Publik (Jurnal Ilmu Adminsitrasi)
Vol. 14 No. 1 Tahun 2025
DOI: http://dx.doi.org/10.31314/pjia.14.1.133-150.2025
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ISSN: 2301-573X E-ISSN: 2581-2084

Public Service Innovation Based on Artificial Intelligence Technology in the Protection of Citizens Abroad: A Comparative Study of Indonesia and Singapore

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Abstract. Digital transformation in public service has encouraged governments to adopt artificial intelligence (AI) technologies to enhance service effectiveness and responsiveness, including in the context of protecting citizens abroad. This study compares Indonesia's digital innovation through the Portal Peduli WNI and Singapore's Digital Consular Services (DCS), focusing on technological integration, system design, and protection effectiveness. The research adopts a qualitative-descriptive approach using document analysis and in-depth interviews with officials from the Ministries of Foreign Affairs of Indonesia and Singapore. The analysis covers ten key aspects: system architecture, functions, technological infrastructure, inter-agency integration, proactive services, scalability and connectivity, key features, system orientation, emergency coordination, national system integration, and data utilization. The findings reveal that Singapore's DCS is structurally and functionally more advanced. It is designed with a modular, cloud-based architecture, integrated with national platforms such as SingPass and MyInfo, and equipped with predictive analytics, automated notifications, and digital case management. In contrast, Indonesia's Portal Peduli WNI remains reactive, lacks comprehensive integration, and has yet to support real-time, data-driven service automation. The study concludes by emphasizing the importance of adopting a whole-of-government approach, improving system interoperability, and applying AI to detect risks and accelerate emergency response for Indonesian citizens abroad. These findings are expected to serve as a foundation for more inclusive, responsive, and sustainable digital public service reform in Indonesia.

Keywords: Innovation; Public Service; Artificial Intelligence; Citizens

Received:22-03-2025 ***Revised***:21-04-2025 ***Accepted***:29-06-2025

INTRODUCTION

The rapid development of information and communication technology necessitates that governments remain adaptive in enhancing the quality of public services and optimizing institutional performance to meet societal demands through continuous innovation in public service delivery (Djamaris et al., 2023). The institutionalization of public service innovation has become a pivotal agenda within the broader framework of bureaucratic reform, requiring comprehensive oversight and implementation across all levels of government (Lesnussa et al., 2023). Through the adoption of electronic-based governance systems, governments are expected to deliver optimal public services and formulate targeted policies that effectively address emerging challenges (Medaglia et al., 2023). Accordingly, digital transformation must be embedded within electronic government systems to ensure high-quality, reliable public service

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delivery, the establishment of an integrated and holistic digital governance framework, enhanced bureaucratic performance, and the strengthening of cybersecurity and information security mechanisms (Newman et al., 2022).

The results of the 2024 E-Government Development Index (EGDI) survey, published by the United Nations, reveal a significant digital disparity among member states. Singapore emerged as one of the top-performing countries, reflecting its advanced digital infrastructure, efficient online services, and strong human capital capacity. Ranked third globally and leading the Asian region—surpassing South Korea—Singapore achieved scores of 0.9831 in the Online Service Index (OSI), 0.9881 in the Telecommunication Infrastructure Index (TII), and 0.9362 in the Human Capital Index (HCI). In contrast, Indonesia demonstrated notable progress, attaining an EGDI score of 0.7991 and rising 13 positions to 64th place from its previous rank of 77 in 2022. This advancement indicates Indonesia's growing commitment to strengthening the implementation of its Electronic-Based Government System (Sistem Pemerintahan Berbasis Elektronik/SPBE), although substantial challenges remain in ensuring the provision of inclusive and optimal digital public services.

Infrastructure development has become increasingly relevant in line with the rapid advancement of communication and information technologies (Tucker, 2012). In pursuit of good governance, governments are expected to be adaptive, proactive, responsive, and innovative in identifying new approaches to public service delivery that contribute to improved governance. Among emerging technological innovations, artificial intelligence (AI) stands out as a conceptually ideal tool for integration into governmental systems. The use of AI in public administration has garnered growing attention from both academic and professional communities worldwide (Newman et al., 2022). This is due to AI's potential to enhance internal administrative efficiency, support more effective decision-making processes, and deliver more inclusive, participatory, and higher-quality public services (Medaglia et al., 2023).

