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Digital Transformation of Public Safety Governance: The DKI Jakarta Satpol PP Enterprise Architecture Using TOGAF-ADM

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ABSTRACT

The rapid population growth in DKI Jakarta challenges the Civil Service Police Unit (Satpol PP) in maintaining public order, necessitating a robust management control system for its 5,500 field personnel. The existing operational application, SISAPPRA, operates sub-optimally due to misalignment with field procedures and isolated data structures. This study aims to analyze the Information and Communication Technology (ICT) requirements and design an enterprise architecture blueprint to enhance the operational management control system of Satpol PP DKI Jakarta. Employing a descriptive qualitative approach, data were gathered through direct observations of public order operations, in-depth interviews with three tiers of informants (leadership, IT staff, and field officers), and analysis of organizational documents. The data were systematically analyzed using the phases of The Open Group Architecture Framework Architecture Development Method (TOGAF-ADM). The gap analysis reveals critical functional deficiencies in the current application, including the absolute absence of access roles for command leadership, non-functioning spatial mapping features, and a lack of data integration with the Regional Civil Service Agency (BKD). To close these gaps, this study defines the target "SISAPPRA 2.0 Landscape," comprising 13 integrated modules and a 2024 implementation roadmap. The enterprise architecture successfully addressed blind spots in operational oversight by introducing a specialized investigation module for Civil Service Investigators (PPNS) and a dynamic executive dashboard. This research offers a theoretical novelty by integrating TOGAF-ADM with the Four Levers of Control concept, providing a transparent, command-integrated digital governance model tailored for high-risk public order enforcement. This enterprise architecture model can be adopted by Satpol PP agencies throughout Indonesia.

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■ INTRODUCTION

Uncontrolled population growth in the city of Jakarta has reduced available living space and fueled the proliferation of the informal business sector, including street vendors (PKL), who often occupy public spaces or facilities. These intense competitive conditions can lead to social friction, such as rampant thuggery and street fights, which directly disrupt public peace and order. As a government institution whose primary function is to maintain public order, the Jakarta Capital Region Civil Service Police Unit (Satpol PP) faces a major challenge in monitoring the entire Jakarta area with a staff of more than 5,500 personnel. The vast scope of its jurisdiction and the high number of hotspots for violations require a complex, region-based management control system.

In the era of electronic government (e-government), government services and operations must adapt to technological advancements to become more efficient and measurable (Chhotray & Stoker, 2009). Digital transformation is driving the shift from analog operations to responsive digital governance (Coleman, 2008). According to Prasojo (2020), a massive, all-encompassing force of globalization is currently underway, giving rise to what he terms “global governance.” The development of ICT and the accompanying disruption, coupled with extraordinary knowledge creation, have led to the emergence of digital governance and knowledge-based

governance (OECD, 2003).

The implementation of Information and Communication Technology (ICT) in the operational control system of the Jakarta Capital Region Public Order Agency (Satpol PP) is already in place. However, it still faces the following challenges: the availability of a reporting portal and IT infrastructure that do not yet align with its core duties and functions, and the underutilization of the existing Satpol PP Information System (SISAPPRA) as a means of operational management control has not been optimal and is not aligned with field Standard Operating Procedures (SOPs); a limited number of personnel with technical IT competencies to support the operational control of the system; the vast operational area and the large number of additional tasks (such as securing vital objects and local officials); and weak cross-agency data integration, all of which make personnel mobilization difficult to control.

A literature review (state of the art) indicates that the implementation of enterprise architecture has been extensively studied in the government sector to optimize the use of Information Systems (IS) and Information Technology (IT). A study by Angeline & Fibriani (2021), titled "Enterprise Architecture Planning Using TOGAF ADM (Case Study: Lembang Village Office)," found that the Lembang village government's use of technology remains suboptimal for processing community data. This is evident from the government's failure to migrate legacy data. This is likely because the village administration has not yet adopted an information system for data collection. Another study on Enterprise Architecture Design Using TOGAF is the case study conducted by Santosa and Sensuse (2020) at the Directorate General of Population and Civil Registration. This study analyzed the organization's core business processes. It yielded insights into enterprise architecture design that incorporates not only core business processes but also supporting business processes.

The TOGAF framework is widely used in the private sector, as noted by Lankhorst (2017). However, few in the public sector, particularly the public safety and order sector, utilize this method, which is useful for designing an ICT implementation model to establish an operational control system for Jakarta's Satpol PP personnel during public safety and order operations (Rouhani et al, 2015). A specific objective is for the ICT-based control system to strengthen the span of control for Satpol PP personnel, who are numerous in the field and spread across various areas.

However, a gap analysis reveals that previous studies have largely focused on static office administration systems. The novelty of this research lies in the use of the enterprise architecture framework (TOGAF-ADM), which is specifically integrated with Simons' (1995) concept of the Management Control System (Four Levers of Control) in the public order enforcement sector. This study designs a control governance framework for dynamic, high-risk field operations and provides a precise gap analysis between the hierarchy of bureaucratic duties and responsibilities and the availability of digital application features (Tessier & Otley, 2012)

Therefore, to address the complexity of this issue, this study was designed to analyze ICT system requirements using The Open Group Architecture Framework Architecture Development Method (TOGAF-ADM). The ultimate goal is to develop an ICT development blueprint to establish a reliable management control system, so that all operational resources of the DKI Jakarta Satpol PP in the field can be managed efficiently and effectively.

Based on the phenomena, theoretical framework, and research gaps described above, the research question is: What are the appropriate stages of a roadmap for the migration and implementation of information technology to ensure that all operational resources of the DKI Jakarta Satpol PP can be managed efficiently and effectively?

■ METHOD

Research Design

This study employs a descriptive qualitative approach to examine the objects and processes of task execution in their natural setting within the DKI Jakarta Satpol PP. Data were collected from the planning phase through August 2024. Data collection was conducted through participatory observation by directly engaging with, intensively interacting with, and immersing myself in the operational activities of public peace and order enforcement (Tramtibum) carried out by the DKI Jakarta Satpol PP, as well as by monitoring the use of information technology tools for reporting systems, conducting in-depth face-to-face interviews, and reviewing internal documents (organizational business process analysis) (Creswell, 2014).

