

Original Research Article

Charting the Road Ahead: Digitalizing Infrastructure Governance through the SI KOI JANTAN Database in Blitar Regency, Indonesia

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Abstract: Road infrastructure underpins community mobility, economic activity, and public-service delivery, yet road-maintenance implementation continues to face fragmented data management, delayed condition updates, and weak support for evidence-based decision-making. This study analyzes the implementation of the SI KOI JANTAN database application (Sistem Informasi, Kondisi Jalan dan Jembatan) in improving road-maintenance data governance at the Department of Public Works and Spatial Planning of Blitar Regency, Indonesia, and its effectiveness in strengthening decision-making and reporting accountability under Regulation of the Minister of Public Works No. 13/PRT/M/2011. The study employed a descriptive qualitative approach. Data were collected through interviews with six purposively selected informants, comprising agency leadership, technical officials, the application operator, field personnel, and a road-user community member, together with observation and documentation, and analyzed using George C. Edward III's policy implementation model, comprising communication, resources, disposition, and bureaucratic structure, complemented by New Public Management and Good Governance perspectives. The findings show that SI KOI JANTAN has meaningfully improved data-management effectiveness through systematic road-condition recording, damage identification, maintenance prioritization, work monitoring, and reporting, marking a transition from manual to data-driven governance. Internal communication and coordination functioned effectively; resources and institutional support proved generally adequate, though human-resource capacity and technology infrastructure required further strengthening; implementers demonstrated positive commitment despite initial adaptation difficulty; and bureaucratic structure supported implementation, though cross-sector integration and standard operating procedures needed continued refinement. The study concludes that SI KOI JANTAN has become an important instrument for more effective, transparent, and accountable road-maintenance governance, while requiring further development toward a fully integrated decision-support system.

Keywords: Policy Implementation, Database Governance, Road Maintenance, George C. Edward III, New Public Management, Blitar Regency.

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1. INTRODUCTION

Road infrastructure constitutes a vital element of regional development, functioning as the primary conduit for the mobility of people, goods, and services, and directly shaping economic growth, social connection, and development equity. Road maintenance accordingly forms a critical component of efforts to sustain network performance in a stable, sustainable condition; within a public-policy frame, road maintenance falls within infrastructure-policy

implementation demanding effectiveness, efficiency, and accountability in execution.

Road-maintenance implementation in Blitar Regency continues to be marked by potholes, cracking, and surface deformation, findings corroborated through technical-data verification conducted at the National Road Implementation Agency during the 2024 Special Allocation Fund (DAK) desk review. Such deterioration diminishes both infrastructure quality and road-user safety. Law No. 2 of 2022 on Roads specifies that road

maintenance, as a component of road preservation activity, must be carried out continuously by road administrators, consistent with each road segment's condition, to achieve its planned service life and sustain its service level.

Road-maintenance processes in Blitar Regency have historically remained reactive and manual, generating frequent delay in addressing damage, since maintenance-management systems have not been integrated with modern technology, leaving data collection and analysis suboptimal. Government accordingly established Regulation of the Minister of Public Works and Public Housing No. 13/PRT/M/2011 on Road Maintenance and Inspection Procedures as the technical guideline for maintenance activity, affirming that road maintenance must be planned, systematic, and sustainable, weighing physical road condition alongside service priority for the community. In practice, however, successful implementation of this regulation depends substantially on the information system and data underpinning decision-making.

A persistent challenge confronting many regional governments, including the Department of Public Works and Spatial Planning (PUPR) of Blitar Regency, concerns the suboptimal state of road-infrastructure data management. Data collection, condition monitoring, and maintenance planning have historically been conducted manually or through non-integrated applications, generating data duplication, delayed information, and difficulty establishing damage-handling priority, collectively diminishing road-maintenance policy-implementation effectiveness at the regional level.

As information technology has advanced, database-application adoption has emerged as an innovative solution supporting public-policy implementation, including in the infrastructure domain. Through a database application, road data can be managed centrally, integrated, and made accessible to every relevant work unit, enabling faster, more accurate condition monitoring, maintenance-need analysis, and activity reporting, thereby strengthening the effectiveness, efficiency, and accountability of road-maintenance implementation. This orientation reflects the modern public-administration paradigm of New Public Management (NPM), emphasizing bureaucratic professionalism, service efficiency, and output orientation, alongside Good Governance principles demanding transparency, participation, and accountability in public-resource management, positioning database-application implementation in road maintenance as both a technical innovation and a component of bureaucratic reform toward improved governance.

