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AI-Based Policy Model in the Governance of National Strategic Projects

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Abstract

Background: National Strategic Projects (PSN) are central to Indonesia's development agenda but continue to face governance challenges related to interagency coordination, planning quality, monitoring, accountability, and impact evaluation.
Objective: This study analyzes how artificial intelligence (AI) could support PSN governance during the planning, monitoring, and evaluation phases and develops a conceptual AI-enhanced governance policy model for Indonesia.
Methods: A descriptive qualitative research design was employed using secondary sources, including peer-reviewed scholarly literature, official government documents, regulations, and selected contextual sources. The study employed a structured literature review, document analysis, content analysis, and thematic synthesis to identify governance challenges, map relevant AI capabilities, and develop the conceptual model.
Results: The reviewed evidence suggests that AI could support feasibility analysis, cost and schedule estimation, resource allocation, real-time monitoring, anomaly detection, risk assessment, and impact evaluation. These functions are conceptualized as decision-support capabilities rather than mechanisms for autonomous public decision-making. Accordingly, the proposed model integrates data, analytical tools, human oversight, legal accountability, privacy and cybersecurity safeguards, and institutional coordination.
Conclusion: The proposed model provides a testable conceptual framework rather than empirical evidence of improved PSN performance. Its anticipated benefits depend on data quality, interoperability, institutional capacity, clearly defined legal responsibilities, and meaningful human oversight. Empirical validation in Indonesian PSN settings is necessary before claims regarding the model's effectiveness in improving transparency and accountability or reducing risks can be substantiated.

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INTRODUCTION

National Strategic Projects (*Proyek Strategis Nasional*, PSN) encompass some of Indonesia's most consequential infrastructure and development initiatives. However, their accelerated implementation creates recurring governance challenges involving planning, interinstitutional coordination, monitoring, evaluation, accountability, and public oversight. These challenges are central to the present study because the value of artificial intelligence (AI) in PSN management depends not merely on computational capabilities but also on whether AI-supported information can be integrated into lawful, transparent, and accountable public decision-making. Nevertheless, PSN remains an important instrument for infrastructure

provision, economic development, and territorial connectivity (Wartono et al., 2024).

PSN implementation has been associated in the reviewed literature with coordination difficulties, uneven planning quality, revisions to project prioritization, financing and land-acquisition constraints, environmental and social concerns, and accountability risks. These issues should not be interpreted as uniform conditions affecting all PSN projects. Rather, they represent governance categories that require project-specific verification and appropriate institutional responses (Sari & SH, 2024; Wartono et al., 2024). Framing these challenges in qualified terms is important because the present study relies on secondary sources and does not independently verify the prevalence of each problem across the entire PSN portfolio.

The rapid development of artificial intelligence (AI) provides a relevant analytical basis for examining how data-intensive tools could support PSN governance. AI can process large datasets, identify patterns, generate forecasts, and automate selected analytical tasks. These capabilities have been explored in project management and public administration (Sularno et al., 2023). However, within the body of literature reviewed for this study, AI applications are discussed primarily in general infrastructure, project management, and public-sector contexts rather than as a validated governance system specifically designed for Indonesian PSN. Accordingly, this study does not claim that no equivalent model has ever existed. Instead, it identifies a research gap within the reviewed secondary literature and develops a conceptual model for subsequent empirical evaluation and legal validation. The study's contribution lies in integrating PSN governance stages, AI-based decision-support functions, institutional responsibilities, and public-law safeguards within a unified conceptual framework, rather than claiming demonstrated technological effectiveness.

National Strategic Projects (*Proyek Strategis Nasional*, PSN) are projects implemented by the central government, regional governments, and/or business entities that possess strategic significance for promoting economic growth and equitable development, thereby improving public welfare and regional development. The designation of a project as a PSN signifies its high priority within the government's development agenda and the intention to accelerate its implementation. PSN forms an integral part of Indonesia's broader national development agenda, as reflected in the National Medium-Term Development Plans (*Rencana Pembangunan Jangka Menengah Nasional*, RPJMN) for the 2015–2019 and 2020–2024 periods (Zakie, 2023).