In the context of transformation driven by artificial intelligence (AI) technologies, Singapore has comprehensively implemented the concept of smart governance, as reflected in its application of technology-based decision-making systems across various public sector services. In December 2024, Singapore launched the National Artificial Intelligence Strategy 2.0 as a major update to its earlier Smart Nation vision introduced in 2019. The country's rapid advancements in AI development merit serious attention from Indonesia, especially considering that both nations share a common mission to accelerate digital transformation and enhance public service quality. Singapore has demonstrated a strong commitment through the formulation

of strategic policies and the establishment of ethical and responsible AI governance frameworks (Prime Minister Lee Hsien Loong's speech at the launch of Smart Nation, 24 November 2014). One institution that has taken concrete steps in this regard is the Ministry of Foreign Affairs of Singapore. As a key agency responsible for providing services and protection to its citizens abroad, the Ministry has adopted AI technology through the deployment of a public service chatbot featured on its official website, titled Ask MFA. Ask MFA functions as an interactive chatbot and help center designed to provide rapid responses to frequently asked questions regarding consular services and foreign policy matters.

In the context of citizen protection abroad, Singapore demonstrates a systematic and responsive performance, particularly through its Digital Consular Services, which comprise several key features, including eRegister, eAppointment Services, Digital Document Services, Consular Assistance Request Online, as well as SingPass and MyInfo, all of which are integrated with the national database. Furthermore, Singapore has proactively established the Consular Response Centre (CRC), a 24-hour operational unit designed to handle emergency cases involving Singaporean citizens abroad.

According to The Revenue and Expenditure Estimates for the Financial Year 2023/2024 of the Republic of Singapore, in 2022 the Ministry of Foreign Affairs of Singapore managed over 7,452 cases and approximately 300,000 consular assistance requests, with an average response time of less than 30 minutes for high-priority cases. The seamless collaboration between systems—namely the Digital Consular Services, the Digital Case Management System, and the CRC—enables swift and integrated case processing, significantly enhancing the responsiveness and effectiveness of consular protection efforts.

In contrast, Indonesia's public service innovation for the protection of Indonesian citizens abroad is implemented through the development of the Portal Pelayanan dan Pelindungan WNI (Portal Peduli WNI). This portal facilitates the registration and documentation of Indonesian citizens through a self-reporting feature and enables online service applications, appointment scheduling with diplomatic missions, and independent incident reporting. The primary objective of Portal Peduli WNI is to ensure comprehensive and accurate data collection of Indonesian citizens residing abroad, thereby optimizing the provision of services and protection by Indonesian diplomatic and consular missions.

The Perceived Satisfaction Score for the Services and Protection of Indonesian Citizens (WNI) in 2024 reached 3.81 out of a target of 4 on a 4-point scale (Laporan Kinerja Direktorat Pelindungan WNI, 2024). One of the critical factors contributing to the unmet target is the low

utilization rate of the Portal Peduli WNI, which has led to inefficiencies in handling cases involving Indonesian citizens abroad. In addition, several technical challenges persist, including issues related to accessibility, system performance, stability and reliability, as well as interoperability and data integration. As of now, the system remains under continuous improvement and further development.