Data Collection Techniques

Using the participatory observation method, data were collected by engaging in the routine activities of the Satpol PP in the formulation of policies and the planning of operational activities, as well as by conducting

Focus Group Discussions (FGDs) with the activity implementers, such as division heads, regarding the mechanisms and systems for conducting Satpol PP patrols and the locations to be patrolled. This was followed by triangulation through verification and cross-checking with those carrying out the activities to validate the data collected from interviews and focus group discussions. The research design was developed to describe and analyze the information technology needs of Satpol PP in carrying out its duties and functions in DKI Jakarta.

Research Subjects/Informants

The informants in this study were selected using purposive sampling, specifically chosen based on their level of understanding of public order enforcement processes in the field and the implementation of e-government. Informants were grouped into three main categories: leadership within the Jakarta Capital Region Public Order Agency (Satpol PP DKI Jakarta), specifically, the Head of Satpol PP DKI Jakarta to understand work procedures/ SOPs and management control system policies; technical/IT staff to analyze the implementation of existing technologies and applications; and members of the field operations unit to map business processes in the field. Informants were selected based on their thorough understanding of or close involvement with the situation or field under study; in this case, this included leaders such as unit commanders and division heads, as well as 12 staff members involved in field operations, in accordance with the needs of this study (Moleong, 2021). In this study, those responsible for implementing activities such as division heads and policymakers, including the Head of the Public Order Agency (Kasatpol) and the Deputy Head of the Public Order Agency (Wakil Kasatpol PP), served as key informants.

Data Analysis

This study employed a qualitative approach, in which data were analyzed in accordance with the phases outlined in TOGAF-ADM. Data analysis uses the TOGAF-ADM (Architecture Development Method) framework, which focuses on the organization's core business processes. The analysis phases are limited to the period from the preliminary stage through migration planning, as follows: 1) Preliminary Phase: defining the framework, preparing the architecture, and securing stakeholder commitment. 2) Phase A (Architecture Vision): mapping the scope, organizational profile, stakeholder identification, and architectural vision. 3) Phase B (Business Architecture): modeling organizational operations and controls within operational activities. 4) Phase C (Information Systems Architectures): designing information system architectures that include data architecture and application architecture (target design). 5) Phase D (Technology Architecture): defining software and hardware infrastructure requirements. 6) Phase E (Opportunities and Solutions): conducting a gap analysis to evaluate existing systems and formulating recommendations/ solutions for future enterprise architecture development. 7) Phase F (Migration Planning. The final phase of this methodology involves developing technical solutions by improving the User Interface (UI) design and creating a SISAPPRA Implementation Roadmap. This was followed by triangulation through verification and cross-checking with those carrying out the activities to validate the data collected from interviews and focus group discussions. The research design was developed to describe and analyze the information technology needs of Satpol PP in carrying out its duties and functions in DKI Jakarta.

Ethics

Given that this study involves human subjects within a hierarchical organizational structure and direct observation of public order enforcement activities in sensitive public spaces, the conduct of this research strictly adheres to social science research ethics standards (Creswell, 2014). There are four key ethical principles applied during the data collection and processing process:

Informed Consent

Prior to data collection, all informants, including leadership, IT staff, and members of field operational units, were provided with a transparent explanation of the study's objectives, scope, and benefits. Informants' participation in in-depth interviews was voluntary, with no coercion from the chain of command. Each research subject signed a consent form indicating that they had the right to withdraw from the interview process at any time without incurring administrative or employment consequences.

Confidentiality and Anonymity

To protect informants from potential administrative risks, career obstacles, or bureaucratic pressure resulting from the disclosure of weaknesses in the existing system (operational blind spots or application feature failures), the informants' personal identities were disguised.

Institutional Permission and Bureaucratic Ethics

This research was conducted after obtaining an official research permit from the Head of the DKI Jakarta Provincial Satpol PP. The researcher adhered to applicable bureaucratic protocols and official etiquette and ensured that the review of internal documents (such as the Strategic Plan, business processes, and the BKD personnel database architecture) was conducted solely for academic analysis and the design of the TOGAF ADM model.

Non-Maleficence and the Principle of Do No Harm

During participatory observation of field operations (enforcement against street vendors or enforcement of local regulations), the researcher positioned themselves as a passive observer who did not intervene in the tactical decisions of field officers or disturb the peace of the residents being regulated. The researcher is committed to not recording or publishing visual data (photos/videos) that clearly show residents' faces in order to protect their dignity and right to privacy. All raw data from interviews and observations are stored in an encrypted database accessible only to the researcher and will be destroyed five years after the scientific publication is released.

■ RESULTS AND DISCUSSION

The Enterprise Architecture Blueprint (SISAPPRA 2.0) Utilizes The TOGAF-ADM Framework, Integrated with the 'Four Levers of Control' Concept.

These principles are intended to guide the information technology architecture decision-making process, enabling leaders involved in policy-making at the DKI Jakarta Satpol PP to determine the structure and composition of the architectural components required by the DKI Jakarta Satpol PP, in terms of determining the appropriate technology and product criteria in accordance with the needs of the DKI Jakarta Satpol PP, namely, architectural design and implementation to oversee the operational activities of DKI Jakarta Satpol PP members.

Preliminary Phase

The design of the operational system architecture for the Jakarta Capital Region Public Order Agency (Satpol PP) is the initial stage in preparing to develop an Enterprise Architecture (EA). The primary objective of this phase is to strengthen stakeholder commitment and to define the detailed framework and methods to be used in developing the EA (Surendro, 2009).

Identify architectural principles subdomain

At this stage, basic guidelines are established to guide the development of business, data, application, and technology architectures to align with the operational needs of the Jakarta Capital City Police (Satpol PP). The agreed-upon architectural principles identified at this stage include: architectural design decisions must align with the objectives, activities, and business processes of the Jakarta Capital Region Public Order Agency (Satpol PP); the systems built must ensure the continuity of operational business and be secured against disruptions such as hacking or viruses; data and systems must be protected from unauthorized access; applications must be easy to use and understand by all Satpol PP personnel in DKI Jakarta; application modules must be integrated and possess interoperability capabilities (operating across systems) among subunits within the organization; and the architecture must prioritize technological independence and a component-based approach so that the system can be easily updated and developed independently.