The principal legal foundation for accelerating PSN implementation is Presidential Regulation (*Peraturan Presiden*, Perpres) No. 3 of 2016. This regulation has undergone several amendments to accommodate evolving implementation needs and evaluation findings, including Presidential Regulation No. 58 of 2017, Presidential Regulation No. 56 of 2018, and Presidential Regulation No. 109 of 2020. In addition to presidential regulations, regulations issued by the Coordinating Minister for Economic Affairs play an important role in determining and updating the PSN list based on evaluation results (Hansastri & Hamdani, 2024). For the proposed model, these legal instruments are not merely background references; they establish the institutional and regulatory framework within which AI-generated outputs must be used. AI-generated assessments may inform project prioritization, monitoring, and evaluation, but formal decision-making authority remains with the legally competent public institutions and officials under the applicable PSN governance framework.

The objectives of PSN implementation encompass multiple dimensions of national development. Broadly, PSN aims to: (1) improve basic infrastructure and national connectivity to enhance mobility and economic efficiency; (2) stimulate economic growth through investment in strategic sectors; (3) promote equitable development across Indonesia, including in remote areas, to reduce regional disparities; (4) strengthen national energy and food security and resilience; (5) enhance Indonesia's competitiveness at the regional and global levels; and (6) create employment opportunities and improve overall public welfare (ekon.go.id, 2023).

The scope of PSN is diverse and extends beyond physical infrastructure. Examples of projects included in the PSN portfolio have encompassed toll-road construction, such as the Trans-Java and Trans-Sumatra toll roads; the Jakarta–Bandung high-speed railway; port and airport development; dam construction to support irrigation and water security; energy projects, including steam power plants (*Pembangkit Listrik Tenaga Uap*, PLTU), and biofuel development; telecommunications infrastructure, such as the Palapa Ring; industrial estate development;

smelter construction to support downstream industrialization; food security initiatives, including the *Food Estate* program; strategic tourism area development; integrated urban development, including areas such as Pantai Indah Kapuk (PIK) and Bumi Serpong Damai (BSD); and the development of the new capital city, Nusantara (*Ibu Kota Nusantara*, IKN). These examples should be understood as illustrative rather than as a definitive statement of the current PSN portfolio, because project designations and implementation status may change over time.

To accelerate PSN implementation and address implementation barriers, the government established the Committee for the Acceleration of Priority Infrastructure Delivery (*Komite Percepatan Penyediaan Infrastruktur Prioritas*, KPPIP). KPPIP serves as a central coordination mechanism for decision-making and *debottlenecking*, or the resolution of obstacles arising from ineffective coordination among stakeholders. Its responsibilities include formulating acceleration strategies, monitoring and controlling implementation, facilitating capacity building, and evaluating and selecting new project proposals or proposed changes to the PSN list, subject to the applicable institutional mandates and procedures.

The existence of KPPIP reflects the recognition that certain infrastructure-development challenges may exceed the capacity of routine bureaucratic coordination mechanisms and require dedicated coordination and problem-solving arrangements. AI, with its capacity for rapid data analysis and the automation of selected tasks, could support KPPIP's *debottlenecking* function. However, its deployment would also require adequate institutional capacity, risk management, and oversight to ensure that AI does not become an additional source of implementation barriers (Primadani, 2019). Within this institutional arrangement, AI should function as a decision-support layer for KPPIP and the competent ministries and agencies. It should not replace statutory authority, administrative discretion, or legally required coordination. Every material AI-generated recommendation should remain subject to human review, with the responsible decision-maker identifiable and accountable for the resulting administrative decision.

METHOD

This study employed a qualitative approach with a descriptive research design to develop an in-depth understanding of the context surrounding the application of artificial intelligence (AI) to the governance of National Strategic Projects (PSN). Its descriptive nature was intended to systematically and accurately characterize the relevant conditions, challenges, potential applications, and conceptual models associated with this topic through secondary data analysis. The qualitative approach enabled an in-depth exploration of the "how" and "why" questions surrounding AI integration into PSN governance, including nontechnical factors such as organizational, regulatory, and ethical considerations that are crucial to public administration.