Blitar Regency, with an extensive territory exceeding 1,500 square kilometers and a regency road

network spanning approximately 1,400 kilometers, faces a substantial challenge in sustaining road condition amid high vehicle volume, weather-related deterioration, and budget constraint, demanding an information system capable of delivering accurate, near-real-time road-condition data. The Department of PUPR of Blitar Regency has begun developing and applying a database-based system to support road-maintenance inventory and activity, intended to serve as the basis for more objective, efficient decision-making consistent with Law No. 2 of 2022 on Roads and Ministerial Regulation No. 13/PRT/M/2011, though the effectiveness of this application's implementation continues to warrant deeper examination from the standpoint of policy implementation, particularly regarding human-resource factors, technological infrastructure, and cross-divisional coordination.

Empirical evidence documents specific gaps motivating this study. The Department's own 2024 road-condition data (DD-1) records road segments in both light- and heavy-damage condition, indicating the need for a more accurate, objective, data-based maintenance-prioritization system. Preliminary interviews with implementing officials further indicate that, prior to database-application adoption, road-condition data management remained substantially manual, incompletely integrated, and constrained by delayed data updates and prioritization difficulty. Several specific problems compound this condition: imprecise targeting of maintenance intervention points, since handling has not always been grounded in real-time damage data; limited cross-divisional coordination among planning, technical, and oversight functions; limited centralized information regarding road-condition status and treatment history; and unclear identification of handling authority across regency, provincial, and village roads, generating follow-up delay. Community understanding of the Department's specific jurisdictional authority similarly remains uneven, with some damage reports directed at road segments falling outside regency-government authority, a condition Law No. 2 of 2022 addresses through provisions on road classification, information management, and community participation.

Prior research underscores the importance of information-technology utilization in supporting road-maintenance governance. Suryani (2019), examining Geographic Information System (GIS) application in Sleman Regency's road-data management, finds that spatial-database-based information systems improved inventory and maintenance efficiency by up to 40 percent relative to manual systems, underscoring the importance of data digitalization in supporting regional infrastructure policy. Rahman and Yuliani (2020), examining e-government implementation in Bandung Regency's road-infrastructure management, find that integrating database applications with online reporting systems improved damage-data accuracy and accelerated decision-making, while identifying human-resource and

network-infrastructure constraints as implementation obstacles. Purnomo (2021), examining the SIMJALAN application at the PUPR Office of Central Java Province, finds that database-based application implementation improved not only work efficiency but also road-maintenance budget transparency, identifying a positive correlation between information-system utilization and public infrastructure-policy-implementation effectiveness.

Building on this rationale, this study examines how database-application implementation improves road-maintenance effectiveness at the Department of PUPR of Blitar Regency, the extent to which this system's application is consistent with Ministerial Regulation No. 13/PRT/M/2011, and the factors shaping implementation success, aiming to contribute both theoretically to technology-based public-policy-implementation scholarship and practically to regional-government road-infrastructure-service quality improvement.

2. LITERATURE REVIEW

2.1 Public Policy and Policy Implementation

Public policy constitutes a course of action or set of decisions formulated by government to address public problems and achieve particular objectives, generally proceeding through problem identification, formulation, adoption, implementation, and evaluation. Policy implementation is the stage at which formulated decisions are translated into concrete action, generating tangible community benefit; without effective implementation, even the best-formulated policy produces no meaningful change. Ripley and Franklin (1986) similarly emphasize that implementation success rests on compliance among implementing actors, smooth operational routine, and outcomes satisfying the intended beneficiary group, criteria directly relevant to assessing whether SI KOI JANTAN's implementation has translated Ministerial Regulation No. 13/PRT/M/2011's provisions into genuinely improved road-maintenance practice.

Public policy has been defined in various ways across the literature. Dye (2013) famously frames it simply as whatever government chooses to do or not to do, while Chandler and Plano (1988) emphasize that policy constitutes a purposive course of action pursued by government in dealing with a problem or matter of concern. Dunn (2018) similarly identifies three core components of any public policy, problem structuring, forecasting and recommendation of alternatives, and outcome evaluation, and Wilson, as cited in Wahab (2017), stresses that policy encompasses not only government's stated objectives but the concrete steps taken, or not taken, to realize them and the accountability given for what results. Haerul, Akib, and Hamdan (2016) further note that policy is followed and executed by the stakeholders it involves in pursuit of resolving a defined problem, while Nasucha (2004) frames policy as

governmental authority translated into legal instrument to absorb social dynamics toward harmonious outcome, a view consistent with Suharto's (2008) emphasis that public policy must originate from a politically mandated authority acting on the public's behalf.