Design object analysis (5W1H Matrix) subdomain

Identifying the constraints and stakeholders involved during architectural design consists of: What (W1), which is creating an EA model capable of managing the operational activities of Jakarta Satpol PP personnel in the field; Who (W2): planners are the Division Heads and the Head of the Data and Information Center (Pusdatin) of the DKI Jakarta Satpol PP; while the person fully responsible for this activity is the Chief of the Jakarta Satpol PP, Where (W3): which is located at the Jakarta Satuan Polisi Pamong Praja office, When (W4), with the target completion date for the EA design set for August 2024, Why (W5): to align information technology (hardware and software) with the Jakarta Satpol PP Strategic Plan in order to strengthen operational control management in the field; How (H1): by using the TOGAF-ADM architecture framework. The TOGAF framework is capable of mapping key business processes to support the integration of strategic information systems within government agencies (Chen & Vernadat, 2004; Hwa, 2006).

Requirements management subdomain

The objective is to identify the process requirements for designing the enterprise architecture at the Jakarta Satpol PP. During the requirements management phase, activity scenarios are needed that cover core business, business processes, and organizational issues

(Irmayanti & Permana, 2018). However, before developing these activity scenarios, it is necessary to first analyze the systems currently in operation at the Jakarta Satpol PP. The DKI Jakarta Satpol PP SISAPPRA application is currently a Special Application 97, that is, an Electronic-Based Government System (SPBE) application built, developed, used, and managed by a central government agency to meet specific needs distinct from those of other central government agencies and local governments. This application was developed to support specific functional services for central government agencies and/or local governments, as well as other strategic sectors. The dashboard menu is divided into two sections: viewing by enforcement action type and by region. When viewed by type of enforcement action, it displays maps of high-risk areas including disasters, fires, street vendors, street children, political issues, and public order and safety, as well as maps of locations with advertising permits. When viewed by region, it displays the percentage and total number of enforcement actions taken for violations. The master data menu contains several submenus, including subdistrict master data, city master data, urban village master data, activity type master data, incident type master data, violation type master data, assistance type master data, and local regulation/local government regulation type master data.

Phase A. Architecture Vision

Phase A (Architecture Vision) aims to clarify the architecture's scope, identify stakeholders, and formulate an architectural vision that aligns the design with the organization's objectives and secures management commitment. In analyzing the information technology needs for the operations of the Jakarta Capital City Regional Public Order Agency (Satpol PP DKI Jakarta), the analysis focuses on three main steps.

Organizational profile analysis subdomain

This step maps the demographic conditions and human resource capacity at the DKI Jakarta Satpol PP. The analysis shows that there are 5,271 employees, consisting of 55% civil servants, 30% temporary employees (PTT), and 15% individual service providers (PJLP). The majority of employees (62.88%) hold a high school diploma and are distributed from the provincial to the regency level across the five administrative cities and the Kepulauan Seribu Regency. This profile mapping serves as a crucial reference to ensure that the designed operational system is fit for purpose and easy for all field personnel to operate.

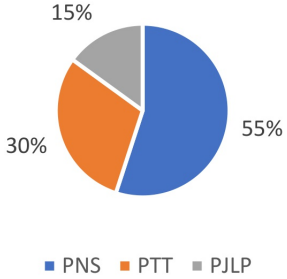

Figure 1. Composition of the DKI Jakarta Satpol PP staff

Profile of the DKI Jakarta Satpol PP subdomain

The role of the Civil Service Police Unit (Satpol PP) within local governments is outlined in Article 255 of Law No. 23 of 2014 on Regional Government. To assist regional heads in enforcing local regulations and maintaining public order and community peace, the Civil Service Police Unit was established. Pursuant to the Governor of the Special Capital Region of Jakarta Regulation No. 285 of 2016 on the Organization and Operational Procedures of the Civil Service Police Unit, its primary duty is to carry out government affairs related to public peace and order, as well as community protection, within the sub-sector of public peace and order.

Defining the vision and mission subdomain

Designing a technology architecture aimed at supporting the regional development vision. In this regard, the Jakarta Satpol PP has determined that IT support must directly underpin the 4th Mission of the DKI Jakarta Provincial Government, namely to ensure and balance environmental conservation and the sustainability of human life. In addition, this architecture aligns with Sustainable Development Goal (SDG) No. 16, which aims to promote peaceful and just societies and build resilient institutions (Ojo & Millard, 2017).

Value chain analysis subdomain

Business processes were mapped to identify which activities provide the most value to the functions of the DKI Jakarta Satpol PP. At this stage, the core operational activities in the field that are supported and controlled by the IT system were identified, namely: handling disturbances to public peace and order (Tramtibum) across provincial borders as well as within cities and regencies; enforcing provincial, regency, and city regulations (Perda) and regulations issued by governors, regents, and mayors; and providing rescue and evacuation services for disaster victims.

