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Digital ID Policy in Support of Digital Transformation in Indonesia

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Abstract: The Indonesian government has initiated the implementation of Digital ID or Digital Population Identity (IKD) as part of the national digital transformation strategy, particularly in supporting the Electronic-Based Government System (SPBE) and the integration of public services. However, IKD adoption remains relatively low. This is indicated by the high demand for e-KTP forms over the past 5 years, especially since the IKD was implemented in 2022. Based on these conditions, this study asks three main questions: (1) What are the strengths and strategic opportunities that support the implementation of IKD? (2) What are the real results and public aspirations regarding the implementation of IKD? and (3) How can IKD support digital transformation in Indonesia? This study employed an explanatory sequential mixed-methods approach. The quantitative phase was conducted first through a survey of 688 respondents who assessed eight policy alternatives based on effectiveness, efficiency, and impact. A thematic analysis of open-ended responses in the same questionnaire followed the qualitative phase. All data were then analyzed using the SOAR (Strengths, Opportunities, Aspirations, Results) framework to map policy strategies based on strengths, opportunities, public expectations, and expected outcomes. The research results showed that the main strength lies in a centralized population data infrastructure and continuously evolving regulations. Strategic opportunities include the integration of IKD into the Priority Population Data Service (SPBE) through GovTech INA Digital, as well as the utilization of digital data verification in the financial and banking sectors. Public aspirations are reflected in the need for digital literacy and better personal data protection, while expected outcomes, such as optimizing IKD-based public services, have not been fully achieved. Meanwhile, IKD has not been fully able to support the digital transformation process in Indonesia. This study concludes that digital information technology (IKD) policy strategies need to be directed at integrating IKD with public services, strengthening cross-sector collaboration, developing responsive regulations, and conducting massive and inclusive public education. These findings contribute to the formulation of service-oriented, evidence-based, and sustainable digital transformation policies to support digital transformation in Indonesia.

Keywords: Digital ID; Digital Transformation; Digital Population Identity; Population Data; Public Services; Population Administration.

1. Introduction

In the increasingly digital era, Digital ID has become a crucial element in supporting digital transformation in various countries, including Indonesia. Digital ID enables individuals to access a variety of public services such as healthcare, education, social assistance, and private services like banking and transportation. Law No. 24 of 2013 and Minister of Home Affairs Regulation No. 102 of 2019 provide the legal basis for the use of population data, including the development of the Digital ID.

Since 2022, the Directorate General of Population and Civil Registration began implementing the Electronic Population Identification Card (IKD) as a continuation of the Electronic Population Card (KTP-el), in line with the Priority SPBE strategy. Based on the 2024 Clean Population Data (DKB) of the Directorate General of Population and Civil Registration (Dukcapil), Indonesia's population reached 284,973,643, consisting of 143,863,392 males and 141,110,251 females. Of this total population, 284,973,643 have registered for an e-KTP out of the 207,608,291 individuals required to have one. However, the distribution of physical e-KTP forms remains high, indicating low adoption of the IKD in the community. This raises an important question: why is the adoption rate of the IKD still low, despite the existing infrastructure and regulations?

Digital transformation in Indonesia is non-negotiable as it has become a major driver of change in politics and governance in Indonesia (Hafel, 2023), and is part of the major national agenda in realizing Golden Indonesia 2045. The vision of Indonesian President and Vice President Prabowo-Gibran “Together with Indonesia Moving Forward to Golden Indonesia 2045” clearly mandates this. This vision is achieved through 8 missions called Asta Cita, within which there are 17 Priority Programs. The 8th priority program is strengthening education, science, technology, and digitalization. This priority is based on the understanding that a nation's progress is determined by the quality of education, as well as mastery of science and technology. Innovation will be born along with progress in these fields. To that end, this priority is supported by research and innovation funding reaching 1.5-2.0% of GDP within 5 years.

The results of Zahlimar et al.’s (2023) study support Prabowo-Gibran's vision, especially among Generation Z, who have a positive view of Digital ID. They believe Digital ID plays a crucial role in Indonesia's digital transformation. In line with this, a study by Karya et al. (2024) highlighted a key supporting factor in the implementation of digitalization of public services, one of which is digital leadership. Digital leadership refers to a leader's ability to effectively direct and manage digital transformation, including strategic decision-making, adaptation to technological changes, and empowering teams to adopt digital innovations.