Given the complexity of these issues, a comparative study examining best practices in public service innovation for the protection of citizens abroad is warranted. Based on the literature review, six prior studies provide a relevant conceptual foundation for the present research. Shirwa et al. (2025) developed a collaborative governance framework to support sustainable digital transformation in the construction industry through the integration of digital enablement and digital strategy. Monteiro et al. (2024) applied benchmarking grounded in multicriteria analysis to assess the performance of both actual and ideal urban spatial planning. Boyanov (2024) positioned benchmarking as a strategic instrument to enhance effectiveness and accountability in the public sector, with particular emphasis on the integration of qualitative and quantitative metrics. Suhendar and Fathurrahman (2023) conducted a comparative study on bureaucratic reform in Indonesia and Malaysia, identifying key success factors and challenges in improving the quality of the civil service. Albab (2022) compared education policies in the United States and Indonesia, highlighting the importance of adapting international best practices to local contexts. Liu and Geva-May (2021) examined cross-country public policy responses to the COVID-19 pandemic as a natural experiment, revealing the influence of institutional, political, and cultural factors on policy effectiveness. This review indicates that comparative studies and benchmarking have been extensively applied across various sectors of governance and public service. However, to date, no research has specifically compared public service delivery in the protection of citizens abroad between Indonesia and Singapore, particularly with a focus on the utilization of artificial intelligence (AI) in such protection processes. This study addresses this gap by offering a comparative analysis that integrates policy, institutional, and AI-based technological innovation dimensions to strengthen public service governance in the domain of citizen protection. Specifically, this research aims to analyze and compare public service innovations implemented by Indonesia and Singapore in the context of overseas citizen protection—namely, Indonesia's Portal Peduli WNI and Singapore's Digital Consular Service. By benchmarking against Singapore's best practices, Indonesia may identify and adopt more effective strategies to address existing challenges and improve the quality of its services and protection mechanisms for Indonesian citizens residing abroad.

This study is expected to provide valuable insights and policy recommendations for the development of more effective, efficient, and sustainable public service innovations, particularly in the domain of service provision and protection for Indonesian citizens abroad. Through a critical and adaptive comparative approach, the findings of this research aim to contribute meaningfully to the strengthening of governance and public service innovation in the protection of Indonesian citizens overseas, while also fostering the advancement of an inclusive and sustainable digital transformation.

METHODS

This study employs a post-positivist approach using a descriptive qualitative research method. Qualitative research is an approach aimed at exploring and contextually understanding the meanings ascribed by individuals or groups to a social or human problem (Creswell, 2018). The approach enables the integration of theory and empirical evidence through observation, in-depth interviews, and document analysis. Using an ideal-type analysis model, the research compares the performance and policy design of two digital platforms—Singapore's Digital Consular Service and Indonesia's Portal Peduli WNI—across dimensions of efficiency, public service delivery, transparency and accountability, public participation, socio-economic impact, and sustainability. Data collection involved key informants from Indonesia's Ministry of Foreign Affairs and official data from Singapore, allowing for systematic comparative analysis despite limited access to Singaporean primary data. Data processing and analysis followed stages of reduction, presentation, and verification, ensuring validity through triangulation. While constrained by the scope of primary data from the comparator country, the focus on two functionally similar digital platforms facilitates targeted and in-depth analysis. The study contributes to understanding how institutional design, technological capabilities, and policy strategies influence the effectiveness of citizen protection abroad, offering evidence-based insights and aligning with international best practices

RESULTS AND DISCUSSION

This study's theoretical framework is constructed upon three core concepts—digital innovation, public service, and artificial intelligence (AI)—directly linked to efforts in enhancing service delivery and protecting Indonesian citizens abroad. Digital innovation is understood not merely as the implementation of technology, but as a comprehensive transformation in governance and the interaction between the state and the public. Strengthening the dimensions of efficiency, transparency, participation, and sustainability serves as key indicators for assessing the success of public service innovation. As public expectations for transparency, accountability,

and efficiency continue to grow, governments worldwide face an urgent imperative to design digital innovation strategies that are adaptive, inclusive, and sustainable.

Contemporary digital innovation strategies in the public sector have evolved toward more systemic and holistic approaches, focusing not only on technological procurement but also on public value creation, organizational transformation, and the strengthening of institutional capacity (Drechsler et al., 2025). In this context, technological readiness, flexible organizational structures, transformative leadership, and a pro-innovation culture emerge as critical determinants for the successful implementation of digital innovation (Weerakkody et al., 2022). Furthermore, governance reforms aimed at creating an enabling ecosystem for digital innovation must also be prioritized (Mergel et al., 2016).

Global phenomena classified under VUCA (Volatility, Uncertainty, Complexity, and Ambiguity) have the potential to act as significant catalysts for accelerating digital innovation in the public sector. Rodriguez, Liu, and Park (2025) note that large-scale crises, such as the COVID-19 pandemic, have exerted substantial external pressure on governmental systems, compelling public institutions to fundamentally reconstruct their operational models and service governance. Within this framework, digitalization can no longer be positioned as a strategic alternative; rather, it has become a normative necessity essential for ensuring public service continuity and reinforcing institutional resilience in the face of disruptive environmental dynamics. Additionally, inclusive approaches in collaborative governance contribute significantly to improving the quality of digital public services by fostering active participation from multiple stakeholders in the governmental transformation process (Aidi et al., 2024).