Beyond definitional variation, the policy process is commonly understood as proceeding through interlocking stages. Anggara (2018), drawing on Dunn's framework, identifies agenda setting, problem formulation, adoption or legitimation, and evaluation as sequential stages through which a public problem becomes formal policy and is subsequently assessed, while Younis and Starling, as cited in Tahir (2014), similarly frame the process as moving from needs identification through formulation, adoption, implementation, and evaluation. Suharno (2010) adds that public policy is distinguished by its purposive, patterned character, issued by government authority and encompassing both action and deliberate inaction on a given matter, while Nugroho (2014) situates Indonesian public policy within a three-tier hierarchy, macro-level instruments such as statute and government regulation, meso-level instruments such as ministerial and regional-head regulation, and micro-level instruments implementing the tiers above, a hierarchy within which Ministerial Regulation No. 13/PRT/M/2011 itself sits as a meso-level implementing instrument directly relevant to this study's regulatory focus. This study's analytical framework further draws on the broader tradition of Indonesian public-policy and public-administration scholarship (Agustino, 2006; Hamdi, 2014; Keban, 2014; Kridawati, 2011; Sadhana, 2011; Pasolong, 2007; Subarsono, 2005; Widodo, 2007), which collectively frame policy implementation as a technical-administrative process shaped by organizational capacity, resource availability, and inter-agency coordination, a framing directly consistent with the Edward III model applied in Section 2.2.

2.2 The George C. Edward III Implementation Model

George C. Edward III's model, presented as a foundational implementation framework within Indonesian public-administration scholarship (Winarno, 2007) and widely applied in public-policy-implementation research including studies of micro, small, and medium enterprise development policy (Mustari, 2015), holds that implementation success depends on four interacting variables. Communication ensures that policy information reaches relevant stakeholders and clarifies policy objectives and benefits, measured through transmission, clarity, and consistency in conveying information to implementers. Resources, encompassing human resources, information, authority, and facilities, are essential since their absence can obstruct implementation regardless of implementer willingness. Disposition concerns the attitudes and dispositions shaping implementer behavior toward a policy, since even well-communicated, well-resourced policy can falter absent implementer commitment.

Bureaucratic structure concerns the organizational arrangement supporting implementation, since inadequate structure can leave otherwise willing, resourced implementers unable to execute a policy coherently.

These four variables do not operate independently. Effective communication strengthens implementer understanding and reinforces disposition; adequate resources ease implementer acceptance of a policy; clear bureaucratic structure eases communication flow and resource utilization; and weakness in any single variable can undermine the others. Within SI KOI JANTAN's implementation, unclear communication

could leave staff without a clear understanding of data-input standards; resource limitation could constrain otherwise committed staff; weak disposition could leave standard operating procedures unenforced; and unclear bureaucratic structure could leave data unverified or unused in decision-making. Edward III's model accordingly helps this study understand that database-application success is determined not by software quality alone but by the interaction among people, organization, procedure, and technology, positioning SI KOI JANTAN's use as a public-policy-implementation process rather than merely a computer-application deployment. Table 1 summarizes the operationalization of this model within the present study.

Table 1: Operationalization of the Edward III Model in the Present Study

Variable	Principal Indicators	Analytical Direction
Communication	Transmission, clarity, consistency	How SI KOI JANTAN policy is conveyed from leadership to implementers, staff understanding, and consistency of technical direction in application use
Resources	Human resources, information, authority, facilities	Readiness of operators, technical officials, field staff, budget, technology devices, networks, servers, data, and application-management authority
Disposition	Attitude, commitment, acceptance, motivation	Implementer acceptance of the shift from manual to digital systems, data-input motivation, resistance, and commitment to data accuracy
Bureaucratic Structure	SOPs, task division, coordination, fragmentation	The survey-input-verification-reporting workflow, role division among actors, internal coordination, and cross-authority relationships

Source: Adapted by the author from Mustari (2015) and Edward III (1980).

2.3 New Public Management and Good Governance

The New Public Management (NPM) paradigm, emerging in the late 1980s as a response to public demand for more efficient, professional, results-oriented public service, emphasizes, following Hood (1991), bureaucratic work efficiency and effectiveness, application of private-sector management practice within public administration, information-technology utilization to improve service performance, and performance-based accountability. Within this study's context, database-application use in supporting road maintenance reflects the managerial-innovation spirit of NPM, improving government organizational performance through process efficiency, data transparency, and decision-making accuracy. Complementing this managerial orientation, the Good Governance framework, articulating nine core principles under UNDP (1997) including participation, rule of law, transparency, responsiveness, consensus orientation, equity, effectiveness and efficiency, accountability, and strategic vision, provides the normative foundation against which SI KOI JANTAN's contribution to more

transparent, participatory, and accountable road-infrastructure governance can be assessed.

2.4 Management Information Systems in Public Infrastructure Governance

A management information system, following Laudon and Laudon (2020), comprises the people, process, data, and technology organized to support organizational decision-making, control, and coordination. Applied to road-infrastructure governance, such a system enables centralized recording of road condition, damage type and severity, treatment history, and maintenance-priority determination, functioning as a bridge between field-level data collection and strategic decision-making at the agency level. SI KOI JANTAN, as this study documents, exemplifies this function within Blitar Regency's specific institutional and geographic context.

2.5 Prior Research

Table 2 summarizes the five most directly comparable prior studies on database and information-system application in road-infrastructure governance.