International studies show three determining factors for the success of Digital ID, namely the readiness of digital infrastructure and governance, the level of public literacy and trust, and data security and privacy protection (Jerab, 2024). Research from Germany, for example, found that data security is a major factor in the public's acceptance of digital identity (Friedhoff et al., 2023). Moreover, the success of digital transformation in the public sector not only depends on the adoption of new technologies but also requires structural and cultural changes in the organization (Fitriani et al., 2025).

Research on digital literacy and e-government in Indonesia shows that public understanding of digital transformation is still low, with technical literacy and security being the main challenges (Isabella et al., 2025). These issues are similar to

those experienced by other public sectors in various developing countries, including the digital divide and privacy concerns (Venkatesh & Sykes, 2013).

Previous research also highlights the importance of digital leadership in bureaucracy for transformation to run effectively (Ushaka Adie et al., 2024). However, research that combines public analysis of IKD has not been widely conducted in Indonesia, especially that which systematically combines quantitative and qualitative approaches.

The existence of the Digital ID (IKD) as a Digital ID has not been able to support the acceleration of digital transformation in Indonesia. This is due to various factors, including low adoption of IKD among the public due to limited digital literacy, uneven technological infrastructure, and a lack of system integration between IKD and public and private services. Furthermore, regulatory challenges and personal data security also raise concerns that hinder public trust in the widespread use of IKD. Yet, the existence of a reliable and inclusive digital ID is a crucial prerequisite for supporting efficient, transparent, and equitable digital-based public services.

This research answers the questions: What are the strengths and strategic opportunities of IKD in supporting digital transformation in Indonesia? What are the public's aspirations regarding IKD implementation? And what alternative Digital ID policies support digital transformation in Indonesia?

To address these issues, this study employed a sequential explanatory mixed methods approach (quant → qual) in mixed methods research. The initial stage was conducted through a quantitative survey of 688 respondents. The quantitative survey results were then qualitatively deepened through open-ended questions within the same survey and analyzed using a thematic approach using the SOAR (Strengths, Opportunities, Aspirations, Results) framework.

This research makes significant conceptual and methodological contributions. First, it presents a systematic public voice mapping of IKD implementation, a finding rarely found in the Indonesian population administration policy literature. Second, it develops a SOAR-based combined quantitative-qualitative analysis model that is relevant and replicable for other digital policy studies. Third, the results of this analysis provide an empirical basis for formulating a more inclusive, efficient, and impactful IKD policy strategy, supporting the direction of national digital development towards Indonesia Emas 2045.

2. Methods

This study uses an explanatory sequential mixed methods approach (quant → qual). There are two types of sequential designs in mixed methods research. The first is the exploratory sequential design, and the second is the explanatory sequential design. This article specifically focuses on the explanatory sequential design in mixed methods research. This design emphasizes the quantitative phase first, followed by the qualitative phase (Toyon, 2021). Mixed methods offer the best opportunity to answer research questions by combining the two main strengths while compensating for the weaknesses of each method. Mixed methods research designs are becoming increasingly relevant in answering research questions that focus on impact (Dawadi et al., 2021).

In this study, the target population consisted of 7,725 individuals, representing 514 provincial, district/city, and Directorate General of Population and Civil Registration (Dukcapil) offices, with the assumption that each unit contributes approximately 15 potential users or administrators of Digital ID. From this

population, 688 respondents were selected using a purposive sampling technique that takes into account regional representation, position, and experience using Digital ID services. Purposive sampling is a non-probabilistic sampling technique used in both qualitative and quantitative research, in which researchers deliberately select individuals or groups deemed most capable of providing relevant, in-depth information that aligns with the research objectives (Memon et al., 2025), namely the Directorate General of Civil Registration and Civil Registration Offices, as well as provincial and district/city Civil Registration Offices throughout Indonesia. With 688 respondents, the margin of error at the 95% confidence level was within ±3.57%, which is considered representative enough to support the validity of generalizing the findings to the study population.