The study relied entirely on secondary sources, including peer-reviewed research articles and review papers identified through databases and search platforms such as ScienceDirect, IEEE Xplore, and Google Scholar; official documents issued by government institutions, including the Coordinating Ministry for Economic Affairs, the Committee for the Acceleration of Priority Infrastructure Delivery (KPPIP), and the Ministry of National Development Planning/National Development Planning Agency (Bappenas); relevant legislation and policy documents; books and conference proceedings; and selected reputable news reports used solely to contextualize current developments. Legal and policy propositions were grounded primarily in primary legal materials, official documents, and peer-reviewed scholarship rather than news reports. Because the study aimed to develop a conceptual model rather than conduct a registered systematic review, sources were selected based on their relevance to the research objectives. Accordingly, the originality claim was limited to the body of literature reviewed and was not intended to establish that no comparable model existed elsewhere.

Data were collected using two main techniques: a structured literature review and document analysis. The literature review examined concepts, theories, and previous findings related to development administration, PSN governance, and AI applications. Document analysis was used to examine the collected secondary sources and extract relevant factual information, arguments, and perspectives.

The secondary materials were analyzed in four interconnected stages. First, content analysis was conducted to identify recurring governance problems, legal constraints, and AI

capabilities reported in the reviewed sources. Second, the findings were coded into thematic categories covering planning, monitoring, evaluation, institutional arrangements, regulatory requirements, ethical considerations, and data governance. Third, the themes were compared across scholarly publications, government documents, and legal materials to distinguish reported evidence from conceptual inferences. Fourth, thematic synthesis was used to translate the convergent themes into components of the proposed AI-enhanced PSN governance model. Because the study relied exclusively on secondary evidence, the resulting model remained conceptual and required empirical validation in actual PSN settings.

RESULTS AND DISCUSSION

Results

Analysis of AI Potential in PSN Governance Policy

The reviewed literature indicates that artificial intelligence (AI) may support several functions relevant to PSN governance, particularly planning, monitoring, and evaluation. These findings describe potential applications inferred from prior studies and cross-sectoral cases; they do not demonstrate effectiveness in Indonesian PSN implementation. Accordingly, the following analysis distinguishes capabilities identified in the literature from the authors' conceptual adaptation of those capabilities to the PSN context.

1. PSN Planning

The PSN planning phase often faces challenges, including inadequate feasibility studies, inconsistencies between the PSN list and formal planning documents such as the *Rencana Pembangunan Jangka Menengah Nasional* (RPJMN), and frequent changes to the list of designated projects. AI offers potential solutions to address these challenges.

a. Addressing Planning Challenges

AI's ability to analyze large datasets and generate predictions can be leveraged from the earliest stages of project selection and prioritization. AI can analyze macroeconomic, sectoral, spatial, and social data to assess project feasibility and potential impacts more objectively and comprehensively before projects are included in the PSN list. AI-based simulations can model various economic, social, and environmental impact scenarios for proposed projects, supporting more informed decision-making and reducing the risk of selecting projects that are insufficiently strategic or misaligned with the RPJMN. AI-assisted risk analysis can also identify potential obstacles at an early stage, enabling better mitigation planning and reducing the likelihood of projects stalling or requiring subsequent revisions (Sulartopo et al., 2023).

b. Improving Accuracy and Efficiency

AI techniques, particularly machine learning (ML) and neural networks (NNs), can improve the accuracy of project cost, schedule, and resource requirement estimates when supported by appropriate data and validation. Applying these predictive models to PSN projects could produce more realistic budget estimates and schedules, thereby reducing the risk of cost overruns and delays. Furthermore, AI-based optimization methods can help allocate budgets and resources, including labor, materials, and equipment, across multiple PSN projects or within individual complex projects. Such applications could improve resource utilization based on project priorities, constraints, and availability (Muhammad Wali et al., 2023).