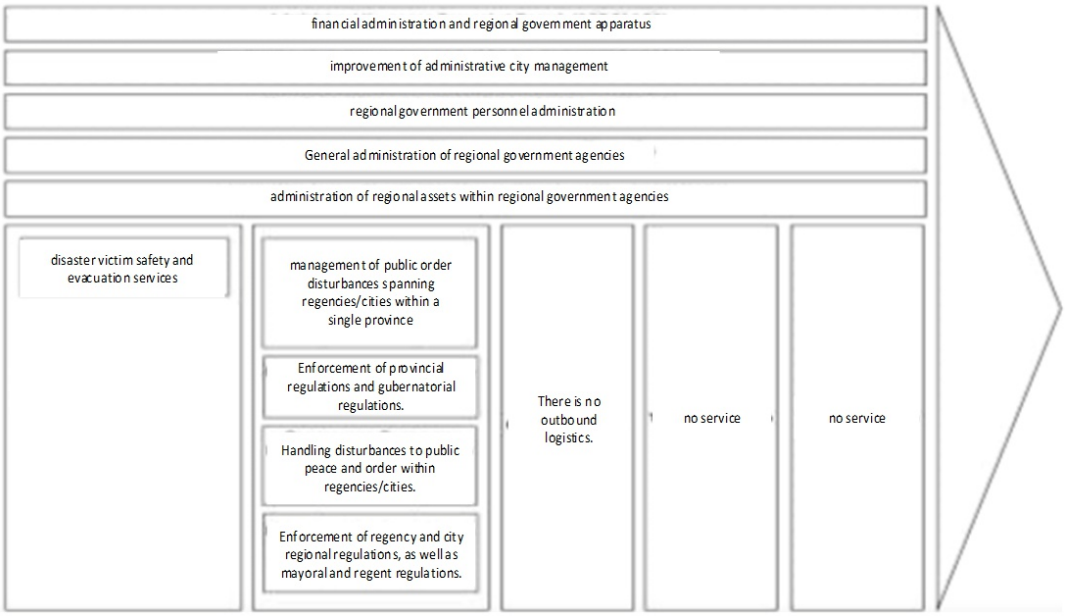

Figure 2. Operational structure of the satpol pp

Through this elaboration of the Architectural Vision, IT infrastructure development projects (such as the SISAPPRA 2.0 application) are ensured to have very clear directional boundaries, remain aligned with the organization's core mission, and focus entirely on meeting the operational needs of maintaining public order in Jakarta.

Phase B. Business Architecture

Phase B (Business Architecture) focuses on modeling the organization's operations and control within operational activities to implement its business strategy (Leonidas & Andry, 2020). This phase defines the architecture's initial state and identifies the core business models and activities that support the agreed-upon technology vision. To analyze the IT needs of the Jakarta Capital Region Public Order Agency (Satpol PP), operational and control modeling in Phase B was conducted through two main subdomains.

Mapping of the organizational structure and job descriptions subdomain

The first step in modeling operational controls is to define the chain of command and hierarchy of authority within the organization (Anthony & Govindarajan, 2002). The business architecture comprehensively maps the structure from the highest leadership down to regional operational units, including the Head of Satpol PP (Kasatpol PP), Deputy Head of Satpol PP (Wakasatpol PP), the Secretariat, and various technical divisions (Public Safety and Order Division, Business Premises Supervision and Control Division, Community Protection Division, Enforcement and Action Division, and PPNS Division), all the way down to the City and Administrative Regency-level Satpol PP units. This mapping is essential for designing access rights (roles) and approval workflows within the future reporting system.

Value chain analysis subdomain

To understand the types of operations that must be controlled by the IT system in the field, a value chain model is used that divides business processes into two categories: core activities and support activities. Core business activities are the primary focus of field operations, which will be supported by application modules (such as SISAPPRA). These core business activities include handling disturbances to public peace and order, both within a single city or regency and across provincial borders; enforcing provincial, regency, and city regulations (Perda), as well as regulations issued by governors, regents, and mayors; and providing rescue and evacuation services for disaster victims. Support activities are back-office operations that also need to be managed, such as financial administration, human resources administration, general administration, and administration of local government assets (inventory and operational equipment).

The goal of business architecture modeling is to define the command structure and break down organizational functions through value chain analysis; as a result, the Jakarta Capital City Public Order Agency

(Satpol PP DKI Jakarta) obtained a clear blueprint for its business processes. This business architecture modeling serves as the foundation and a mandatory prerequisite before developing the application design (Information System Architecture), to ensure that the technology to be developed will be capable of facilitating and controlling every activity of personnel in the field in accordance with the organization's standard operating procedures (Thaib & Emanuel, 2020).

Phase C. Information Systems Architectures

Phase C (Information Systems Architectures) focuses on developing information system architectures, including data and application architectures. Through field observations and discussions with operational managers, qualitative data were obtained on the routine workflows of Satpol PP operations, which served as the basis for drafting the module requirements for the SISAPRA 2.0 application.

This phase defines how the organization's business architecture is implemented and supported by information systems, which, in this case, are used to build a control system for the operational tasks of the Jakarta Capital Region Public Order Agency (Satpol PP) in the field. A study by Martyn, Sweeney, & Curtis (2016) used survey data to analyze how organizations configure the four levers of Simon's framework, which create a dynamic tension between innovation and control, leading to optimal organizational performance.

This phase focuses on analyzing the requirements of the target application and producing a framework design known as the SISAPPRA 2.0 Landscape. This landscape diagram provides an in-depth understanding of the direction of the application's development by mapping all modules and sub-modules to be implemented, based on Simons' (1995) Management Control System concept (Four Levers of Control) in the public order enforcement sector.

The study by Kruis, Speklé &Widener (2016) examined the relationship between the four elements of LOC: managerial attention, strategic learning and firm performance. The study found that belief systems and interactive control systems promote learning, whilst diagnostic and boundary systems ensure that behavior is aligned with objectives.

Platform sequence diagram subdomain

In this architectural design, system module development is grouped into three main areas of improvement: the addition of new modules that is, designing new modules or submodules for the existing application to be incorporated into the SISAPPRA 2.0 design; module optimization that mapping modules from the legacy application (SISAPPRA 1.1) that already exist but require performance optimization to meet field task requirements; and retaining existing modules that identifying modules from the legacy application that are already functioning well and retaining them in SISAPPRA 2.0 without the need for additional optimization.

Based on the results of Information Systems Architecture modeling, the target architecture for SISAPPRA 2.0 is designed to consist of 13 main, mutually integrated modules, including: Dashboard, Human Resources, Reporting, Facilities and Infrastructure, Budget, Enforcement of Local Regulations and Mayor's Decrees, Public Order and Security Management, Community

