio is structurally caused by the limited quantity of certified Backoffice operator personnel and the high number of vehicle database anomalies that are not found or do not match when filtered through the Electronic Registration and Identification (ERI) application. However, if the effectiveness of ETLE is compared with the conventional manual ticketing model during official operations (such as Operation Patuh Candi), the performance of this cyber technology still shows a massive quantitative advantage.

Annual report data and enforcement statistics show that in a two-week routine operating period, manual enforcement by officers in the field is only able to produce around 200 tickets due to limited physical reach of personnel. In contrast, in the same operating period, the ETLE system has been proven to be able to record, verify, and process between 600 and 1,700 violations dominated by two-wheeled vehicle drivers (Semarang, 2025). This quantitative advantage is supported by the reliable performance of static camera technology which has a sensor accuracy level of up to 90% in identifying Motor Vehicle Registration Plates (TNKB), even under the influence of extreme weather disturbances such as heavy rain or low lighting conditions at night.

The acceleration of procedures is also reflected in the administrative Service Level Agreement (SLA), where the digital bureaucratic chain starting from image capture, screening in the back office, to sending a confirmation letter to the door of the violator's house via a logistics courier service takes an average of only 3 (three) working days (Aipda Rio Sasongko, 2026). However, this technical success is hampered by administrative obstacles stemming from the low cultural compliance of the community in orderly motor vehicle administration. In a sample of police document examinations, it was found that more than 30% of vehicle owner addresses registered in the SAMSAT database were invalid or the vehicles had actually changed hands (sold) without any name change process by the new owner (Aipda Rio Sasongko, 2026).

This data mismatch problem has direct implications for the low responsiveness of the public in seeking clarification, where the level of fulfillment of online and offline confirmation obligations after receiving a traffic ticket is below 40%. The majority of people tend to ignore or ignore the physical confirmation letter sent (Semarang, 2025). To mitigate this passive resistance, the Semarang City Police Traffic Unit was forced to implement administrative sanctions by means of government coercion (*bestuursdwang*) in the form of a STNK blocking mechanism at the SAMSAT office, so that violators are routinely locked and cannot make

annual tax payments before settling their electronic traffic ticket fines. Demographically, the pattern of traffic violations caught by the ETLE system in Semarang City shows very specific sociological characteristics based on age and profession (Aipda Rio Sasongko, 2026).

The visualization results of camera captures prove that the young age group under 30 years old is the most dominant entity, with a contribution of more than 50% of the total number of daily traffic violations. The types of violations they commit are generally minor but high risk, such as driving without wearing a helmet SNI standard, violating stop markings (stop lines), and using a mobile phone while the vehicle is moving. Meanwhile, based on livelihood characteristics, the most vulnerable professional group and often identified by the backoffice system are online transportation drivers or online motorcycle taxis in the 30-40 year age range (Semarang, 2025). The high frequency of violations in this online motorcycle taxi cluster correlates with the high daily road utility and economic demands to pursue time efficiency, which often conditions them to make pragmatic calculations by violating road markings for the smooth running of their operational activities.

When the entire empirical data above is analyzed using Lawrence M. Friedman's Legal Systems Theory, a wide gap is clearly visible between the structural subsystem (ETLE technology and officers) and the cultural subsystem (the legal culture of the Semarang community). System modernization through sophisticated cameras with 90% accuracy has only succeeded in engineering a digital law enforcement space, but has not been able to engineer the inner legal awareness of human drivers. (Friedman, 2009). The psychological impact of digital law enforcement has given rise to a sociological anomaly in the form of a partial deterrence effect that leads to a false sense of spatial compliance. Drivers in Semarang City demonstrate a very high level of discipline and suddenly become orderly only when crossing five main road corridors with static cameras installed (such as on Jalan Pandanaran or Simpang Lima). However, once they leave the visual range of electronic sensors and enter secondary arterial routes or alternative suburban roads (such as the Tembalang or Genuk areas), the behavior of violating traffic markings, going against traffic flow, and riding without a helmet again increases sharply. This conditional compliance, when viewed from the perspective of Legal Compliance Theory (Tyler, 2017), confirms that the legal awareness of the people of Semarang City is still at the instrumental-pragmatic compliance stage.