2. PSN Monitoring

Monitoring PSN projects distributed across Indonesia, which vary in scale and complexity, presents a distinct challenge, particularly given limited supervisory resources and the potential lack of timely data. AI could help modernize monitoring systems.

a. Addressing Monitoring Challenges

AI technologies combined with sensors, the Internet of Things (IoT), drones, and satellite imagery can enable real-time or near-real-time monitoring of physical progress and project performance. For example, AI-based computer vision applied to drone or satellite imagery can help track construction progress, assess conformity with approved designs, and identify potential problems at project sites. Analysis of data from sensors installed on infrastructure, such as bridges and dams, can also detect anomalies or early indications of structural deterioration. These capabilities could reduce reliance on time-consuming and costly manual inspections while expanding monitoring coverage and increasing inspection frequency (Sholeh, 2024).

b. Modernizing Monitoring Systems

AI can automate project progress reporting by generating standardized reports periodically or on demand. Interactive, AI-enabled monitoring dashboards can present key information about project status, budget utilization, labor absorption, and other performance indicators in visual formats that stakeholders can readily understand. Moreover, predictive analytics can assess project performance and generate early warnings when projects are at risk of delays or budget overruns. AI-based anomaly detection also has considerable potential for identifying suspicious deviations in project data, such as financial transactions and progress claims, that may indicate inefficiency, waste, or possible fraud or corruption (Kushariyadi et al., 2024). Such anomalies, however, require independent verification before any conclusions about misconduct can be drawn.

3. PSN Evaluation

PSN evaluation often emphasizes the completion of physical outputs, while the measurement of long-term economic, social, and environmental impacts remains challenging. AI could support a more comprehensive and evidence-based evaluation process.

a. Addressing Evaluation Challenges

AI can analyze large and diverse datasets to assess PSN impacts more holistically. For example, AI-assisted analysis of satellite imagery over time can help identify changes in land cover and economic activity around PSN projects. Mobile network data, subject to applicable privacy and data protection requirements, can help analyze mobility patterns, while socioeconomic data can support assessments of changes in income levels and access to services. Environmental data can also be analyzed to assess changes in air and water quality. These analyses could provide quantitative evidence of PSN contributions to development objectives, including regional economic growth, poverty reduction, improved connectivity, and progress toward the Sustainable Development Goals (SDGs) (Kushariyadi et al., 2024).

b. Measuring Performance and Capturing Lessons Learned

AI can be used to analyze performance data from completed and ongoing PSN projects to identify factors associated with project success or failure. Such analyses could support the evaluation of individual projects and the systematic extraction of lessons learned across projects. The resulting knowledge could then inform subsequent project planning cycles, establishing a mechanism for continuous learning and improvement in PSN management.

Table 1

Matrix of AI Applications in PSN Governance Phases and Their Challenges

PSN Governance Phase	Specific AI Application	AI Techniques Used (Examples)	Relevant PSN Challenges	Relevant Case Study Examples	Potential Benefits for PSN
Planning	Project Cost & Time Estimation	ML (Regression, RF), NN (ANN, DL)	Inadequate planning, Risk of cost overrun & delays	Infrastructure cost-estimation applications reported in reviewed project-management literature (Akbar et al., 2024).	Increased accuracy of budget & schedule planning, reduced risk of cost overruns.
	Resource Allocation (Budget, HR)	Optimization Algorithms, GA, RL	Inefficient resource use, Coordination between projects/institutions	Resource-allocation applications discussed in reviewed project-	Optimized resource use, increased productivity, budget efficiency.