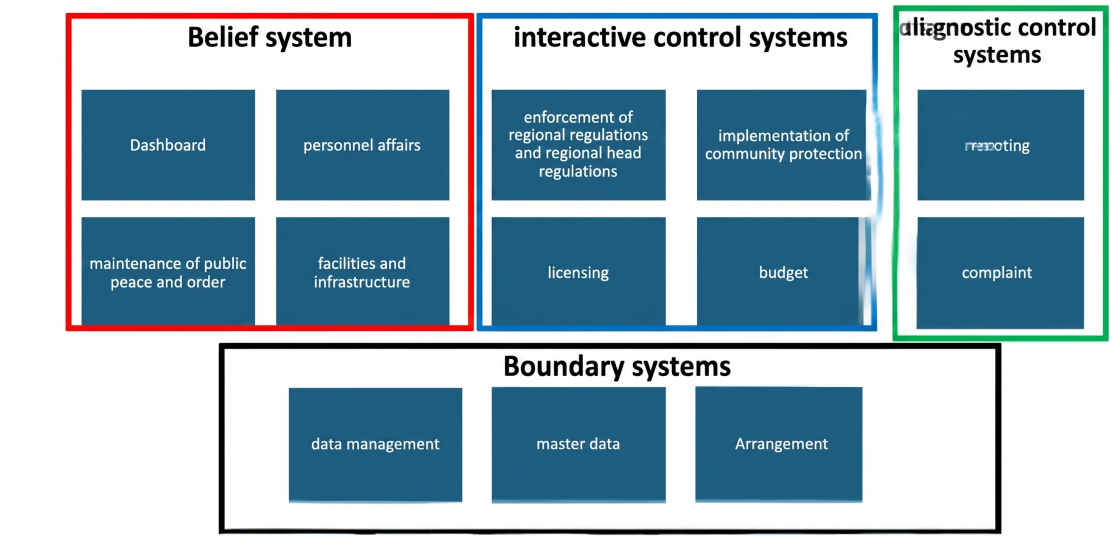

Figure 3. SISAPPRA 2.0 objectives

Security Management, Licensing, Complaints, Data Management, Master Data, and Configuration.

Phase D. Technology Architecture

Phase D (Technology Architecture) aims to define and build a technology infrastructure including hardware and software, so that the designed information system and data architecture can operate optimally to meet the operational control needs of field personnel. The implementation of this phase focuses on two main aspects: application interaction modeling and infrastructure configuration.

Application interaction modeling subdomain

A sequence diagram is a graphical representation of the interactions between objects within a system. It shows how objects interact in a specific sequence over a given period of time. This diagram illustrates the messages exchanged between these objects and the order in which they occur. Sequence diagrams are very useful for modeling interactions between objects in a software system, aiding in the understanding and analysis of system behavior.

Application Design Modeling is a critical stage for translating business requirements into a detailed software system framework. The researchers used several visual modeling tools to bridge the interaction between users (Satpol PP personnel) and the system, namely: A Sequence Diagram is a diagram that graphically represents interactions between objects or actors in a specific chronological order; an example of its application is modeling the steps taken by members of the Jakarta Capital Region Satpol PP when accessing the main page and selecting the operational reporting dashboard. Use Case Diagrams describe the functions available within the SISAPPRA application (e.g., Manage Reporting, Manage Local Regulation Enforcement, Manage Infrastructure) and the authorized users (actor roles) who can access them. Flow Maps and Flow Charts illustrate how data flows from one component to another and the sequence of the system's operational procedures. Deployment Diagram: Used to plan the technology infrastructure by illustrating how hardware and software are deployed and interact within a physical network environment (Lee, 2007).

Infrastructure configuration subdomain

Infrastructure and System Security Configuration. The technology architecture also provides a detailed breakdown of the devices and infrastructure of the Electronic-Based Government System (SPBE) that are relied upon to support the SISAPPRA application. The specified components include: the primary software, which uses CentOS 7 as the operating system (server OS); Cloud Computing, which relies on the Government Cloud in the form of

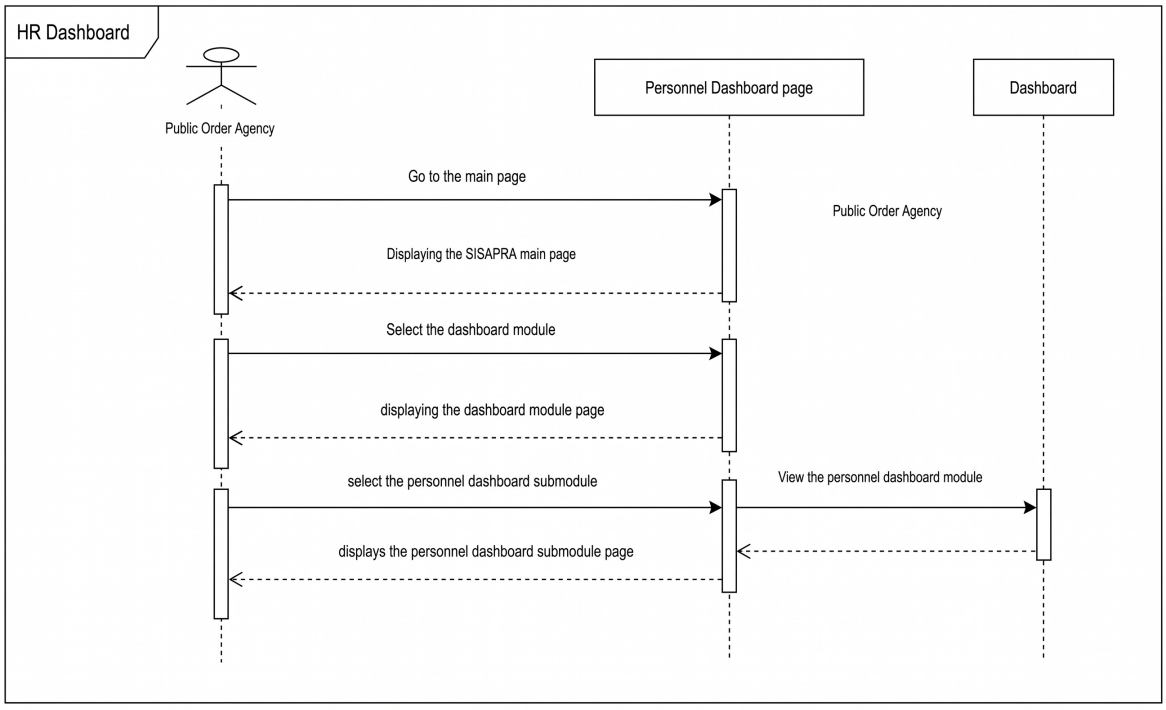

Figure 4. System-user interaction

Virtual Machines (VMs) provided by the DKI Jakarta Provincial Communication and Information Technology Agency (Diskominfotik); an independent physical server specifically a Fujitsu Primergy RX4770 M3 that dedicated to storing all data and information systems of the Jakarta Capital Region Public Order Agency (Satpol PP), and system security, where the technology system is designed to meet SPBE security standards, including ensuring data confidentiality (through access restrictions), data integrity (detecting modifications), data availability (through backup and recovery systems), and non-repudiation features (implementation of digital signatures and digital certificates).