The successful implementation of digital innovation in public service delivery requires comprehensive and measurable evaluation criteria to ensure its impact on governance and societal well-being. These criteria include operational efficiency—defined as the ability of innovation to reduce costs, enhance bureaucratic productivity, and accelerate service processes (OECD, 2015). Service quality is assessed through improvements in user satisfaction, accessibility, and responsiveness to public needs. Innovation must also strengthen transparency and accountability through open information systems and widely accessible public reporting mechanisms. Public participation constitutes another crucial dimension, promoting societal engagement and cross-sectoral collaboration in policymaking and service delivery. From a socio-economic perspective, digital innovation should contribute to enhancing societal welfare, fostering economic growth, and creating new employment opportunities (Brynjolfsson & McAfee, 2017). Finally, sustainability remains a fundamental requirement, encompassing environmental

efficiency, financial continuity, and the long-term adaptive capacity of digital public service systems.

In the context of serving and protecting Indonesian citizens abroad, Indonesia's Ministry of Foreign Affairs Regulation No. 5 of 2018 provides the normative foundation for the country's consular operational system. This study specifically undertakes a comparative analysis of two digital platforms—Singapore's Digital Consular Services and Indonesia's *Portal Peduli WNI*—focusing on technological architecture, service functionality, and responsiveness during emergencies. This analysis is particularly relevant given that AI has emerged as a key catalyst for public service reform, where the integration of big data and machine learning can enhance the accuracy and speed of governmental decision-making in critical situations.

To operationalize the analysis, the study organizes evaluative indicators into variables such as technological architecture, infrastructure, functionality, operational efficiency, and public participation. Through this approach, the research aims not only to assess differences in the technical performance of the two platforms but also to evaluate the extent to which modern public governance principles have been strategically and contextually applied in both countries. This framework is expected to yield findings that are not only descriptive and comparative but also generate actionable and context-sensitive recommendations to strengthen Indonesia's digital public service policy.

This study compares two digital public service innovations developed by the governments of Indonesia and Singapore in the context of protecting citizens abroad. Indonesia has developed the Portal Peduli WNI as its primary tool for the registration and protection of Indonesian citizens overseas, while Singapore has implemented the Digital Consular Services (DCS), which is integrated with national systems through SingPass and MyInfo. The analysis focuses on ten key aspects: system architecture, functionality, technological infrastructure, inter-agency integration, proactive services, scalability and connectivity, key features, system orientation, emergency coordination, national system integration, and data utilization, as elaborated below.

A. System Architecture

Portal Peduli WNI was developed as a digital system using a semi-monolithic architecture, in which key functions—such as self-reporting, assistance requests, and citizen data management—are consolidated within a single unified platform. While this approach facilitates centralized management in the initial development phase, it presents several structural limitations, including poor scalability, challenges in integrating with external systems, and limited modular separation between service components. As a result, any changes or disruptions in one feature

may affect the entire system. Furthermore, the lack of modularity hinders the system's ability to adapt and innovate in response to evolving global dynamics, making technological upgrades and reforms slow and inefficient.

In contrast, Digital Consular Services is designed with an integrated modular architecture, comprising a range of distinct yet interoperable digital consular services. Each feature operates autonomously while being interconnected through an Application Programming Interface (API)-based infrastructure, enabling real-time data exchange and cross-system function calls. The system is also integrated with SingPass and MyInfo, which allow for automatic user authentication without the need for manual data input and ensure high levels of inter-agency interoperability. Moreover, its modular architecture supports incremental development without disrupting the core system and ensures enhanced security and auditability, as user data and activity can be tracked across modules with high integrity. This modularity aligns with the principle of agility in digital public services, allowing regulatory changes or urgent needs to be addressed through partial updates without overhauling the entire system.