Table 2: Summary of Prior Studies on Database and Information-System Application in Road-Infrastructure Governance

Study	Focus / Location	Key Finding
Suryani (2019)	GIS-based spatial database, Sleman Regency	Spatial-database-based information systems improved road inventory and maintenance efficiency by up to 40% relative to manual systems.
Rahman & Yuliani (2020)	E-government / online reporting integration, Bandung Regency	Database-reporting integration improved damage-data accuracy and decision-making speed, though HR and network-infrastructure constraints remained.
Purnomo (2021)	SIMJALAN application, PUPR Office, Central Java Province	Database-application use improved both work efficiency and maintenance-budget transparency, with a positive correlation between system utilization and implementation effectiveness.
Nababan <i>et al.</i> , (2025)	Smart Mobility innovation planning for damaged-road detection, Yogyakarta City	Sensor- and application-based smart-mobility design shows strong potential for real-time damaged-road detection, though implementation depends on inter-agency data-integration readiness.
Setiawan <i>et al.</i> , (2024)	Travoy digital-governance application, Jasa Marga toll-road traffic service	Digital-governance application improved toll-road traffic-service responsiveness and public information accuracy, illustrating road-sector digital-governance benefit beyond routine maintenance.

Source: Synthesized by the author from the reviewed literature.

These studies collectively reinforce the proposition that road-maintenance-policy-implementation success depends substantially on information-system and data-management quality. This study extends that literature specifically to SI KOI JANTAN's implementation in Blitar Regency, a locus and application combination not previously examined, while applying Edward III's implementation model in conjunction with NPM and Good Governance perspectives to assess both process and normative dimensions of the application's contribution to road-maintenance governance.

3. RESEARCH METHODS

3.1 Research Approach

This study employed a descriptive qualitative approach, aimed at understanding in depth the process of SI KOI JANTAN implementation and its contribution to road-maintenance effectiveness at the Department of PUPR of Blitar Regency. This approach was selected because the research objective is to obtain a comprehensive, contextual understanding of application implementation, drawing on the perspectives of both implementing officials and road-user community members, rather than to test statistical relationships among variables.

Consistent with Moleong (2017), qualitative research of this kind seeks to understand a phenomenon experienced by research subjects holistically, describing it through words and language within its natural setting, while Sugiyono (2020) similarly frames descriptive-

qualitative research as an effort to depict field conditions as they actually occur without manipulating the variables under study. This orientation aligns with Creswell's (2014) broader characterization of qualitative inquiry as an approach for exploring and understanding the meaning individuals or groups ascribe to a social problem, and with Yusuf's (2017) classification of descriptive research as research aimed at systematically describing a phenomenon's characteristics rather than testing a predetermined hypothesis.

3.2 Research Site

This study was conducted at the Department of Public Works and Spatial Planning (PUPR) of Blitar Regency, East Java Province, with primary focus on the Bina Marga (Highways) Division responsible for road-maintenance implementation and SI KOI JANTAN application management.

3.3 Informants

Informants were selected through purposive sampling, following Sugiyono's (2019) characterization of the technique as informant selection based on particular considerations consistent with research objectives. Informants were selected for their knowledge, experience, and direct involvement in SI KOI JANTAN implementation, or as beneficiaries of road-maintenance policy. Table 3 presents the resulting informant composition, spanning internal implementing officials and an external community informant, enabling the study to capture both organizational-implementation and public-service-impact perspectives.

Table 3: Profile of Research Informants

Code	Position / Role	Institution
I-1	Head of the Department of PUPR, Blitar Regency	Department of PUPR, Blitar Regency
I-2	Head of the Bina Marga (Highways) Division	Department of PUPR, Blitar Regency
I-3	Junior Functional Expert, Road and Bridge Engineering	Department of PUPR, Blitar Regency

Code	Position / Role	Institution
I-4	Database Application Operator / SI KOI JANTAN System Manager	Department of PUPR, Blitar Regency
I-5	Field Technical Staff / Road Maintenance Implementer	Department of PUPR, Blitar Regency
I-6	Community Member / Road User, Blitar Regency	-

Source: Field data, compiled by the researcher (2026).

3.4 Data Collection Technique

Data were collected through in-depth interviews with the six informants listed in Table 3, exploring their perspective, experience, and assessment of SI KOI JANTAN implementation across the four Edward III dimensions; direct observation of application operation, data-input workflow, and field road-condition survey activity; and documentation, encompassing statutory regulation, the Department's technical data (DD-1), organizational profile documents, and other administrative records relevant to road-maintenance governance. Consistent with Arikunto (2010), the researcher functioned as the study's key instrument throughout this process, with the interview guide, observation checklist, and documentation log serving as supporting tools for systematic data collection.

