

Research Article

Integration of Electronic Test Pass Evidence and Smart Enforcement at the Sidoarjo Regency PKB UPT

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Abstract: Digital transformation in public administration demands the creation of an integrated policy ecosystem to ensure land transportation safety. The implementation of the program to waive periodic motor vehicle inspection fees in Sidoarjo Regency based on Regional Regulation No. 1 of 2024 presents significant challenges in monitoring the roadworthiness of freight transport fleets. This study aims to analyze the system integration architecture model, identify cross-sectoral institutional barriers, and formulate Smart Enforcement policies capable of producing public value. Using descriptive-analytical qualitative methods, data were collected through in-depth interviews, observations in server rooms, and documentation studies of relevant agencies' IT blueprints. The results show that although the Electronic Test Pass Proof (BLU-e) innovation successfully eliminated document falsification within testing facilities, its impact on macro traffic safety remains fragmented. The main problem lies in digital sectoral ego, where the BLU-e database belonging to the Transportation Agency and the Electronic Traffic Law Enforcement (ETLE) automated ticketing system belonging to the Sidoarjo Police Traffic Unit operate separately in their respective silos. The readiness index measurement results indicate that the technical and semantic dimensions are in the "Very Ready" and "Ready" categories due to the mature computerization infrastructure. However, this integration project has encountered bottlenecks in organizational and regulatory interoperability due to the lack of a local legal framework. Therefore, policy intervention in the form of a Regent Regulation and a Memorandum of Understanding (MoU) is needed to build an Application Programming Interface (API)-based data bridge to achieve proactive and accountable automated law enforcement.

Keywords: BLU-e; Data Interoperability; Sidoarjo; Smart Enforcement; Smart Governance.

1. Introduction

Digital transformation in the public administration sector has shifted from simply computerizing internal services to creating an integrated, responsive, and intelligent policy ecosystem (smart governance). (Anthopoulos et al., 2021) In the modern era, the success of an innovation is no longer measured solely by the ease of transactions at the service counter, but rather by the ability of a digital system to consistently and automatically enforce regulations in public spaces. (Lorvão Antunes et al., 2024) One of the crucial pillars in land transportation safety management is the compliance of the freight fleet with technical feasibility threshold standards. (Rusdy & Flambonita, 2023) When the government provides a radical stimulus in the form of exemption from periodic vehicle testing fees through the mandate of Law Number 1 of 2022 concerning Financial Relations between the Central Government and Regional Governments (HKPD Law), the main challenge for regional governments is no longer how to attract interest in mandatory testing, but rather how to ensure the effectiveness of vehicle roadworthiness monitoring on the highway after the implementation of the zero rupiah tariff so as not to sacrifice public safety. (Prabowo & Lukman, 2026).

Sidoarjo Regency, as one of the largest logistics hubs and manufacturing centers in East Java, bears a heavy sociological burden due to the high intensity of large-tonnage freight vehicles in its territory. Sidoarjo's strategic position as the main gateway for logistics movement to Surabaya City and Eastern Indonesia causes the volume of container trucks and material transport to experience a massive escalation every year. The Sidoarjo Regency Transportation Agency, through the Motor Vehicle Testing Technical Implementation Unit (UPT PKB), has actually implemented an innovation of Electronic Test Pass Proof (BLU-e) in the

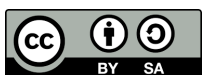
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form of a smart card to replace the manual test book system that is prone to forgery. However, empirical reality shows the existence of major legal loopholes on the asphalt highway, where fluctuations in mandatory test compliance remain high and it is common to find freight vehicles with expired KIRs still operating freely, which directly contributes to the high number of traffic accident fatalities. (Zhao, 2023).