B. Functionality

Portal Peduli WNI is designed to support the mandate of the Ministry of Foreign Affairs of the Republic of Indonesia in providing basic protection to Indonesian citizens (WNI) residing abroad. The portal focuses on three core elements: reporting the presence of Indonesian citizens, support for consular services, and monitoring of individual cases related to their needs or problems overseas, such as lost documents, legal assistance, or emergency evacuations. This functionality is reactive in nature, meaning the system only becomes operational after individuals manually report their situation. While this approach serves administrative needs, the system remains limited in terms of service automation and inter-agency data integration.

In contrast, Digital Consular Services adopts a more comprehensive and proactive approach in supporting the protection of citizens abroad. In addition to providing travel reporting and emergency assistance features—similar to those in Portal Peduli WNI—the Singaporean system includes digital document management (e.g., electronic legalization), an automated appointment scheduling system (eAppointment) for embassy services, and direct access to national identity records through integration with the MyInfo platform. As a result, validation processes and consular services can be carried out automatically, efficiently, and in real time using data-driven mechanisms.

C. Technological Infrastructure

From a technological infrastructure perspective, there are notable differences between the system architectures employed by Portal Peduli WNI and Singapore's Digital Consular Services. Portal Peduli WNI, developed by the Ministry of Foreign Affairs of the Republic of Indonesia, still relies on conventional server-based architecture. This on-premise system presents limitations in terms of scalability, particularly when handling large volumes of data (e.g., bulk uploads) and real-time service processing. These constraints have adversely affected system performance, as evidenced by frequent downtime, failures in mass data uploads, and delays in user access during periods of high traffic.

In contrast, Singapore's Digital Consular Services is built using a cloud-native architecture, specifically designed to operate optimally within a cloud computing environment. This architecture provides elastic resource scalability, allowing the system to automatically adjust to changes in workload without compromising service performance. Moreover, the system is supported by National Digital Identity (NDI)-based encryption, which is integrated with SingPass and MyInfo, ensuring the security of citizens' digital identities during authentication processes and cross-system data transactions. The use of cloud-native technology also offers significant advantages in data redundancy, disaster recovery, and distributed system maintenance, enabling service availability levels to be maintained at nearly 99.9% uptime. This stands in stark contrast to traditional server-based architectures, which require manual maintenance and are prone to single points of failure.

From a security standpoint, Singapore's integration of its systems with the National Digital Identity (NDI) framework not only enables two-factor authentication and end-to-end encryption, but also establishes an auditable trail that allows for transparent and secure tracking of user activities. In contrast, Portal Peduli WNI continues to face significant limitations in managing data in real time and in ensuring the integrated security of user data, indicating that its technological architecture has yet to fully meet the standards of modern digital consular systems.

D. Inter-Institutional System Integration

The Portal Peduli WNI system continues to face significant limitations in system interoperability, both technically and institutionally. On a technical level, integration with national systems such as SIMKIM (Immigration Management Information System), SIAK (Population Administration Information System), SIMKAH (Marriage Management Information System), and SISKOTKLN (Overseas Migrant Worker Placement System) has not yet been fully optimized. As

a result, the verification of civil and legal status data for Indonesian citizens abroad still requires manual processing or the repeated uploading of documents—factors that not only slow service delivery but also increase the risk of data inconsistencies.

Additionally, institutional fragmentation in Indonesia's civil registration and population data governance contributes to inconsistent and sometimes overlapping integration processes across systems. For instance, the absence of a national API standard for population data hinders seamless synchronization between consular systems and civil registry or immigration databases. These challenges ultimately undermine the efficiency of digital consular services and restrict the ability to accurately monitor the presence and status of Indonesian citizens overseas.

Singapore demonstrates a structural advantage through the implementation of centralized and efficient inter-ministerial connectivity. Its digital consular system is directly linked to MyInfo, the government-managed national data vault containing verified personal information of Singaporean citizens. Through MyInfo, the Ministry of Foreign Affairs can access real-time data from a range of strategic agencies, including the Immigration and Checkpoints Authority (ICA), Ministry of Health (MOH), Ministry of Manpower (MoM), as well as financial and educational institutions. This integration is automated and real-time, enabling swift identity authentication, citizenship status tracking, and emergency assistance delivery without procedural overlap or delay.