				management literature.	
	Project Risk Analysis & Prediction	ML (Predictive Analytics), NLP	Early risk identification, Ineffective risk mitigation, Potential conflicts of interest	Risk-prediction applications discussed in reviewed literature on project risk management.	More comprehensive & proactive risk identification, more effective mitigation strategies.
	Initial Project Feasibility & Impact Analysis	Simulation, Big Data Analysis, ML	Less objective project selection, Inconsistency with RPJMN	Conceptual PSN adaptation based on macroeconomic, sectoral, spatial, and social data.	More evidence-based project selection, alignment with national development goals.
Monitoring	Real-time Physical & Financial Progress Tracking	Computer Vision (Drone/Satellite), Sensor Data Analysis	Slow & limited manual monitoring, Lack of real-time data	Computer-vision and sensor-based monitoring applications reported in infrastructure literature (Hashimzai, 2024).	Increased project progress visibility, rapid response to deviations.
	Anomaly Detection (Construction, Operational, Financial)	ML/DL (Autoencoders, LSTM, GNN), Statistics	Construction quality risks, Operational failures, Potential fraud/corruption	Anomaly-detection applications reported across infrastructure and cyber-physical-system studies; legal misconduct requires separate verification.	Early detection of quality, operational, or financial deviations.
	Safety & Environmental Compliance Monitoring	Computer Vision, Sensor Data Analysis	Occupational accident risks, Environmental compliance	Safety and environmental monitoring applications reported in reviewed infrastructure literature.	Improved occupational safety, more effective environmental compliance monitoring.
Evaluation	Project Performance Analysis against KPIs	Data Analysis, ML	Less in-depth performance evaluation	Post-completion project-performance analysis	Better understanding of project success/failure factors.

			reported in reviewed project-management literature.	
Impact Assessment (Economic, Social, Environmental)	Big Data Analysis (Satellite, Socio-economic), NLP	Difficulty measuring real & long-term PSN impacts	Conceptual PSN adaptation for economic, social, and environmental impact assessment.	More comprehensive & quantitative impact evaluation, supporting accountability.
Automatic Lessons Learned Extraction	NLP, ML (Pattern Recognition)	Learning from previous projects is less systematic	NLP-based lessons-learned extraction reported in project-management literature.	Improved planning & implementation of future projects

Source: Processed data

This table summarizes how various AI applications could address specific challenges in PSN governance across the planning, monitoring, and evaluation phases. It also identifies relevant techniques and examples from the literature. Together, these findings provide a conceptual basis for developing the proposed model in the following section. However, the examples should not be interpreted as evidence that these applications have already been implemented or validated in Indonesian PSN governance.

Conceptual Model of AI-Based Policy for PSN Governance

Based on the analysis of AI's potential applications and the challenges associated with PSN governance, and drawing on theoretical foundations in public policy and public project governance, this study proposes a conceptual model termed the AI-Enhanced PSN Governance Policy Framework. The framework aims to integrate AI capabilities into decision-making processes to improve the effectiveness, efficiency, transparency, and accountability of PSN management in Indonesia (Rachmad et al., 2024). It is built on the following principles:

1. Integration Across the Project Life Cycle: AI is applied across all key phases of PSN governance: planning, monitoring, and evaluation.
2. Data-Driven Decision-Making: Decision-making at each phase is supported by comprehensive data analysis, using real-time data where available and appropriate.
3. Balance Between Public Policy Functions: The framework supports both public policy capacity, by strengthening the institutional capabilities required for PSN management through technology adoption and data-driven processes, and governance policy implementation, by applying AI directly to PSN planning, monitoring, and evaluation.
4. Governance Integration: The framework incorporates the principles of good governance, including transparency, accountability, and participation, as well as collaborative governance, which emphasizes the involvement of multiple stakeholders, into the design and operation of the AI system.
5. Adaptability and Sustainability: The framework is designed to support learning and adaptation based on new data and feedback while contributing to sustainable development goals.

The AI-Enhanced PSN Governance Policy Framework consists of the following main components.

1. Data Input Layer

The foundation of the framework is the availability of relevant, accurate, and integrated data from multiple sources. These include:

a. Internal Project Data: Planning documents, including feasibility studies and design specifications; budget data; schedules; progress reports; contract data; risk registers; and documented lessons learned from previous projects.

b. Field and Operational Data: Data from IoT sensors installed on infrastructure; imagery from drones or satellites; inspection records; and construction activity logs.

c. External Data: Macroeconomic data; sociodemographic data; environmental data, including weather conditions and air and water quality; market data, such as material prices; and news reports and public sentiment data.