By completing Phase D, the Jakarta Satpol PP has clear operational technical guidelines regarding the infrastructure foundation, physical database structure, and interface scheme, which are absolute requirements before implementing the transition to the SISAPPRA 2.0 application.

Phase E. Opportunities and Solutions

An analysis of the gap between the current information system architecture (SISAPPRA) and the field Standard Operating Procedures (SOPs), as well as the management control system requirements at the DKI Jakarta Satpol PP. Phase E (Opportunities and Solutions) aims to evaluate the target architecture model by comparing it to the current state of the system. This evaluation is conducted using a Gap Analysis approach (Kettani & Moulin, 2014). The implementation of this phase focuses on analyzing the gaps between the operational duties and functions (Tupoksi) of each position and the features actually implemented in the existing application, namely SISAPPRA.

SISAPPRA Gap Analysis Subdomain

Based on the Gap Analysis, several key gaps were identified, which also present opportunities for improvement in the development of the system (SISAPPRA 2.0), as described in Table 1.

Researchers Alhari & Fajrillah (2022) mapped out the requirements for integrating public service data using digital platforms. In their discussion, they state: “The output produced in this study takes the form of an enterprise architecture for a smart village design that will assist the village government in defining a target… in the form of several application platforms covering various aspects of public service management.” This phase sets out how government applications manage documents and administrative services to ensure alignment with the Sustainable Development Goals (SDGs).

The lack of authorized access rights for leaders, particularly for high-ranking and strategic positions such as the Head of the Public Order Agency (Kasatpol PP), the Deputy Head of the Public Order Agency (Wakasatpol PP), various Heads of Subdivisions, and Section Chiefs, who currently have no designated roles or specific features within the application. This results in leaders lacking the means within the system to view comprehensive reports or approve reports prepared by administrators. Furthermore, there is a lack of databases in certain areas where some work units have not yet been integrated into the system; for example, the Business Premises Supervision and Control Division (which includes the Industrial, Non-Industrial, and Entertainment and Recreation Business Premises Sections) does not yet have a database within the application. Features for the General, Finance, and Equipment and Supplies subsections are also not yet available. Data synchronization and integrity are compromised because the employee data module in the SISAPPRA application is isolated and cannot yet be synchronized with the system maintained by the Regional Civil Service Agency (BKD). Data updates can only be performed internally, without cross-validation, which significantly increases the risk of inconsistencies and errors in employee information.

The SISAPRA module that has been developed subdomain

Modules marked as “Live” but not functioning, where various features are technically active (live) but do not work in practice, such as the Billboard Map module and the Local Regulation/Regent Regulation Enforcement module. This problem is exacerbated by the lack of a follow-up mechanism to fix these malfunctioning features. There is a role gap at the regional level where, for Satpol PP units at the Administrative City, Regency, and Subdistrict levels, user roles are consolidated into a single “general admin” such as Role_Admin_Kota or Role_Admin_Kecamatan. There are no specific access rights for regional-level Heads of Satpol PP to approve their subordinates' reports.

Through this Phase E analysis, weaknesses in the SISAPPRA application that hinder operational efficiency were successfully identified. The results of this analysis were then used as the basis for solutions to improve features and access rights (roles) in the user interface design for the next architectural

Table 1. Gap analysis between the sisappra 1.1 application and the development of the SISAPPRA 2.0 application

Aspect/Work Unit	Current Application Status (SISAPPRA 1.1	Implications / Targets (SISAPPRA 2.0)	Evidence/Metric
Command Leadership Access Rights:	There are no authorization roles for the Head of Satpol PP, the Deputy Head of Satpol PP, or the Head of Division. Leaders cannot monitor or approve reports (The head of the public order agency cannot access reports in real time).	Added Performanc Dashboard, Data Analysis, an Thematic Map features fo leaders.	There is no specifi content that the Head o Satpol PP can access.
	There is no operational database within the application (Enforcement operations in the field are not yet data-driven).		
Business Premises Supervision		Development of a new modul and a dedicated database fo supervising business premises	There is no module fo supervising busines premises.
	Isolated from the Regional Personnel Agency (BKD) system. Data updates are internal and do not involve cross-validation (no data synchronization with the BKD application).	API integration between th SISAPPRA 2.0 Personne module and the BKD system.	
Personnel Data Module	These features are active (live) in the application but have been neglected and are non-functional (there are as yet no data sources from licensing authorities other than the Jakarta Satpol PP).		Data is not integrate with the BKI application.
Local Regulation Enforcement & Advertising Features	User roles are combined into a general admin role. Regional leaders do not have accounts to approve reports (Regional leaders cannot receive reports in real time).	Re-optimization of feature and addition of a Investigation Module fo PPNS.	Data is not integrated neither full data no push data from th licensing application.
Regional Access Rights (City/District)		Separation of roles in tier according to the regiona command hierarchy.	There are no module within the SISAPR application that can b accessed by the Mayo District Heads, o Village Heads.

design.

Phase F. Migration Planning

The stages of the roadmap for the migration and implementation of appropriate information technology to ensure that all operational resources of the DKI Jakarta Satpol PP can be managed efficiently and effectively. Phase F (Migration Planning) is the stage in which an organization plans the transition from the old system to the new one. This phase aims to analyze the risks, benefits, and dependencies of various projects in order to establish priorities and develop a detailed migration implementation plan. The implementation of this phase within the operational information system of the Jakarta Capital Region Public Order Agency (Satpol PP) involves two main steps in the migration planning process: completing a gap analysis through user interface design and drafting the SISAPPRA 2.0 implementation roadmap for 2024. Research by Fitriani, L. (2018) discusses how to draw up a migration plan from the old system to the new e-government system. The researcher emphasizes that migration planning helps to determine work priorities and transition strategies for government services and information, so that these can be better communicated to the public. This is supported by research by Entsie, E. (2025), which explains that, using the Technology-Organisation-Environment (TOE) and Diffusion of Innovation (DOI) frameworks, this study evaluates the factors that determine the success of cloud migration planning in the public sector. Key factors include support from top management, compliance with government regulatory standards, and human resource readiness.