People obey traffic rules not because they view them as a moral obligation or normative value for the sake of collective safety, but solely because of rational economic calculations to avoid financial sanctions from fines and the hassle of blocking vehicle documents at the SAMSAT. From a Progressive Law perspective (Rahardjo, 2009), the law must not be allowed to become a rigid

automatic machine amidst the manipulation of social behavior. When drivers circumvent the ETLE system by using fake license plates or removing their vehicle registration tags to avoid camera shots, the actions of the Semarang Police Traffic Unit, which combines it with a dual law enforcement system (stationary ticket hunting system directly in the field), is a tactical and responsive necessity. This hybrid step is presented as a complementary instrument to break the impunity of cyber law, restore the authority of the law immediately on the highway, and slowly force the orientation of instrumental compliance of the Semarang community to move towards genuine normative awareness in all public spaces.

3.2. Structural and Cultural Barriers to the Transition to Digital Legal Compliance

The effectiveness of a legal system cannot be judged solely on the sophistication of the technological instruments it uses. According to the legal system theory developed by Lawrence M. Friedman, successful law enforcement is the result of harmonious collaboration between three main elements: legal structure, legal substance, and legal culture. (Teubner, 2021). In the context of the implementation of Electronic Traffic Law Enforcement (ETLE) in Semarang City, the transition from conventional law enforcement patterns to a repressive digital system encountered quite complex obstacles in both structural and cultural dimensions.

These obstacles trigger systemic dysfunction, where the digital legal system is capable of recording violations on a massive scale, but fails to transform them into consistent normative compliance among road users. The first structural obstacle, which is a major weakness in ETLE law enforcement at the Semarang City Police Traffic Unit, lies in the limited operational capacity and human resources in the Backoffice unit. Empirically, there is a very wide gap between the automatic data production capabilities of camera sensors and the factual verification capabilities of law enforcement officers (Sahadina & Kastubi, 2023). The raw data recordings (traffic violation logs) produced by five static cameras at strategic points such as Jalan Pandanaran, Jalan Brigjen Katamso, Jalan Siliwangi, and Jalan Perintis Independen reach an average of 5,000 potential violations per day. However, the limited number of operators with special qualifications and certifications for data filtering results in a very slow verification process. As a result, of the thousands of screenshots, only around 200 violations can be converted into valid ticket confirmation letters each day. This 96% volumetric gap reveals the fact that the legal structure subsystem at the implementing level is not yet ready to keep up with the speed of cyber technology acceleration, thus creating a vacuum for legal action (digital impunity) that reduces the authority of the ETLE system itself.

In addition to personnel issues, this structural obstacle is exacerbated by the problem of inter-institutional vehicle database integration, which has not yet been optimally implemented. The data filtering process in the Traffic Police back office relies heavily on the accuracy of the Electronic Registration and Identification (ERI)

system, which is connected to the SAMSAT (Vehicle Registration and Identification System). However, in the field, administrative reality has revealed a corrosive obstacle, with more than 30% of vehicle owner address data listed in the database being invalid or out of date. This problem arises from the widespread phenomenon of vehicles changing hands through underhand transactions without the new owner having to transfer their ownership. The legal implications of this structural data inaccuracy are severe; electronic ticket confirmation letters are often misdirected because they are sent to the address of the previous owner, who legally no longer has any civil relationship or physical control over the vehicle.

These administrative obstacles are the primary reason behind the low public responsiveness to clarification requests, with the level of fulfillment of the confirmation requirement after receiving a physical letter falling below 40%. This situation forces the legal system to take defensive action by unilaterally blocking vehicle registration certificates to enforce compliance, a hybrid legal measure that reflects the lack of independence of the digital enforcement system. (Ayunisa, 2022). When the analysis shifts to the cultural dimension, the obstacles faced shift to behavioral resistance and the legal mentality of the Semarang City community, which is not yet ready to adapt to the openness of digital law. Using the theory of legal awareness, legal culture reflects how society responds to, interprets, and internalizes the values contained in legal regulations.

The most prominent cultural barrier in Semarang City is the still dominant mindset of instrumental compliance - based on fear of economic sanctions, not from an inner awareness of driving safety. The public tends to view ETLE cameras not as an instrument of public safety protection, but rather as a "repressive surveillance machine" that threatens their financial stability through fines. This artificial legal culture gives rise to a situational and spatial pattern of traffic order, where drivers will only strictly obey road signs and markings when within the field of view of the Semarang Police's static camera sensors (Aipda Rio Sasongko, 2026). Once outside the digital surveillance zone, selfish driving again dominates the public space.