The principal challenges at this layer are ensuring data quality, standardization, interoperability, and security across the institutions and stakeholders involved in PSN governance. A robust data governance policy is therefore required (Sensuse & Putra, 2008).

2. Integrated AI Platform

The core of the framework is a software platform that hosts multiple AI modules designed to support specific governance functions (Mulanda & Adnan, 2023).

a. AI Planning Module: Algorithms for cost, schedule, and resource requirement prediction; resource allocation optimization; scenario analysis and simulation; and preliminary project feasibility assessment.

b. AI Monitoring Module: Algorithms for real-time or near-real-time progress tracking; sensor and image data analysis; anomaly detection related to quality, safety, operations, and financial activities; and analysis of public sentiment concerning PSN projects.

c. AI Evaluation Module: Algorithms for analyzing project performance against targets; big data analytics for economic, social, and environmental impact assessment; and automated extraction of lessons learned from historical project data.

The platform should be designed with a modular and flexible architecture that allows algorithms to be added, updated, or replaced as AI technologies evolve and new requirements emerge (Putri & Pertiwi, 2025).

3. AI-Driven PSN Governance Policy Processes

This component defines how outputs from the Integrated AI Platform support decision-making by relevant stakeholders, including the central government, the Committee for Acceleration of Priority Infrastructure Delivery (KPPIP), ministries and government agencies, regional governments, state-owned enterprises (SOEs), and private-sector entities, at each phase of PSN governance (El Yana, 2024).

a. Planning: AI-generated feasibility and risk analyses can inform KPPIP and the Ministry of National Development Planning/National Development Planning Agency (Bappenas) in project selection and prioritization. AI-based resource allocation recommendations can help project owners, such as the Ministry of Public Works and Housing and SOEs, prepare more efficient work plans.

b. Monitoring: AI-enabled dashboards and anomaly alerts can support project supervision teams and management in monitoring progress and determining whether intervention is necessary. Automated reports can support routine reporting to institutional leadership and KPPIP.

c. Evaluation: AI-generated performance and impact analyses can inform evaluations conducted by Bappenas, the Ministry of Finance, and other relevant institutions. Lessons learned extracted from project data can be incorporated into an institutional knowledge base to inform future project planning.

These processes should support collaboration among stakeholders, including through secure data-sharing and analytical platforms, while maintaining appropriate access controls, institutional responsibilities, and legal safeguards.

4. Output and Feedback Layer

This layer presents AI-generated analytical results to users in formats that are understandable and actionable (Hovakimyan et al., 2002). Its outputs include: 1) Automated, structured reports on project progress, risks, performance, and impacts. 2) Interactive visual dashboards displaying real-time KPIs where real-time data are available. 3) Early-warning alerts

for anomalies or critical risks. 4) Data-driven recommendations to support decision-making, such as resource reallocation, schedule adjustments, and risk mitigation strategies. 5) A structured, accessible database of lessons learned.

Feedback from users, including decision-makers and project managers, is essential for validating results, refining models, and supporting continuous improvement. Such feedback should be incorporated through documented review procedures rather than being treated as an automatic substitute for independent validation.

5. Ethical and Security Governance Layer

This component is fundamental to the entire framework and applies across all its components (Pandey, 2022). It includes the following elements:

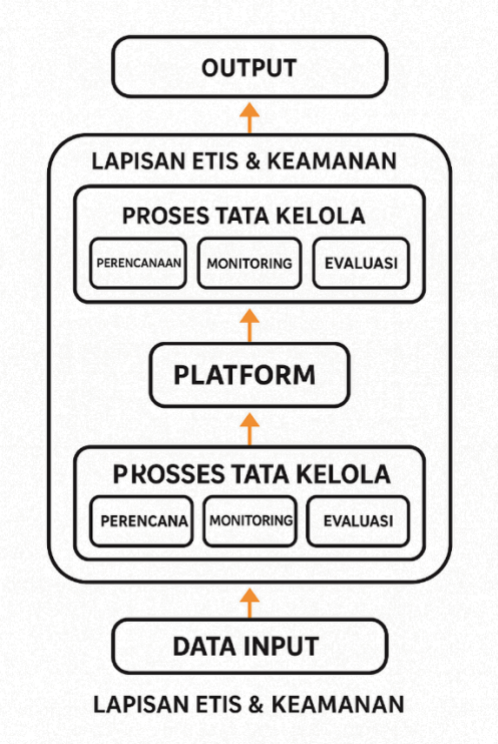
a. AI Ethics Principles: Ensuring that AI applications are fair, transparent, and accountable while protecting data privacy. Explainable AI (XAI) techniques can help make model outputs and their limitations more understandable. Regular audits should assess potential biases in data and algorithms.

b. Cybersecurity: Protecting the AI platform and PSN data against unauthorized access, cyberattacks, and data breaches.

c. Personal Data Protection: Ensuring compliance with applicable personal data protection regulations, particularly when AI systems process information about citizens affected by PSN projects. Relevant data may include identity information, land acquisition and compensation records, employment information, grievances, geospatial information, and other citizen-related records generated during PSN implementation. Access should be role-based and restricted to authorized personnel and institutions with a legitimate need. Appropriate safeguards should include purpose limitation, data minimization, security controls, audit trails, and documented human authorization for consequential uses.

d. Regulatory Compliance: Ensuring that all operations under the framework comply with the applicable legal and regulatory framework in Indonesia.

Model Visualization



[Model flow: Data Input -> Secure and Governed AI Platform -> Planning/Monitoring/Evaluation Decision Support -> Human and Institutional Review -> Accountable Output; an Ethical, Legal, Privacy, and Cybersecurity Layer applies across all stages.]

The AI-Enhanced PSN Governance Policy Framework should be understood as an

administrative decision-support framework rather than a stand-alone technology deployment. Its purpose is to reorganize how evidence is generated, reviewed, documented, and used in PSN governance while preserving human authority, legal accountability, and institutional checks and balances.

Discussion

The proposed AI-Enhanced PSN Governance Policy Framework offers potential benefits but also presents implementation challenges and implications that require careful consideration.

Potential Benefits of the Framework

a. Increased Efficiency and Effectiveness

The automation of routine tasks, such as reporting and preliminary scheduling, combined with resource allocation optimization and early problem detection, could reduce time and financial waste and increase the likelihood that projects will be completed on schedule and within budget. Faster, better-informed decision-making based on comprehensive data analysis could also improve the effectiveness of efforts to achieve development goals.

b. Increased Transparency and Accountability

Providing timely project data through interactive dashboards and automated reports could increase the visibility of project progress and performance for stakeholders. Digital audit trails documenting AI-supported decisions and processes could strengthen accountability mechanisms. Anomaly detection could also help identify irregularities and flag patterns that warrant further investigation. However, anomalies alone do not establish corruption or administrative wrongdoing; such allegations must be assessed through the applicable evidentiary and legal processes.

c. Proactive Risk Management

AI's ability to analyze historical and real-time data to identify and predict risks could enable earlier intervention and more effective mitigation strategies, thereby reducing the adverse effects of risks on projects. The reliability of such predictions would depend on data quality, model validation, and the suitability of the methods used.

d. Improved Decision-Making and Planning Quality

In-depth data analysis and AI-assisted scenario simulation could support more robust planning and better-informed strategic decisions, ranging from project selection to technical design. These capabilities would complement, rather than replace, professional judgment, stakeholder consultation, and formal feasibility assessments.

e. Strengthening Administrative Capacity

Because this study relies entirely on secondary sources, the proposed framework should be treated as a conceptual model requiring empirical validation rather than as evidence of improved PSN performance. Future research should test the framework in specific PSN cases, examine its compatibility with administrative law and data protection requirements, and evaluate whether its anticipated benefits in efficiency, transparency, accountability, and risk management can be realized without undermining public participation, rights protection, or public-sector responsibility.