Resolving the gap analysis subdomain

The initial migration planning was underpinned by the creation of a new visual user interface (UI) design based on the results of the gap analysis of the existing system. This UI design was crafted to ensure that user interaction (by Satpol PP officers) with the new system is smooth and easy to understand. The result of this phase is a Gap Resolution Roadmap Design Model, in which all modules of the old application were enhanced, and new sub-modules were added (leading to SISAPPRA version 2.0) in accordance with the organizational structure, including dashboard visualization and case investigation management features.

Development of the SISAPPRA 2.0 implementation roadmap subdomain

To ensure a systematic and targeted migration, the researchers have drawn up a Roadmap for the Implementation and Development of SISAPPRA 2.0 for 2024. This roadmap was developed to ensure that all stakeholders, from the provincial level down to the city, regency, subdistrict, and village levels, have a comprehensive understanding of the direction and implementation stages.

The migration planning and implementation outlined in the 2024 roadmap are divided according to priority levels. First is the Initial Phase (Foundation Building), where development focuses on the core modules, specifically strengthening the Master Data Module and the Data Management Module. Prioritizing this is essential to ensure that all core data that form the foundation of the

Figure 5. General SISAPPRA roadmap

system are properly managed from the very start of the transition. Second, Advanced Development: once the foundational modules are ready, the migration will continue with the development and launch of other operational modules. These modules include the Personnel Module, reporting, facilities and infrastructure, enforcement of local regulations and mayoral decrees, maintenance of public peace and order (Tramtibum), Civil Defense (Linmas), and Licensing.

In the SISAPPRA 2.0 architectural design, several new modules and submodules have been developed to address functional gaps in the previous system. Based on the roadmap for addressing the gap analysis, the following new modules and submodules have been added: The Investigation Module, specifically designed to support the operational tasks of the Civil Servant Investigators (PPNS) Division. This module includes key functions such as case management, which manages all information related to an investigation from start to finish, including data on suspects, the chronology of events, evidence, and the investigation's progress. Additionally, the investigative collaboration feature supports coordination among the various parties involved in the investigation, including the sharing of investigative information to ensure the process runs effectively and efficiently. Research conducted by Abu Bakar, Razali & Jambari (2022) analyzed the challenges and formulated a conceptual model for migrating legacy systems to a citizen-centric digital ecosystem. The research found that successful migration planning in the public sector must take into account four key aspects: people, processes, products (technology), and organization.

Several new submodules have been added to the main reporting module to record enforcement activities in greater detail. These new submodules include reports on Summary Offense Hearings (PPNS), Alcohol Enforcement, Building Enforcement, Media Enforcement, Enforcement Regarding Individuals with Social Welfare Issues (PPKS), Yellow Card Enforcement, and Security. A new Security Report submodule has also been added to the Community Protection (Linmas) section. Furthermore, additional data visualization (Dashboard) has been implemented to strengthen the management control system capabilities for leadership. SISAPPRA 2.0 also adds new functionality to the data visualization section, including a Performance Dashboard, Analytical Data Visualization, Evaluation Data Visualization, and Thematic Maps of Violations and Enforcement Actions.

The main challenges in synchronizing data between the SISAPPRA application and the Regional Civil Service Agency (BKD) system include several fundamental issues with the employee data module, namely: the lack of system connectivity and integration, whereby the employee data module within the SISAPPRA application is currently isolated and cannot be synchronized with the BKD system; the absence of a synchronization validation feature, as the SISAPPRA system cannot validate data synchronization with the BKD system, resulting in a very high risk of information errors and data inconsistencies; and data updates are internal and unverified: The process of updating employee data can only be performed internally by the Satpol PP. The results of these updates are not verified across agencies, posing a threat to data integrity: Due to the absence of a cross-verification mechanism with official data from the BKD system, the risk of compromising the integrity and validity of employee data is very high (Kubicek & Cimander, 2009).

The research findings indicate that the existing SISAPPRA application (version 1.1) operates suboptimally due to a mismatch between its information technology architecture and the operational realities of law enforcement bureaucracies in the field. Based on the Four Levers of Control theoretical framework developed by Simons (1995), the success of a management control system in a dynamic organization depends heavily on the balance between Diagnostic Control Systems and Interactive Control Systems. Diagnostic systems are used to monitor performance against established standards. In contrast, interactive systems enable leaders to be directly involved in analyzing strategic uncertainties and to interact continuously with subordinates.

In the context of the Jakarta Capital Region Satpol PP, the lack of authorized access rights (roles) for strategic leadership levels (such as the Head of Satpol PP and the Deputy Head of Satpol PP) in the existing application constitutes a critical structural weakness. This weakness prevents the application system from functioning as an Interactive Control System. Top commanders experience a “digital blind spot” because they lack the tools within the system to validate reports, provide real-time tactical guidance, or respond to escalating public order disturbances in a rapidly changing metropolitan area. As a result, the application functions merely as a repository for passive (static) report data without adding value to the decision-making process. The target architectural design of the SISAPPRA 2.0 Landscape comprehensively addresses this gap

by providing a Performance Dashboard and interactive thematic map visualizations. The addition of these features transforms the system into an interactive control instrument that enables leaders to carry out tactical interventions and allocate personnel with precision, which ultimately contributes directly to the creation of public value in urban security governance (Moore, 1995).

The current state of the personnel management module in the SISAPPRA application, which is isolated and not yet integrated with the database of the DKI Jakarta Provincial Regional Civil Service Agency (BKD), reflects the organization's low level of e-government maturity. Based on the e-government maturity model formulated by Layne and Lee (2001), the development of digital governance should ideally progress from the simple cataloging stage toward horizontal integration, which connects information systems across government agencies with different functions (G2G/Government-to-Government). When personnel data modules operate in silos (isolated from one another), internal data updates performed without automatic cross-validation create a very high risk of data integrity vulnerabilities.