The fundamental weakness of the current BLU-e system implementation stems from the lack of real-time data integration between the KIR approval database held by the Sidoarjo UPT PKB and law enforcement instruments on the highway. Currently, the BLU-e instrument only functions as a passive means of proof when the vehicle is in the testing facility. (Chuma, 2025) Once the logistics fleet is on the road, technical roadworthiness monitoring returns to relying on conventional inspection methods through joint physical inspections, which are temporary, time-consuming, and cause congestion. (Firdaus et al., 2021). Fleet owners who adopt a reactive-defensive approach easily exploit this loophole; they demonstrate high compliance in the UPT PKB test lane, but opportunistically ignore technical eligibility or illegally modify their loads immediately after receiving their approval cards, knowing the low probability of being caught in manual raids on Sidoarjo's arterial routes such as the Waru and Krian corridors. In fact, with the development of modern traffic monitoring technology, the Sidoarjo Regency area has begun adopting Smart Enforcement instruments, such as Electronic Traffic Law Enforcement (ETLE) cameras and dynamic weight sensor technology (Weigh-in-Motion). (Narendroputro & Rusfian, 2023) Unfortunately, the potential of this advanced monitoring technology has not been fully optimized to screen vehicle roadworthiness compliance because the electronic BLU-e data passing data belonging to the Transportation Agency and the digital ticketing system belonging to the National Police Traffic Corps still run separately in their respective digital silos. This digital ego-sectoral phenomenon causes ETLE cameras on highways to only be able to detect visible traffic violations such as seat belt use or road markings, but are blind to the KIR test validity status of goods vehicles passing in front of them. (Fitriani, 2025).

Therefore, a strategic study is needed regarding the system integration between BLU-e and Smart Enforcement at the Sidoarjo Regency PKB UPT from a public policy perspective. Through Application Programming Interface (API)-based data interoperability, vehicle data that is declared to have failed or expired KIR at the PKB UPT can be automatically sent to the Police Smart Enforcement command center to trigger automatic electronic ticketing when the truck's license plate is captured by an ETLE camera on the road. This digital bureaucratic engineering step is urgently needed to convert the regional levy-free policy based on Regional Regulation Number 1 of 2024 into a supervisory instrument that has a rigid, transparent law enforcement fang, and is free from subjective discretion by officers in the field. (Louis Bisma Wicaksana Praharsa et al., 2024). To date, public literature on the Sidoarjo Public Works and Transportation Unit (UPT PKB) is still dominated by partial evaluations of physical service quality, drive-thru lane waiting time efficiency, or the level of mandatory testing satisfaction with officers. There is still a deep academic research gap regarding the analysis of cross-sector digital data interoperability policies in realizing transportation safety. This research aims to fill this gap by focusing on the analysis of the system integration architecture model, institutional and legal barriers that hinder the integration of data bridges, and how the formulation of a comprehensive Smart Enforcement policy can produce public value in the form of safe, orderly, and sustainable road space in Sidoarjo Regency.

2. Literature Review

The development of a theoretical foundation in contemporary public administration research serves as a theoretical compass and theoretical instrument linking technological innovation with the effectiveness of regulatory enforcement at the macro level. In analyzing the phenomenon of digitalization of government services, information technology should not be viewed narrowly as mere hardware or applications, but rather as a policy instrument that reconstructs the governance of relations between state institutions for the sake of fulfilling public rights. (Thabit et al., 2025) The issue of non-compliance with the roadworthiness of freight vehicles represents a public problem that is cross-sectoral and broad in scope. Resolving this problem is no longer adequate if it relies on traditional, hierarchical, and fragmented bureaucratic structures. (Quek et al., 2023) Through structured conceptual reasoning, this study integrates Smart Governance Theory, Digital Policy Interoperability Theory, and Public Value Theory to build a sharp analytical knife in dissecting the urgency of harmonizing motor vehicle testing data in Sidoarjo Regency.

The main theory (grand theory) underlying this research is the Smart Governance Theory developed by Hans Jochen Scholl. Scholl asserts that smart governance is the government's core capability to utilize advanced information technology to improve the quality of decision-making, cross-sector coordination, and objective and transparent law enforcement. (Anom et al., 2025) The main characteristic of smart governance lies not in how many independent digital applications an agency has successfully created, but rather in the extent to which these systems are able to adapt and collaborate in solving citizen problems automatically and responsively. (Nuradhawati, 2025). In the operational context of the Sidoarjo PKB UPT, this theory is used to evaluate the level of effectiveness of the transition of the BLU-e smart card system from merely an internal bureaucratic evidence tool to a proactive macro-supervision instrument in the public traffic space. (Social et al., 2023) To describe the technical and institutional mechanisms of this system integration, this study adopts the Theory of Digital Policy Interoperability in the Public Sector. Interoperability is defined as the readiness of different organizations and information systems to interact, exchange data, and share information in real time to achieve common goals. (Ruci et al., 2024) This theory divides the level of readiness into three crucial levels: technical interoperability (network and data format alignment), semantic interoperability (data variable meaning similarity), and organizational interoperability (inter-agency operational procedures and legal umbrella alignment). (Androniceanu et al., 2022). This theoretical framework is highly relevant to dissect the structural barriers why the digital KIR test pass data belonging to the Sidoarjo Transportation Agency has not been able to be read automatically by the Police's ETLE ticketing computer system, as well as how to formulate a valid data bridge (Application Programming Interface) policy formulation in the eyes of state administrative law.