3.5 Data Analysis Technique

Data were analyzed using the interactive model of Miles, Huberman, and Saldana (2014), comprising data condensation, involving the selection, focusing, and simplification of data obtained from interview, observation, and documentation; data display, involving the organization of condensed data into narrative and tabular form to clarify relationships and patterns across the four Edward III dimensions; and conclusion drawing and verification, involving the interpretation of findings to determine each variable's implementation status, subsequently verified through triangulation across interview, observation, and documentation sources to generate credible, accountable research conclusions.

4. RESULTS

4.1 Institutional and Application Profile

The Department of PUPR of Blitar Regency, operating under Regent Regulation No. 99 of 2022, bears responsibility for road-infrastructure administration across the regency's approximately 1,400-kilometer road network, executed principally through the Bina Marga Division. SI KOI JANTAN (Sistem Informasi, Kondisi Jalan dan Jembatan) was developed as a database application to support road- and bridge-condition data recording, damage identification, maintenance prioritization, work monitoring, and reporting, replacing a previously manual, non-integrated data-management approach. Prior to the application's adoption, road-condition data relied substantially on manual recording, community reports, and field survey results not fully integrated into a single system; through SI KOI JANTAN, data is now managed within one system, enabling decision-making grounded in traceable technical data rather than relying solely on apparatus memory, report pressure, or subjective judgment.

4.2 Communication

Field data indicate that SI KOI JANTAN policy information has been conveyed through a tiered cascade, from the Head of Department to the Head of the Bina Marga Division, then to functional officials, the application operator, field technical staff, and other relevant implementers, through internal meetings, leadership direction, administrative instruction, divisional coordination, initial training, and technical mentoring, reflecting reasonably clear policy transmission. Notwithstanding this functional cascade, technical communication requires further strengthening, since not all staff share an equivalent understanding of the application's strategic function; some implementers continue to regard the application merely as a data-input tool, whereas substantively SI KOI JANTAN functions as a decision-making and performance-accountability instrument. Public socialization regarding the digital road-monitoring system similarly requires strengthening to reinforce community participation in reporting and oversight.

4.3 Resources

Field data indicate that SI KOI JANTAN implementation is supported by reasonably adequate human resources, facilities, and institutional backing. The Department's organizational structure, encompassing the Bina Marga Division, functional technical officials, the application operator, and field technical staff, provides a relevant foundation for the application's operation, with staff educational background generally adequate for information-system implementation. Information-technology capability nonetheless remains uneven across staff: the operator and several technical staff have mastered the application, while other staff, particularly those more accustomed to manual systems, continue to require mentoring. Technology infrastructure, including internet network, server capacity, storage, work devices, system security, mobile-access features, and GIS integration, similarly requires continued strengthening to support fully optimal, real-time operational function.

4.4 Disposition

Field data indicate that apparatus acceptance of SI KOI JANTAN is broadly positive. Early implementation generated adaptation difficulty for some staff, rooted in the shift from manual to digital work patterns, differing digital-literacy levels, and the precision data-input requires; following direction, training, and mentoring, however, implementers came to recognize the application's benefit in accelerating reporting, clarifying documentation, easing coordination, and supporting technical work, such that

emergent resistance proved more adaptive than substantively oppositional. This positive disposition constitutes important capital for the application's continued sustainability, since information-system success depends not only on technological device but on human willingness to use and consistently maintain that system.

4.5 Bureaucratic Structure

Field data indicate reasonably clear task division supporting SI KOI JANTAN implementation: the Head of Department holds strategic decision-making, policy-direction, and performance-evaluation authority; the Head of the Bina Marga Division holds technical control and implementation-coordination responsibility; functional officials conduct technical analysis and data validation; the application operator bears responsibility

for data input, update, management, backup, and output presentation; and field technical staff conduct survey, documentation, and road-condition reporting. This structure supports accountability in application use, though standard-operating-procedure implementation requires further strengthening, particularly regarding data-collection workflow, input-format standards, validation mechanisms, update scheduling, data-quality control, and reporting-time standards, absent which the application risks functioning merely as a data repository rather than a genuine work-control system for road-maintenance management.

4.6 Synthesis of Findings

Table 4 consolidates this study's principal findings across the four Edward III dimensions.

Table 4: Synthesis of Research Findings by Edward III Dimension

Variable	Finding Condition	Conclusion
Communication	Policy direction and socialization have proceeded, though technical and public communication require strengthening	Fairly effective
Resources	Basic human resources, facilities, and budget are available, though not yet optimal for further development	Fairly supportive
Disposition	Implementers accept the application through gradual adaptation and increasingly recognize its benefit	Positive
Bureaucratic Structure	Role division and SOPs are reasonably clear, though consistency and external integration require strengthening	Supportive, with reservations

Source: *Compiled by the author from interview, observation, and documentation data (2026).*

Beyond these four dimensions, informants consistently identified specific supporting and inhibiting factors. Supporting factors include leadership commitment, institutional backing, organizational need for objective road data, availability of core human resources, existing facilities, benefits implementers have begun to experience, and community demand for faster, better-targeted, transparent, accountable maintenance service. Inhibiting factors include uneven digital literacy, limited technology-infrastructure capacity, suboptimal real-time data updating, incomplete advanced technical features (including GIS integration, predictive damage analysis, interactive dashboards, automated reporting, more responsive mobile functionality, offline mode for field officers, and public-information mechanisms), limited development budget, and the sheer scale and dynamism of road-condition change across Blitar Regency's extensive territory.