In operations to enforce local regulations that carry high legal risks, the validity of personnel data (such as active status, rank, position, and the administrative legitimacy of officials) is an absolute prerequisite for ensuring the legal accountability of actions taken in the field. Fountain (2001), through the Institutional Theory of E-Government, points out that the greatest obstacle to technology integration in the public sector often lies not in technical aspects, but in bureaucratic habits that resist breaking down institutional sectoral silos. The SISAPPRA 2.0 blueprint breaks down these digital bureaucratic barriers by adopting Application Programming Interface (API)-based integration with the BKD system, ensuring that field personnel deployment is supported by an accurate, valid, and up-to-date civil service database.

Research findings on features that are active (live) but neglected and non-functional in practice (such as the Local Regulation Enforcement Module and the Billboard Map) indicate weaknesses in the organization's boundary systems. Simons (1995) explains that boundary systems serve to define behavioral boundaries, minimize organizational risk, and prevent the institution from wasting energy on unproductive or low-impact activities. The failure of these features to function in the field stems from the technology systems being built without binding digital Standard Operating Procedures (SOPs) and the absence of periodic post-implementation evaluations.

The SISAPPRA 2.0 architectural design bridges this functional gap by embedding strict bureaucratic workflow logic into the system, specifically through the Investigation Module, designed for Civil Service Investigators (PPNS). This module formally digitizes the stages of legal case management, from investigation reports to enforcement proceedings, ensuring the application's functions operate in accordance with applicable legal frameworks. The introduction of the Investigation Module for PPNS and the visualization of thematic maps effectively transform static oversight functions into a fully integrated, dynamic law enforcement system. Standardized under the Electronic-Based Government System (SPBE), the optimization of hardware and software infrastructure in Phase D ensures the system's reliability against technical failure.

The SISAPPRA 2.0 architecture demonstrates the TOGAF ADM's ability to overhaul control systems in megacity-scale security agencies. This comprehensive update to the enterprise architecture has successfully transformed static surveillance functions into a dynamic, accountable mechanism for maintaining public order, focused on fulfilling the public's sense of security as a basic need of city residents. This sense of security includes freedom from physical and psychological harm and protection from various threats (Maslow, 1970; Potter & Perry, 2006).

The successful implementation of the SISAPPRA 2.0 blueprint depends not only on the excellence of the technological infrastructure design and the comprehensiveness of the functional modules, but also on the readiness of the human ecosystem within the bureaucracy to adopt new ways of working. The socio-technical systems theory put forward by Bostrom and Heinen (1977) asserts that failures in the implementation of Information Systems (IS) within government agencies are generally not caused by software bugs but rather by a failure to account for psychosocial aspects and users' work habits (user resistance). In the context of the Jakarta Capital Region's Satpol PP, the integration of a dynamic leadership dashboard, real-time reporting based on spatial mapping, and the digitization of the PPNS investigation module have brought about fundamental changes in the level of accountability and oversight of personnel in the field. The transition from the more lenient monitoring approach under SISAPPRA 1.1 to the strict, interactive monitoring under SISAPPRA 2.0

has the potential to trigger resistance within the organizational culture, such as fears of more transparent performance audits, reluctance to change manual reporting practices, and a digital literacy gap amongst the 5,500 operational staff.

Therefore, Phase F (Migration Planning) within the TOGAF ADM framework must be reinforced with a structured Change Management Program. Adopting the ADKAR (Awareness, Desire, Knowledge, Ability, Reinforcement) framework from Hiatt (2006) and combining it with Kotter's (1996) eight-step transformation model, the change management programme at the Jakarta Capital Region Public Order Agency (Satpol PP DKI Jakarta) was designed through three stages of strategic intervention: building awareness and a coalition of command (Awareness & Desire), enhancing competencies at various levels (Knowledge & Ability), and strengthening and institutionalising a digital culture (Reinforcement).

Through the integration of this change management program, the TOGAF ADM enterprise architecture framework serves not merely as a rigid information technology blueprint, but as a dynamic instrument for organizational transformation. This program ensures that the technology adoption cycle proceeds in tandem with the consolidation of interactive control systems, thereby strengthening the digital governance and responsiveness of the Jakarta Capital Region Public Order Agency (Satpol PP) in maintaining public peace and order within the metropolitan area.

■ CONCLUSION

This study concludes that enterprise architecture design using the TOGAF ADM framework can provide a comprehensive solution to the inefficiencies in the operational management control system at the Jakarta Capital Region Public Order Agency (Satpol PP DKI Jakarta). Based on a gap analysis, three critical issues were identified in the existing SISAPPRA application: the lack of authorized access rights for command leaders, which creates digital blind spots; the isolation of the personnel database from the Regional Civil Service Agency (BKD) system; and the failure of several strategic operational functions in the field. As a solution, this study develops an IT governance blueprint through the SISAPPRA 2.0 Landscape, comprising 13 integrated modules, including a Leadership Performance Dashboard and a specialized Investigation Module for Civil Servant Investigators (PPNS).

Both theoretically and practically, this study introduces novelty by combining information system architecture design with the concept of the Four Levers of Control. This digital transformation has successfully transformed the application from a mere passive reporting tool (diagnostic control) into a dynamic command-and-control system (interactive control), enabling leaders to carry out tactical interventions in real time. Furthermore, G2G (Government-to-Government) cross-integration with the BKD has successfully broken down bureaucratic silos, thereby ensuring the validity, integrity, and accountability of data for 5,500 personnel operating in a high-risk metropolitan area.

As a recommendation for implementing this new governance framework, the SISAPPRA 2.0 migration roadmap must be accompanied by a structured change management program to address potential resistance stemming from field personnel's work culture. For future research, it is recommended that a follow-up study be conducted to evaluate network readiness, particularly in outlying areas such as the Kepulauan Seribu Administrative District. Additionally, evaluative research using the Technology Acceptance Model (TAM) is needed to empirically measure the level of acceptance and adoption of the application by field operational units after the system is fully implemented.

■ DECLARATION OF GENERATIVE AI USAGE IN THE WRITING PROCESS

During the writing of this manuscript, the author used AI (Gemini) to assist with the line of reasoning, language refinement, and structural editing. This AI tool was specifically used to: (a) improve the clarity and academic style of the sentences; (b) provide structural suggestions regarding the organization of the discussion section; and (c) check grammar. All substantive and theoretical analyses, normative arguments, conclusions, and recommendations were formulated independently by the author. The author has reviewed and edited all content generated by this tool and assumes full responsibility for the content of the published article.

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