As a binding force for all conceptual variables, this study applies the Public Value Theory pioneered by Mark H. Moore. Through the Strategic Triangle concept, Moore emphasizes the alignment between the intended substantive benefits (public value), the support of the political/regulatory environment (legitimacy and support), and the organization's operational capacity (operational capability). (Moore, 2021). Along with the collapse of the regional revenue motive due to the implementation of a zero rupiah tariff for KIR testing based on Sidoarjo Regency Regional Regulation Number 1 of 2024, the functional orientation of the Sidoarjo UPT PKB must be totally mutated. The highest public value that must be produced by the current agency is the protection of road user safety and the preservation of highways from damage through the optimization of the Smart Enforcement ecosystem that is integrated, objective, and free from subjective discretion by field officers. (B, 2023).

3. Research Method

Research methods in public administration serve as operational designs and scientific guidelines for objectively unraveling the complexities of digital bureaucratic governance and the systemic interactions between government institutions. In studies of smart governance transformations, such as the integration of data policies across sectoral agencies, the reality on the ground is dynamic, technical, and involves system alignment that cannot be fully understood by measuring only macro statistics. A research design is needed that can penetrate aspects of policy architecture, IT infrastructure readiness, and even procedural obstacles faced by implementing bureaucrats. (Lorenza & Subowo, 2022) Therefore, this methodology section is systematically structured to present an accountable, in-depth investigation that is able to analyze the determining factors for the success of the data bridge to automatically enforce vehicle roadworthiness regulations in Sidoarjo Regency.

The approach applied in this research is a qualitative approach with a descriptive-analytical method. The qualitative approach was consciously chosen because the focus of this study is directed at exploring, understanding, and comprehensively mapping the abstract dimensions of organizational and technical interoperability within the bureaucracy. The researcher acts as the main instrument (human instrument) who is directly present at the research locus to observe data interactions, record structural controls, and capture bureaucratic cultural barriers without laboratory engineering. Through this descriptive method, the researcher will describe in detail how the Electronic Test Pass Proof (BLU-e) data integration model owned by the Transportation Agency can be aligned with the Smart Enforcement (ETLE) digital ticketing ecosystem owned by the Police to produce public value in the form of land transportation safety. The research locus was determined purposively at the Motor Vehicle Testing Technical Implementation Unit (UPT PKB) of the Sidoarjo Regency Transportation Agency. This location selection is crucial considering that Sidoarjo is an industrial

metropolitan area supporting East Java which has a high urgency in monitoring the roadworthiness of freight transport fleets following the implementation of the regional levy-free program. The informant selection technique relied on purposive sampling to identify actors with policy authority and operational technical expertise. The key informant structure in this qualitative study consisted of the Head of the Sidoarjo PKB Technical Implementation Unit (UPT PKB) responsible for internal technical regulations, the Head of the Traffic Division of the Transportation Agency, the Traffic Ticketing Administration Officer of the Sidoarjo Police Traffic Unit, and the Information Technology (IT) Development Team that manages the electronic KIR approval database.

The data in this study were classified into two types: primary data and secondary data. Primary data were collected directly through semi-structured in-depth interviews, focusing on three levels of digital policy interoperability indicators and the challenges of Smart Governance bureaucratic engineering. These interviews were reinforced by passive participant observation, in which the researcher directly observed the data synchronization mechanism in the UPT PKB server room, the digital graduation input process in the mechanical test lane, and the operationalization of traffic monitoring camera captures on arterial roads. Meanwhile, secondary data were obtained through documentation studies, including the blueprint for the development of the Transportation Agency's information system, the daily log of BLU-e issuance, and the draft of the traffic law enforcement coordination cooperation. To ensure the validity and reliability of the qualitative data obtained, the researcher applied source triangulation and technical triangulation techniques. Source triangulation was carried out by comparing and cross-referenced verbal information between the Transportation Agency's IT data manager and the Police ETLE system operator, then converting it with the views of public policy experts. Technical triangulation was carried out by testing the alignment of data from interview results, field observation notes in the control room, and evidence of data log manifests listed in agency documents.