5. DISCUSSION

5.1 From Manual Ledger to Digital Ledger: Reading SI KOI JANTAN through Edward III

Read through Edward III's (1980) four-variable framework, SI KOI JANTAN's implementation demonstrates a case of generally functional, mutually reinforcing implementation conditions, clear if imperfect communication, adequate if uneven resources, positive if gradually built disposition, and supportive if incompletely formalized bureaucratic structure, consistent with the model's central proposition that these

variables interact rather than operate independently. The specific finding that some implementers still regard the application merely as a data-input tool rather than a decision-support instrument illustrates Edward III's clarity indicator precisely: information has been transmitted, but its full strategic meaning has not been uniformly internalized, a gap with direct implications for how consistently the application's data will be used in actual prioritization decisions rather than treated as routine administrative record-keeping.

5.2 Resources and Disposition: Technology Readiness Outpacing Human Readiness

This study's findings reveal an asymmetry between technological and human-resource readiness: while facilities and core infrastructure are generally available, the human capacity to fully exploit that infrastructure, particularly digital literacy among staff accustomed to manual systems, lags behind. This asymmetry helps explain why disposition, though positive, required a gradual adaptation period rather than immediate, uniform acceptance, consistent with Edward III's proposition that resource adequacy and implementer disposition are interdependent: staff who feel technically under-equipped are more likely to experience new-system adoption as burdensome regardless of their underlying willingness to change.

5.3 Bureaucratic Structure as the Binding Constraint on Full Institutionalization

Among the four Edward III variables, bureaucratic structure, specifically the absence of a fully formalized SOP governing data-collection workflow, input standards, validation, and update scheduling, emerges as this study's most consequential remaining constraint. Consistent with the theoretical caution articulated in Section 2.2, an application can accumulate substantial data volume while still falling short of functioning as a genuine work-control system absent consistent procedural enforcement; this finding suggests that SI KOI JANTAN's continued evolution from a data repository toward a true decision-support system depends less on additional technological feature development than on institutionalizing the procedural discipline surrounding its use.

5.4 Situating SI KOI JANTAN within NPM and Good Governance

Read through the New Public Management lens, SI KOI JANTAN exemplifies Hood's (1991) core NPM principles, bureaucratic efficiency, private-sector-style management practice, information-technology utilization, and performance-based accountability, evidenced by the shift from subjective, memory-dependent prioritization toward traceable, technical data. Read through Good Governance principles, the application's contribution to transparency and accountability is clearly established, while its contribution to participation, one of UNDP's (1997) nine core principles, remains comparatively underdeveloped given the still-limited public socialization and absence of a public-facing information mechanism identified in this study's findings, suggesting that SI KOI JANTAN's governance contribution, while genuine, remains asymmetric across different Good Governance dimensions.

5.5 Comparison with Prior Studies

These findings both corroborate and extend the prior literature summarized in Table 2. Consistent with Suryani (2019), database-based information systems are confirmed here to improve road-data management efficiency, though this study's qualitative findings do not permit the precise percentage-improvement quantification Suryani's GIS-focused study provides. Consistent with Rahman and Yuliani (2020), this study confirms that human-resource and infrastructure constraints persist even where database-reporting integration proceeds successfully. Consistent with Purnomo (2021), SI KOI JANTAN's contribution to budget transparency and implementation effectiveness parallels SIMJALAN's documented impact in Central Java Province. The study extends this literature by applying Edward III's implementation model in explicit conjunction with NPM and Good Governance perspectives, and by identifying the specific procedural, rather than technological, nature of the implementation

gap constraining SI KOI JANTAN's fuller institutionalization.

6. CONCLUSION

6.1 Summary of Findings

This study examined the implementation of the SI KOI JANTAN database application in improving road-maintenance data governance at the Department of PUPR of Blitar Regency using George C. Edward III's implementation model. The application has meaningfully improved data-management effectiveness through systematic road-condition recording, damage identification, maintenance prioritization, work monitoring, and reporting, supporting a transition from manual to data-driven governance consistent with Ministerial Regulation No. 13/PRT/M/2011. On communication, information transmission has functioned reasonably well, though technical and public communication require strengthening. On resources, human resources, facilities, and institutional support are generally adequate, though technology infrastructure and digital-literacy uniformity require continued development. On disposition, implementer acceptance is positive, built through gradual adaptation. On bureaucratic structure, role division is reasonably clear, though SOP formalization and cross-sector integration require strengthening. The study's synthesis matrix (Table 4) confirms all four variables as either effective, supportive, or positive, with reservations concentrated specifically in technical infrastructure, digital-literacy uniformity, and procedural formalization.