The questionnaire was divided into two main sections. First, closed-ended questions based on a 1–5 Likert scale assessed eight policy alternatives related to IKD: IKD coverage, regulations, digital infrastructure, system security, service integration, digital literacy, interagency collaboration, and incentives for the private sector, based on three assessment aspects (effectiveness, efficiency, and impact). Second, open-ended questions explored public opinions, expectations, and perceptions regarding obstacles, opportunities, and the need to strengthen the IKD system.

The results of the quantitative and qualitative surveys were analyzed using a thematic approach using the SOAR (Strengths, Opportunities, Aspirations, Results) framework. This approach allows policy mapping to be based not only on issues and weaknesses but also on strengthening potential, public expectations, and desired outcomes, all of which are positive (Fathurrahman et al., 2024). The use of SOAR also represents a shift in policymaking from a problem-based approach to solution-based policy formulation. Quoting Cole et al. (2022), the SOAR framework strengthens strategic thinking, planning, conversation, and leadership through a generative approach to exploring strengths, opportunities, aspirations, and measurable outcomes to shape a desired future. This approach enables positive changes in strategy, structure, business models, systems, human resources, and processes. SOAR has the advantage of fostering innovation, collaboration, and positive organizational change. Unlike SWOT, which is more suitable for initial assessments, the SOAR approach is considered more relevant for supporting transformational leadership and future-oriented strategic planning (Kamkankaew, 2023).

3. Results and Discussion

3.1. The Definition of Digital ID

Referring to legal regulations, the term Digital ID refers to the IKD. Article 1 of Home Affairs Ministerial Regulation Number 72 of 2022 explains that IKD is electronic information used to represent population documents and feedback data in digital applications via devices that display personal data as the relevant identity. This definition emphasizes the use of electronic information, indicating a shift from physical identity to Digital ID. Furthermore, it also refers to population documents, such as e-KTP, Family Card (KK), birth certificates, and other population documents, demonstrating integration with government administration systems. This allows for more flexible and easier access for users.

This definition has limitations. It doesn't explicitly mention security and privacy, critical components of a Digital ID system. Furthermore, it doesn't explain authentication or verification mechanisms, which are crucial for ensuring identity

authenticity. It also doesn't address interoperability, the ability of a Digital ID to be used across multiple platforms or services, both government and private.

To complement the definition of Digital ID, Giannopoulou (2023) defines Digital ID as a representation of an individual's identity in a machine-readable and data-enabled format. This process does not refer to a single digital artifact with uniform functionality, but rather encompasses an individual identification system as well as an authentication system that regulates access rights and authorization to perform certain actions. In the context of digital transformation, a digital ID is defined as a digital representation of an individual that serves as a reference in identification and authentication processes in digital environments. Sedlmeir et al. (2021) explain that digital identity is "a digital reference to a person," which generally refers to how an individual is represented in a digital system through certain verifiable attributes. This identity allows a person to prove who they are online without having to reveal all their personal information. This concept is crucial in the development of identity systems that uphold the principles of data minimization and privacy and forms the basis for new approaches such as self-sovereign identity (SSI) and verifiable credentials, which give individuals greater control over their identity data.

Babel et al. (2025) stated that a digital ID is a digital representation of an individual, organization, or machine used to access and interact with digital services. Traditional digital identity approaches often result in fragmented identities and reliance on large service providers, which can limit user data sovereignty. As an alternative, the concept of self-sovereign identity (SSI) was introduced to give individuals greater control over their identity data through the use of secure, decentralized digital wallets.

Based on these definitions, it can be concluded that a Digital ID is a digital representation of an individual's identity that enables efficient and secure identification and authentication processes within a digital ecosystem. This identity is not limited to a single digital artifact but encompasses a system that regulates access rights and authorization. Digital ID supports interoperability, ensures privacy through the principle of data minimization, and gives individuals greater control over their data. In this context, Digital ID is a key element in digital transformation, replacing physical identities with a machine-readable system that can be used across services.

3.2. The Development of Digital ID in Indonesia

The development of information technology and digitalization in Indonesia has had a significant impact on all aspects of people's lives, including public services. One form of public service impacted by digitalization is population administration and civil registration, which are basic state services provided to citizens to guarantee civil and legal rights related to ownership of population documents (Pradnyandari et al., 2025). This transformation marks a shift from manual service patterns to digital-based services that are more effective, efficient, and measurable. The application of technology in Dukcapil services is not only oriented towards improving system quality but also towards developing human resources as service users, reflecting readiness for Digital ID (Eka Patrisia et al., 2022).