All valid data were then analyzed interactively, adopting the Miles, Huberman, and Saldana model through three circular stages. The first stage is data reduction to select and simplify raw field data into thematic clusters for digital system integration. The second stage is data display by pouring the data into a macro data flow matrix so that the relationship patterns between systems can be easily understood. The final stage is drawing conclusions and verification (conclusion drawing) to formulate the meaning of the Smart Enforcement ecosystem found, linking it back to Scholl and Moore's theory, to produce a final conclusion that is robust and applicable for policymakers in Sidoarjo Regency.

4. Results and Discussion

The transition to a zero-rupee tariff policy for periodic motor vehicle inspections in Sidoarjo Regency, mandated by Regional Regulation No. 1 of 2024, requires a paradigm shift from traditional bureaucratic oversight to proactive, data-driven regulation within a smart governance framework. Empirical findings from this study indicate that while the implementation of Electronic Vehicle Test Pass Certificates (BLU-e) has successfully eliminated physical document forgery within testing facilities, its impact on road safety at the macro level remains highly fragmented. Through the analytical lens of Hans Jochen Scholl's Smart Governance theory, the primary institutional bottleneck lies in the existence of digital silos; where the real-time vehicle compliance database managed by the Sidoarjo Regency Transportation Agency operates in isolation from the automated traffic law enforcement (ETLE) infrastructure controlled by the Sidoarjo City Police Traffic Unit. This lack of system interoperability allows vehicles with expired vehicle inspection (KIR) validity periods or with illegal dimensions to pass through automated checkpoints undetected, significantly harming public value in the form of road safety and infrastructure preservation. To optimize the strategic triangle of public value creation proposed by Mark H. Moore, comprehensive structural integration is required. This reengineering involves establishing a secure data bridge (Application Programming Interface/API) that connects the BLU-e registry with the ETLE system, effectively transforming passive administrative data into a robust, real-time, automated compliance enforcement mechanism while eliminating human bias and subjective discretion of officers in the field.

Table 1. Interoperability Scheme of BLU-e Integration Policy Flow Data Flow and Smart Enforcement.

System Stages	Primary Data Source	Management Agency	Proposed Integration Mechanism	Tactical Impact of Regulatory Enforcement
Hulu	Mechanical Test Result Data (Brakes, Emissions, Lights) & Truck Physical Dimensions.	UPT PKB Sidoarjo Transportation Agency	Automatic data transmission from the test lane computer to the Ministry of Transportation's central database.	Guarantee the authenticity of graduation documents without any gaps in manual physical manipulation.
Process (Data Bridge)	Digital Certificate Document of Periodic Test Passing (BLU-e).	UPT PKB Sidoarjo Transportation Agency	Provision of a secure public Application Programming Interface (API) for law enforcement agencies to access.	Vehicle data that has expired its KIR period is immediately entered into the traffic system blacklist.
Downstream (Execution)	Visual recording of license plate numbers of logistics vehicles on arterial roads.	Sidoarjo Police Traffic Unit (ETLE Center)	Automatic matching between license plates captured by ETLE cameras and BLU-e data.	Vehicle owners who are in arrears with their vehicle inspection (KIR) will immediately receive an electronic ticket sent to their home address.

Source: Conceptual Analysis Results of Digital Governance System Engineering, 2026

Based on the analysis of the data flow and interoperability scheme in Table 1, it can be concluded that the effectiveness of enforcing vehicle roadworthiness regulations after the zero-rupiah tariff policy can no longer rely on passive administrative oversight within the PKB UPT. The transformation from traditional governance to smart governance requires the development of a digital bridge in the form of *Appli Programming Interface(API)* that connects

the Transportation Agency's technical graduation database (BLU-e) in real-time with the Sidoarjo Police Traffic Unit's automated law enforcement infrastructure (Smart Enforcement / ETLE). The integration of data flow from upstream (test lane) to downstream (execution on the highway) is an absolute tactical solution to close the gap for physical manipulation by freight fleet owners, eliminate the discretionary space for field officers, and realize an objective and independent traffic law enforcement system to produce public value in the form of land transportation safety.

Table 2. Readiness Index Matrix for Digital Policy Interoperability at the Sidoarjo PKB UPT.