E. Proactive Service Delivery

Indonesia's Portal Peduli WNI system remains reactive in nature and relies heavily on manual self-reporting. Indonesian citizens (WNI) residing abroad are required to report their presence and condition independently by completing online forms. In emergency situations, protection is only provided after the individual actively submits a report or request for assistance through the available communication channels. The absence of an automated notification system leads to delays in initial response—particularly when citizens are in areas with network disruptions, limited access to information, or urgent circumstances that hinder timely self-reporting.

This reflects Indonesia's continued dependence on individual initiative, rather than on a data-driven system capable of detecting risk automatically and initiating action. In addition to slowing the government's response time, this approach carries high risk in large-scale or rapidly evolving crises, such as global pandemics or cross-border military conflicts. In this regard, Singapore demonstrates a more advanced and structured approach. The Digital Consular

Services system is connected to an automated notification mechanism that sends alerts to citizens who have registered via eRegister and are integrated within the national digital ecosystem through SingPass and MyInfo. In the event of a crisis—such as a natural disaster, disease outbreak, political unrest, or security disturbance in a particular region—the system automatically identifies affected citizens and dispatches official notifications from the Ministry of Foreign Affairs.

These notifications not only contain safety advisories but also provide information on available assistance measures, including emergency hotlines, nearby evacuation points, and the location of relevant diplomatic missions. This approach positions Singapore's system as a technology-based risk mitigation instrument, leveraging real-time data, location tracking, and automated communication to accelerate the government's response to potential threats facing its citizens abroad.

F. Scalability and Connectivity

Portal Peduli WNI continues to face significant challenges in terms of scalability and system stability. Due to its reliance on conventional server-based technology, the portal exhibits limitations in handling large-scale data processing (e.g., bulk uploads) and supporting simultaneous user access. According to the 2024 Performance Report from Indonesian diplomatic missions abroad, the system frequently experiences downtime, failures in exporting verified data, and delays in uploading data for thousands of users, ultimately impeding service effectiveness—particularly during times when rapid responses are critical.

Moreover, limitations in system connectivity result in a high dependence on manual processes, such as identity validation and repeated data entry by users. These not only slow down service workflows but also increase the risk of input errors and data duplication. In the context of protecting Indonesian citizens abroad—where accuracy and speed are vital—such constraints pose serious obstacles to achieving the standards of a responsive and adaptive digital consular service.

In contrast, Singapore's Digital Consular Services demonstrates clear superiority in this dimension. The system is designed with a cloud-native architecture and operates on a low-latency global network infrastructure, allowing it to maintain optimal performance even when accessed simultaneously by citizens across different regions of the world. By utilizing elastic cloud infrastructure, the system can automatically scale its computing resources in response to sudden surges in traffic or service demand—such as during natural disasters, conflicts, or global

health crises. Moreover, its seamless integration with national platforms like SingPass and MyInfo enables real-time authentication and data validation without the need for additional connections to other agencies, thereby enhancing both the speed and reliability of data connectivity. This combination ensures a consistent and uninterrupted user experience, while maintaining system stability at nearly 99.9% uptime. These features make Singapore's system highly dependable for cross-time zone, cross-border services, even under extreme or emergency conditions.

G. Key Features

Portal Peduli WNI remains limited to basic functionalities such as self-reporting and assistance requests, with most services being manual and non-automated. There is currently no online system for tracking application status, leaving Indonesian citizens without visibility into the progress of their cases once submitted. This lack of transparency contributes to user uncertainty and reduces satisfaction levels, especially in urgent or crisis situations. The absence of real-time tracking features also negatively affects the internal efficiency of the Ministry of Foreign Affairs, as consular staff must manually respond to status inquiries. In contrast, Singapore's Digital Consular System is equipped with active, real-time, and automated features. One of its most notable components is Digital Document Legalization, a service that allows official documents—such as birth certificates, marriage certificates, and legal records—to be legalized online without the need for physical presence at a diplomatic mission. This significantly streamlines administrative processes, reduces the workload of consular staff, and offers greater convenience to citizens living far from embassies or consulates.

Additionally, the system includes a 24/7 Consular Hotline, an emergency communication channel accessible at any time to Singaporean citizens abroad. This hotline is operated by the Consular Response Centre (CRC) and is supported by a real-time case tracking system connected to the national database. Through this system, citizens can receive immediate assistance, status updates, and case escalations when necessary. Another key feature that enhances service quality is the automated application tracking system, allowing users to monitor the progress of their legalization requests, assistance applications, or lost document reports via an online dashboard. This feature not only improves service transparency but also fosters a stronger sense of security and public trust in government performance.