6.2 Theoretical Implications

This study reinforces Edward III's proposition that policy-implementation success depends on the interaction among communication, resources, disposition, and bureaucratic structure rather than any single variable in isolation, while extending the model by documenting a specific asymmetry between technological and human-resource readiness in digital-government implementation, and by showing that bureaucratic-structure gaps, specifically incomplete SOP formalization, can constrain full institutionalization even where the other three variables are broadly favorable. The study further demonstrates the value of reading digital-infrastructure-governance implementation jointly through Edward III, NPM, and Good Governance frameworks, revealing that governance contribution can be asymmetric across different normative dimensions, strong on transparency and accountability, weaker on participation, a nuance a single-framework analysis might not surface.

6.3 Practical Implications

For the Department of PUPR of Blitar Regency, the findings support formalizing a comprehensive standard operating procedure governing SI KOI JANTAN's data-collection workflow, input standards, validation mechanism, and update schedule; strengthening technical communication to ensure all staff

understand the application's strategic decision-support function, not merely its data-entry function; and continuing digital-literacy mentoring for staff more accustomed to manual systems. For infrastructure development, the findings support strengthening internet network, server capacity, and mobile-access functionality, alongside pursuing GIS integration, predictive-analysis capability, an interactive dashboard, automated reporting, and offline mode for field officers. For cross-authority coordination, the findings support strengthening information exchange among the Department, village and district government, and provincial and national road authorities to ensure community damage reports are directed to the appropriate jurisdictional authority. For community engagement, the findings support expanded public socialization regarding reporting mechanisms and road-authority classification, alongside development of a public-facing information channel to strengthen participatory oversight consistent with Good Governance principles. For future research, quantitative or mixed-methods studies measuring the application's effect on time efficiency, budget efficiency, road-condition improvement, and community satisfaction, alongside before-and-after comparative studies using specific indicators such as average verification time, average handling time, and prioritization accuracy, would usefully complement this study's qualitative findings.

6.4 Limitations of the Study

This study is subject to several limitations. First, it is confined to a single regional agency in a single regency, meaning its findings cannot be generalized to other regions' road-maintenance database implementation without further comparative research. Second, the qualitative descriptive design, involving six informants, privileges contextual depth over statistical generalization, meaning the patterns identified should be read as context-grounded findings specific to Blitar's institutional and geographic conditions. Third, the study relies on informant perception and documentary evidence rather than quantitative measurement of specific efficiency indicators, such as time savings or budget impact, that future research could usefully establish.

6.5 Recommendations for Future Research

Future research could extend this study through quantitative or mixed-methods analysis of SI KOI JANTAN's measurable impact on maintenance-time efficiency, budget efficiency, road-condition improvement, and community satisfaction. Comparative research examining database-application implementation across multiple regencies with differing geographic and fiscal characteristics would help determine whether the technology-human-resource asymmetry identified here reflects a broader pattern in Indonesian regional road-infrastructure digitalization. Future studies might also focus specifically on technical

development design, including GIS integration, public dashboards, data security, offline functionality, and interoperability with regional planning and budgeting systems, to enrich the scholarly and practical contribution to data-based infrastructure-governance development.

Taken as a whole, the Blitar Regency case suggests that a road-maintenance database application can achieve genuine governance improvement, strengthening data traceability, prioritization objectivity, and reporting accountability, while its evolution into a fully integrated, adaptive decision-support system depends less on additional software feature development than on sustained investment in human-resource capacity, procedural formalization, and participatory public engagement.