No.	Interoperability Dimensions	Empirical Condition Indicators in Sidoarjo	Readiness Score	Management Evaluation Notes
1	Technical Interoperability	The test lane computer hardware is fully computerized and the local server of the UPT PKB has adequate memory capacity.	Very Ready	The basic infrastructure is very strong; just open limited outbound network access (secure gateway).
2	Semantic Interoperability	The data dictionary and naming of vehicle variables between the Transportation Agency and Police (Sam-sat/ETLE) systems already use uniform plate registration numbers.	Ready	The license plate and chassis number data formats are aligned, simplifying the automatic data matching process.
3	Organizational Interoperability	There is no specific MoU that regulates the distribution of server management authority and cybersecurity guarantees across agencies.	Not Ready	The main obstacles lie in the egos of bureaucratic sectors and concerns about leaks of private data of transport owners.
4	Regulation/Legality	The macro regulations of the ITE Law and the HKPD Law support integration, but there is no Sidoarjo Regent Regulation (Perbup) that details the implementation of Smart Enforcement KIR.	Just Ready	Requires local regulatory intervention from the Regional Head to formally bind the cooperation commitment between the two agencies.

Source: Results of Interview Data Reduction and IT Blueprint Document Review, 2026

Through the readiness index matrix mapping in Table 2, it can be concluded that mechanically and technologically, Sidoarjo Regency actually has very strong digital capital to implement the Smart Enforcement ecosystem. This readiness is evidenced by the technical and semantic interoperability aspects that are categorized as "Very Ready" and "Ready," where the computerized infrastructure for test lanes is mature and the naming variables for vehicle data between agencies are already uniform using license plate registration numbers. However, this system integration project has encountered a deadlock in the dimensions of organizational and regulatory interoperability due to strong bureaucratic sectoral egos and the absence of a local legal umbrella (Regent Regulation) governing cross-sectoral data governance. Therefore, the final conclusion confirms that the success of digital transformation in Sidoarjo currently no longer requires the procurement of new technological tools, but rather requires

policy intervention from the Regional Head to formulate formal regulations and a Cooperation Agreement (MoU) to dissolve institutional barriers for the benefit of broader public safety.

5. Conclusions

Conclusion

Based on a comprehensive analysis of the digital governance ecosystem in Sidoarjo Regency, this study yields two substantive conclusions. First, the effectiveness of enforcing regulations on the technical roadworthiness of freight fleets following the implementation of the regional levy-free program has proven to no longer rely on passive administrative oversight upstream or conventional, temporary, physical joint raids. A radical transformation toward a smart governance concept requires the integration of dynamic macro data flows through the use of Application Programming Interface (API) technology. This digital bridge functions to align the Transportation Agency's electronic KIR (BLU-e) database with the Sidoarjo Police Traffic Unit's automated ticketing database (Smart Enforcement / ETLE) in real time. A structured integration flow, from computerized test lanes to automated execution of electronic ticketing on highway asphalt, is an absolute prerequisite for eliminating opportunistic tactics of fleet owners, eliminating subjective discretion by field officers, and ensuring that logistics transportation roadworthiness operates independently and accountably. Second, the mapping results using the readiness index confirm that the main obstacles faced in realizing this system integration do not stem from limited hardware capacity or differences in data code reading formats. Sidoarjo already has a very solid digital technology foundation, marked by a mature mechanical test lane system and uniformity in naming vehicle registration numbers between systems, which are rated "Very Ready" and "Ready." The data interaction bottleneck actually crystallizes at the organizational and regulatory interoperability level due to high bureaucratic sectoral egos, concerns about database access rights, the absence of a formal memorandum of understanding (MoU), and the lack of local regulations at the level of a Regent's Regulation that detail the implementation of sanctions. Thus, the success of digitalizing public services in Sidoarjo currently depends heavily on the political courage of the regional head in reconstructing institutional relationships to create public value in the form of macro transportation safety.

Suggestion

To realize an effective Smart Enforcement ecosystem in Sidoarjo Regency, the Regional Head is encouraged to immediately issue a Regent Regulation (Perbup) as a formal legal umbrella for the implementation of digital KIR integration. This local regulatory step must be followed up concretely through the preparation of a Cooperation Agreement or Memorandum of Understanding (MoU) between the Transportation Agency and the Sidoarjo Police Traffic Unit. The MoU is crucial for overcoming bureaucratic sectoral egos, clarifying the division of server management authority, and ensuring the security and privacy of vehicle owner data. Finally, technically, the IT development teams of both agencies are advised to immediately optimize the mature test lane infrastructure by building a digital bridge based on a secure public Application Programming Interface (API). Through this data bridge, the vehicle test pass database (BLU-e) can be synchronized in real-time with the automated ticketing system (ETLE) to realize sustainable public transportation safety.

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