H. System Orientation

Portal Peduli WNI still adopts an administrative-driven approach, wherein the system is primarily oriented toward government data collection needs rather than facilitating a smooth and

user-friendly process for citizens. Indonesian citizens seeking to access services must manually input data, upload documents independently, and undergo identity verification procedures that are not yet fully integrated with national systems or automated. This results in a fragmented and slow user experience, often requiring the repetition of the same information across multiple service stages.

This administrative nature also contributes to low service efficiency and a high dependency on human operators, both at the central government and at Indonesian missions abroad, for tasks such as verification, data validation, and communication with users. In contrast, Singapore adopts a user-centric approach, placing the citizen at the center of the service delivery process. The system is designed to reduce administrative burdens on users, facilitate seamless interaction, and minimize manual data input through automation and integrated data systems. A key enabler of this approach is the use of SingPass, which allows for pre-verified user data through the national platform MyInfo, enabling authentication processes to be conducted automatically, quickly, and accurately. The implication of this design is a seamless user experience, where consular services such as self-reporting, assistance requests, document submissions, and application tracking can be carried out within a single system—without repetitive processes or redundant data entry. The system also provides real-time feedback and notifications, positioning citizens as active participants in the state's service delivery process.

I. Emergency Coordination

Crisis response for Indonesian citizens (WNI) abroad remains largely manual and decentralized, with each Indonesian diplomatic mission acting independently as the frontline emergency responder in the absence of a centralized coordination system. The limitations of the Portal Peduli WNI have contributed to a pattern in which citizens tend to contact the embassy hotline directly, resulting in inefficiencies in portal utilization. The processes of identifying affected citizens, collecting data, and delivering assistance are typically carried out through conventional communication channels, such as emails, phone calls, or citizen-initiated reports. This approach leads to delays in response time, inconsistent actions across different missions, and a heavy reliance on the individual capacity of consular officials in the field. The lack of integration between the self-reporting system and a national coordination mechanism also hampers the Ministry of Foreign Affairs' ability to conduct rapid, data-driven interventions. Furthermore, Portal Peduli WNI lacks essential features such as crisis tracking, automated notifications, and a real-time dashboard to monitor the distribution of citizens during emergencies. These shortcomings

represent a structural weakness in Indonesia's digital protection system for citizens abroad, especially in the context of globalization and increasing geopolitical uncertainty.

In contrast, the Ministry of Foreign Affairs of Singapore has established the Consular Response Centre (CRC), which operates 24 hours a day, seven days a week. The CRC is not merely a call center, but a fully integrated system with full access to data from eRegister and MyInfo. It is equipped with a case management system that enables real-time case tracking, digital inter-agency information exchange, and the activation of rapid interventions by embassies or consulates in affected regions. Supported by cloud-based technology and a modular system architecture, the CRC facilitates the automatic delivery of emergency notifications to registered Singaporean citizens located in crisis zones. Furthermore, the CRC serves as a direct coordination hub linking the Ministry of Foreign Affairs with security agencies, disaster response bodies, and diplomatic partners in host countries. This mechanism allows Singapore to achieve a highly responsive, measurable, and systematically documented time-to-response, significantly enhancing the effectiveness of its citizen protection efforts abroad

J. National System Integration

Indonesia continues to face significant challenges in establishing a comprehensive and robust national system integration. The Portal Peduli WNI is not yet fully and automatically connected with key national databases such as the Civil Registration Information System (SIAK) managed by the Ministry of Home Affairs, the Immigration Self-Reporting Portal, the Immigration Management Information System (SIMKIM) under the Ministry of Law and Human Rights, the Migrant Worker Information System (SISKOTKLN) under BP2MI, or the Marriage Information Management System (SIMKAH) under the Ministry of Religious Affairs. As a result, data validation for Indonesian citizens abroad must still be conducted manually, requiring users to upload civil documents, passports, or marriage certificates independently. This not only slows down the service delivery process but also increases the risk of data duplication, input errors, and inconsistencies across institutions. The absence of real-time system connectivity further complicates the detection and response to urgent cases such as human trafficking, vulnerable legal status, or evacuation needs. Moreover, the lack of standardized interoperability among Indonesia's national systems has led to institutional fragmentation and hinders the development of a cross-sectoral service ecosystem. Each agency still manages its data in isolated silos, with non-harmonized data access policies and infrastructure that does not yet support direct and secure data exchange.