REFERENCES

- Agustino, L. (2006). *Dasar-dasar kebijakan publik*. Alfabeta.
- Anggara, S. (2018). *Kebijakan publik*. CV Pustaka Setia.
- Arikunto, S. (2010). *Prosedur penelitian: Suatu pendekatan praktik*. Rineka Cipta.
- Chandler, R. C., & Plano, J. C. (1988). *The public administration dictionary*. ABC-Clio.
- Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches*. SAGE Publications.
- Dunn, W. N. (2018). *Public policy analysis: An integrated approach* (6th ed.). Routledge.
- Dye, T. R. (2013). *Understanding public policy* (14th ed.). Pearson Education.
- Edward III, G. C. (1980). *Implementing public policy*. Congressional Quarterly Press.
- Haerul, Akib, H., & Hamdan. (2016). Implementasi kebijakan program Makassar Tidak Rantasa di Kota Makassar. *Jurnal Administrasi Publik*, 6(2), 21-34.
- Hamdi, M. (2014). *Kebijakan publik: Proses, analisis, dan partisipasi*. Ghalia Indonesia.
- Hood, C. (1991). A public management for all seasons? *Public Administration*, 69(1), 3-19. <https://doi.org/10.1111/j.1467-9299.1991.tb00779.x>
- Keban, Y. T. (2014). *Enam dimensi strategis administrasi publik: Konsep, teori dan isu*. Gava Media.
- Kridawati, S. (2011). *Implementasi kebijakan publik: Konsep dan aplikasi*. Universitas Merdeka Malang Press.
- Laudon, K. C., & Laudon, J. P. (2020). *Management information systems: Managing the digital firm* (16th ed.). Pearson Education.
- Miles, M. B., Huberman, A. M., & Saldaña, J. (2014). *Qualitative data analysis: A methods sourcebook* (3rd ed.). SAGE Publications.
- Moleong, L. J. (2017). *Metodologi penelitian kualitatif*. PT Remaja Rosdakarya.

- Mustari, N. (2015). *Pemahaman implementasi kebijakan publik*. LeutikaPrio.
- Nababan, Y. K., Mukminah, S., & Albaribin, D. A. (2025). Perencanaan inovasi smart mobility sebagai pendeteksi jalan raya rusak di Kota Yogyakarta. *Journal of Public Administration and Local Governance*, 9(1), 1-15.
- Nasucha, C. (2004). *Reformasi administrasi publik: Teori dan praktik*. PT Gramedia Widiasarana Indonesia.
- Nugroho, R. (2014). *Public policy: Teori, manajemen, dinamika, analisis, konvergensi dan kimia kebijakan*. PT Elex Media Komputindo.
- Pasolong, H. (2007). *Teori administrasi publik*. Alfabeta.
- Purnomo, A. (2021). *Efektivitas penggunaan aplikasi SIMJALAN pada Dinas PUPR Provinsi Jawa Tengah*. Universitas Diponegoro.
- Rahman, A., & Yuliani, D. (2020). *Implementasi e-government pada pengelolaan infrastruktur jalan Kabupaten Bandung*. Universitas Padjadjaran.
- Ripley, R. B., & Franklin, G. A. (1986). *Policy implementation and bureaucracy* (2nd ed.). Dorsey Press.
- Sadhana, K. (2011). *Realitas kebijakan publik*. Universitas Negeri Malang Press.
- Setiawan, M. A., Hartoyo, K. B., Sartono, B., & Fitriati, R. (2024). Digital governance of toll road traffic services in Indonesia: Study of Travoy Jasa Marga application. *Matra Pembaruan: Jurnal Inovasi Kebijakan*, 8(1), 1-14.
- Subarsono, A. G. (2005). *Analisis kebijakan publik: Konsep, teori dan aplikasi*. Pustaka Pelajar.
- Sugiyono. (2019). *Metode penelitian kualitatif, kuantitatif, dan kombinasi (mixed methods)*. Alfabeta.
- Sugiyono. (2020). *Metode penelitian kualitatif*. Alfabeta.
- Suharno. (2010). *Dasar-dasar kebijakan publik*. UNY Press.
- Suharto, E. (2008). *Kebijakan sosial sebagai kebijakan publik*. Alfabeta.
- Suryani. (2019). *Penerapan Sistem Informasi Geografis (SIG) dalam pengelolaan data jalan Kabupaten Sleman*. Unpublished manuscript.
- Tahir, A. (2014). *Kebijakan publik dan transparansi penyelenggaraan pemerintahan daerah*. Alfabeta.
- United Nations Development Programme. (1997). *Governance for sustainable human development*. UNDP.
- Wahab, S. A. (2017). *Analisis kebijakan: Dari formulasi ke penyusunan model-model implementasi kebijakan publik*. Bumi Aksara.
- Widodo, J. (2007). *Analisis kebijakan publik: Konsep dan aplikasi analisis proses kebijakan publik*. Bayumedia Publishing.
- Winarno, B. (2007). *Kebijakan publik: Teori dan proses*. Media Pressindo.
- Yusuf, A. M. (2017). *Metode penelitian: Kuantitatif, kualitatif, dan penelitian gabungan*. Kencana.
- Undang-Undang Republik Indonesia Nomor 2 Tahun 2022 tentang Perubahan Kedua atas Undang-Undang Nomor 38 Tahun 2004 tentang Jalan.
- Peraturan Menteri Pekerjaan Umum Nomor 13/PRT/M/2011 tentang Tata Cara Pemeliharaan dan Penilikan Jalan.
- Peraturan Bupati Blitar Nomor 99 Tahun 2022 tentang Kedudukan, Susunan Organisasi, Tugas dan Fungsi serta Tata Kerja Dinas Pekerjaan Umum dan Penataan Ruang Kabupaten Blitar.

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