Demographically, these cultural barriers are clearly depicted in the two groups of legal subjects who dominate the daily number of violations, namely the young age group under 30 years and the group of online transportation workers (online motorcycle taxis). The young age group, which contributes more than 50% of the total recorded violations, has a legal culture characteristic that ignores risks for pragmatic convenience, such as being reluctant to use SNI standard helmets for short distances or continuing to use cell phones while driving for social existence (Semarang, 2025). On the other hand, the group of online motorcycle taxi drivers in the 30-40 year old age range often violates road markings and traffic lights due to normative economic pressures to pursue time efficiency for the sake of their work algorithmic point system.

The cultural characteristics of these two groups indicate that the internalization of traffic law values is eliminated by short-term rational calculations and urgent needs on the road. The most extreme and destructive form of cultural barriers in the ETLE ecosystem in Semarang City is the emergence of legal subversion or active efforts by road users to deceive the visual camera detection system. This "digital cat and mouse" phenomenon materializes through various *modus operandi*, such as deliberately removing the rear Motor Vehicle Registration Plate (TNKB), using fake license plates not registered with the ERI, to covering numbers or letters on license plates with mud, duct tape, or other props. (Fanani, 2025). This subversive act culturally demonstrates a hidden collective rejection of automated surveillance systems. Society develops adaptive skills not to comply with the law, but to escape the clutches of cyber law enforcement.

Legal sociologists see this phenomenon as a reflection of the low moral legitimacy of law enforcement officers in the public eye; when law enforcement shifts entirely to automation without being balanced by procedural justice and participatory education, the public will respond with legal alienation and veiled acts of defiance. The integration of structural barriers in the form of limited Backoffice verification ratios (only able to process 200 of 5,000 daily violations) with cultural barriers in the form of license plate subversion creates a vicious cycle that paralyzes the reach of the law.

People aware of the structural validation weaknesses and the chaotic gaps in vehicle administration data are becoming increasingly bold in ignoring incoming confirmation letters. The absence of a physical police presence in the field, replaced by cameras, actually eliminates the direct psychological deterrence effect on these cyber violators. This situation confirms that the transition to digital law compliance in Semarang City remains stuck in a purely formal-technological phase. The new legal system has succeeded in modernizing enforcement tools (structure), but has failed to socially engineer drivers' mindsets and behaviors (culture). As a result, the law has lost its meaning as a substantive instrument for maintaining social order and has instead become a digital bureaucratic system for collecting fines, whose effectiveness is continually undermined by the cultural rejection of its own community.

3.3. Strategy for Strengthening and Optimizing ETLE in Developing a Culture of Orderly Traffic

The systemic failure of digital law enforcement, trapped within the boundaries of spatial and instrumental compliance, requires a comprehensive and progressive strategic reconstruction. Referring to Roscoe Pound's thinking on law as a tool of social engineering, which was then contextualized by Mochtar Kusumaatmadja into the concept of law as a means of societal renewal, law cannot be merely passive-repressive. Law must be optimized as an active instrument deliberately directed at changing the behavior, habits, and collective mentality of

society.(Sugito & Manurung, 2025). The operation of Electronic Traffic Law Enforcement (ETLE) by the Semarang City Police Traffic Unit should not be seen as merely a digitalization of material fine bureaucracy, but rather must be re-architected as the upstream of a social engineering movement to realize a culture of orderly traffic that is normatively internalized in the City of Semarang.

Based on the results of the analysis of structural and cultural barriers found in the field, the strategy for optimizing the ETLE system by the Semarang Police Traffic Unit in engineering road user behavior is divided into three main pillars, namely:

a. Structural Optimization Through Systemic Data Integration and Administrative Force Means

The first pillar focuses on addressing the high number of misdirected confirmation letters (errors in person) due to limited validity of vehicle ownership data. The Semarang City Police Traffic Unit needs to fully integrate the Electronic Registration and Identification (ERI) database with the inter-institutional database at the Central Java Provincial Vehicle Registration and Registration Office (SAMSAT). Concrete steps in this optimization include(Aipda Rio Sasongko, 2026):

1) Automatic Preventive Vehicle Registration Blocking Implementation: When a violation is recorded by an ETLE camera, the system automatically locks the vehicle's administrative status at the SAMSAT (Vehicle Registration and Tax Office). If the previous owner, who receives the confirmation letter, files an objection online, including proof of transfer of ownership (sale or purchase), the legal burden of the fine is automatically transferred to the new owner through the blocking of the vehicle registration certificate during the annual tax renewal.