Singapore has implemented a highly advanced model of national system integration, whereby all citizen data is consolidated through the MyInfo platform—an official digital data repository that aggregates verified information from various government agencies, including the Immigration and Checkpoints Authority (ICA), the Ministry of Health (MOH), the Ministry of Manpower (MOM), and the Central Provident Fund (CPF). This system not only stores data on international travel, residency status, and health records, but is also directly connected to the digital consular services provided by the Ministry of Foreign Affairs of Singapore.

This integration enables the Ministry to automatically access real-time data concerning the whereabouts and condition of citizens abroad—for example, whether an individual has recently entered a specific country, is undergoing medical treatment, or is enrolled in an overseas employment scheme. All of these processes are carried out without manual intervention, thereby accelerating identity verification, needs assessment, and policy response formulation during emergency situations.

K. Data Utilization

Indonesia remains in the early stages of active data utilization within the Portal Peduli WNI system. At present, the system's primary functions are still limited to administrative data recording and storage, such as personal identity, location, and types of assistance requested. The data collected is processed manually to identify risk patterns or detect trends in specific case types, without comprehensive or automated analytical capabilities. The system lacks analytical modules and a digital case management platform, resulting in fragmented case handling that is not based on predictive modeling. Consequently, Indonesia’s approach to protecting citizens abroad tends to be reactive and reliant on individual reports, rather than driven by technology-assisted risk detection. This limits the speed and effectiveness of response and intervention, particularly during emergencies that require rapid mapping of citizen distribution and vulnerability levels.

Singapore has actively utilized predictive analytics technology within its Digital Consular Services system. This approach enables the government to detect potential risks to its citizens by analyzing data related to travel patterns, health status, geographic location, employment trends, and historical assistance requests. For instance, if there is a surge in registrations of Singaporean citizens in a country with declining security conditions, the system will automatically issue an alert to the Ministry of Foreign Affairs and send proactive notifications to the affected individuals regarding the potential threat. This allows for preventive intervention before a crisis escalates and provides sufficient time to prepare evacuation routes or diplomatic assistance.

Moreover, Singapore's system is equipped with a digital case management platform that enables the documentation, tracking, and longitudinal analysis of consular cases. Through this system, the Ministry of Foreign Affairs can monitor the progress of various cases involving Singaporean citizens—such as those facing legal proceedings abroad, victims of violence, or repatriation cases—with well-documented and integrated case histories. The combination of predictive analytics and digital case management creates a data-driven service ecosystem that is not only reactive, but also adaptive and anticipatory

CONCLUSIONS

The main finding of this comparative descriptive analysis is that the comparison between Indonesia's Portal Peduli WNI and Singapore's Digital Consular Services reveals a significant disparity in public service innovation for the protection of citizens abroad. Singapore's Digital Consular Services consistently outperforms in various dimensions, including its integrated and modular system architecture, utilization of advanced digital technologies such as MyInfo and SingPass, and real-time inter-agency data interoperability. Singapore's approach—grounded in predictive analytics, digital case management, and metrics-based evaluation—reflects a high level of digital maturity and is oriented toward proactive service delivery. By contrast, Portal Peduli WNI remains in a developmental phase, characterized by limited system integration and a predominantly reactive approach. The system has not yet fully supported efficient and responsive protection for Indonesian citizens, particularly in areas such as emergency response and case management. While Indonesia has demonstrated a commitment to consular digitalization, institutional capacity building, technological infrastructure enhancement, and cross-sector system integration are essential prerequisites for narrowing the innovation gap. The implementation of a whole-of-government approach, as exemplified by Singapore, may serve as a relevant policy model for developing a responsive, efficient, and citizen-oriented digital consular service ecosystem. The optimization of data protection and the enhancement of human resource capacity must also be integral components of this broader digital reform initiative.

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