Implementation Barriers

a. Technical Barriers

The availability of high-quality, structured, and integrated data across institutions is a fundamental prerequisite and a potentially significant challenge in the Indonesian government context. Adequate information technology infrastructure, including computing capacity, data storage, and network connectivity, is also necessary. Interoperability between new AI systems and existing legacy systems may present additional difficulties. Furthermore, computationally intensive AI models may require substantial processing capacity and associated financial resources.

b. Organizational and Human Resource Barriers

Institutional readiness to adopt new technologies and adapt established work processes may be limited. A shortage of personnel with expertise in AI and data analytics within the public sector may further constrain implementation. Resistance to organizational change, limited

understanding of AI's capabilities and limitations, and an organizational culture that does not consistently prioritize data-driven decision-making may also constitute significant barriers. In addition, the initial investment required to develop, deploy, and maintain AI systems may be substantial.

c. Governance and Regulatory Barriers

The absence of a comprehensive and integrated regulatory framework governing AI use in the Indonesian public sector may create uncertainty concerning technical standards, ethical safeguards, oversight, data governance, interinstitutional data access, cybersecurity, and responsibility for adverse outcomes. Under the proposed framework, AI-generated recommendations must not displace the legal responsibilities of competent public authorities or officials who adopt, reject, or act on those recommendations.

d. Sociopolitical Barriers

Biases embedded in historical data or introduced through AI model design may reproduce or exacerbate existing social and regional inequalities, potentially undermining the PSN objective of equitable development. The digital divide, including disparities in access to technology and digital literacy, may also affect public acceptance and participation. Furthermore, the politicization of data collection, model development, or the interpretation of AI-generated results remains a potential risk in the Indonesian governance context.

Ethical Implications

a. Fairness

How can AI-supported decisions, such as project prioritization, social impact assessment, and land acquisition compensation allocation, be designed to avoid discrimination against particular groups or regions? Particular attention must be paid to potential biases in training data, the selection of variables, and model design. Human review and meaningful opportunities to challenge consequential decisions are also necessary.

b. Transparency

Complex AI models, particularly some deep learning systems, can be difficult to interpret, making it challenging to understand how they produce particular outputs. This lack of interpretability may undermine accountability and public trust. Explainable AI (XAI) techniques can help clarify model outputs, underlying factors, and limitations. However, explainability alone does not guarantee that a model is accurate, fair, or legally compliant.

c. Accountability

Legal and administrative responsibility must remain with the institution and authorized official who relies on an AI-supported recommendation within the scope of their statutory authority. Developers and system providers may bear separate contractual, technical, or other legally defined responsibilities; however, public authorities cannot transfer their decision-making accountability to an algorithm. The framework therefore requires human approval, traceable audit logs, documented reasons for consequential decisions, and mechanisms for escalating and reviewing contested outputs.

d. Privacy

The large-scale collection and analysis of data for AI applications, particularly when citizen data are involved, such as socioeconomic information, mobility data, and land acquisition records, pose substantial privacy risks if not managed according to robust data protection principles. Appropriate safeguards include data minimization, purpose limitation, access controls, secure storage and transmission, retention limits, and procedures for addressing unauthorized disclosure or misuse.

CONCLUSION

This study concludes that AI has a plausible, but not yet empirically demonstrated, role in supporting PSN planning, monitoring, and evaluation. Its principal contribution is a conceptual AI-enhanced PSN governance policy framework that connects data integration and analytical capabilities with human oversight, institutional authority, accountability, privacy protection, cybersecurity, and interagency coordination. The framework positions AI as a decision-support mechanism rather than an autonomous public decision-maker, thereby preserving responsibility

for consequential public decisions with legally competent institutions and officials.

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AUTHOR CONTRIBUTION STATEMENT

Siti Khumayah: Conceptualization, methodology, writing—original draft preparation, and formal legal-policy analysis. Leni Rohida: Data curation, literature review, validation, and writing—review & editing. Mukarto Siswoyo: Supervision, project administration, resources, and final approval of the version to be published.

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