2) Increasing Backoffice Verification Capacity: Increasing the number of certified Backoffice operators to reduce the gap in law enforcement (which currently only processes 200 out of 5,000 daily violations). By optimizing the number of verification officers, the conversion rate of raw data into traffic ticket results can be significantly increased, thereby reducing the gap in digital impunity on the roads.

b. Expanding Spatial Surveillance Reach Through Dynamic ETLE Systems (Mobile and Drone)

The second pillar aims to address the partial deterrence effect and the "digital cat-and-mouse" behavior, where drivers only comply with traffic regulations at five fixed camera locations (Jalan Pandanaran, Jalan Brigjen Katamso, Jalan Siliwangi, and Jalan Perintis Independen). This enhanced monitoring coverage is being implemented through:

1) Acceleration of ETLE Mobile (Go-Sigap Application): Maximizing the use of handheld camera devices by Satlantas patrol officers to reach blind spot areas on secondary arterial roads and connecting roads between regions.

2) ETLE Drone Infrastructure Development: Operating drone technology equipped with visual intelligence cameras in suburban areas with high traffic violation rates, such as the Tembalang, Genuk, and outer ring roads of Semarang City. This dynamic, mobile surveillance will psychologically create an omnipresence policing effect. Road users will no longer be able to predict the location of camera sensors, so rational calculations to violate the rules at certain points can be suppressed, and driving compliance will be consistent throughout the city.

c. Cultural Transformation Through Procedural Justice and Participatory Education Approaches

The third pillar rests on strengthening sociological legal awareness to shift the compliance orientation of Semarang residents from instrumental-pragmatic (compliance due to fear of financial penalties) to normative-legally conscious compliance (compliance due to safety needs). Based on Tom R. Tyler's Theory of Legal Compliance, people will voluntarily comply with the law if they perceive that the law enforcement process is fairly conducted and transparently. This strategy is implemented through:

1) Digital-Based Procedural Transparency: Each physical confirmation letter sent to the offender's home must include a unique matrix code (QR Code). This code provides legal subjects with direct access to visual evidence of the violation (high-resolution photos/videos) through the official application, complete with details of the normative articles violated and a method for direct fine payment via a Virtual Bank Account (BRIVA). This accurate and personal-free transparency will increase public trust in the moral legitimacy of ETLE law enforcement.

2) Patterned Sociocultural Education: Targeting the demographic clusters most vulnerable to violations based on empirical data, namely the young age group under 30 and the online transportation worker community (online motorcycle taxis). The Semarang City Police Traffic Unit transformed one-way socialization into a participatory campaign through the integration of driving safety curriculum in formal schools/universities and regular partnership forums with online motorcycle taxi associations. This education emphasizes paradigm reconstruction: that road markings and SNI standard helmets are not a legal obligation burden on the state, but rather an instrument for protecting the right to life and the human rights of other road users.

4. Conclusion

Optimizing the Electronic Traffic Law Enforcement (ETLE) system in building a culture of orderly traffic in Semarang City shows that the transformation of digital-

based law enforcement has succeeded in increasing the effectiveness of traffic supervision and enforcement through more massive, accurate, and efficient violation detection capabilities compared to conventional systems, but this effectiveness has not been fully able to produce substantive legal compliance. Empirical findings indicate a gap between technological capacity and the readiness of the implementing structure, which is reflected in the low violation data conversion ratio due to limited back-office personnel, problems with the validity of the vehicle database, and the low public response to the ETLE confirmation mechanism. In the cultural aspect, community compliance patterns are still dominated by an instrumental-pragmatic orientation that gives rise to spatial compliance, adaptive behavior to avoid supervision, and high violations among young age groups and online transportation workers. Thus, the novelty of ETLE optimization lies not only in strengthening the function of law enforcement technology, but in reconstructing the system towards an integrative digital law enforcement model through strengthening administrative structures, expanding dynamic supervision, and transforming legal culture based on procedural justice and participatory education to encourage the formation of a normative, consistent, and sustainable traffic order culture throughout the public spaces of Semarang City.

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