Discussions about digital ID in Indonesia cannot be separated from the development of identity cards, which were once implemented in Indonesia. These identity cards took the form of Resident Identity Cards (KTP) or e-KTP.

According to Article 1 of Law Number 23 of 2006 concerning Population Administration, the Resident Identity Card (KTP), hereinafter abbreviated as KTP, is

an official identity card for residents as proof of identity issued by the Implementing Agency and valid throughout the territory of the Unitary State of the Republic of Indonesia. Furthermore, the definition of an e-KTP refers to Law Number 24 of 2023 concerning Amendments to Law Number 23 of 2006 concerning Population Administration, namely an electronic KTP (KTP-el), which is a Resident Identity Card equipped with a chip that serves as an official identity card for residents as proof of identity issued by the Implementing Agency.

The history of the Directorate General of Population and Civil Registration (Dukcapil) shows that the transformation of Population Administration services in Indonesia has undergone significant development, starting from a manual system to sophisticated and integrated digitalization.

Before 1995, population registration was still done manually. This resulted in inefficiency, data duplication, localized population documents, and susceptibility to misuse. Then, the government began implementing the Population System (SimDuk) in 1995, which aimed to create a more accurate population database. This reform was further strengthened by the establishment of the Directorate General of Population Administration (Ditjen Adminduk) in 2001. Its primary task was to formulate policies and oversee the management and administration of population data nationally.

A major step forward occurred in 2004 with the issuance of Presidential Decree Number 88 of 2004 concerning the Management of Population Administration Information (PIAK). This marked a new era of integrated information technology-based population data management. This was followed by the issuance of Law Number 23 of 2006 concerning Adminduk, which provided a stronger legal basis for the implementation of Adminduk, including the use of data for national development purposes.

The 2009-2011 period marked a significant milestone with the national population data update, the adoption of the National Identity Number (NIK) as a single identity, and the implementation of the national NIK-based e-KTP (electronic ID card) to improve data security and accuracy.

The transformation of the Population Administration (Adminduk) continued through Law Number 24 of 2013, updating previous policies by strengthening the utilization of population data for various public service purposes. The government then further expanded the use of population data through Minister of Home Affairs Regulation Number 61 of 2015 concerning the Requirements, Scope, and Procedures for Granting Access Rights and Utilization of NIK, Population Data, and e-KTP, which allows government and private agencies to legally access population data to improve service efficiency. Another innovation was the introduction of online civil registration in 2016 through Minister of Home Affairs Regulation Number 9 of 2016 concerning the Acceleration of Increasing Birth Certificate Ownership Coverage, which makes it easier for the public to access services without being physically present.

2019 marked the peak of the digital transformation of the Civil Registration Administration (Adminduk) with the launch of Dukcapil Go Digital, an innovation in issuing population documents using white paper and electronic signatures in accordance with Minister of Home Affairs Regulation Number 109 of 2019 concerning Forms and Books Used in Civil Registration (Adminduk). Furthermore, to improve service accessibility, the Independent Dukcapil Kiosk (ADM) was introduced through Minister of Home Affairs Regulation Number 7 of 2019 concerning Online Civil Registration Services, which allows the public to print their population

documents. This transformation not only increases efficiency but also accelerates the digitalization of the government sector in supporting a more modern and integrated public service ecosystem.

The digitization of civil registration services aligns with the World Bank's global initiative, the Identification for Development (ID4D) program. This initiative aims to promote a trusted digital identification and civil registration system to achieve the Sustainable Development Goals (SDGs), by engaging across sectors such as digital development, social protection, health, financial inclusion, gender, and governance (Daud et al., 2022).

The implementation of the IKD system has been implemented in stages since 2022 as part of the digital-based transformation of population administration services. This phased strategy aims to ensure technological infrastructure readiness, data security, and more controlled adoption across all levels of society. The phased implementation also allows for evaluation and refinement of the system before widespread implementation for the entire population. The initial step was to implement the IKD system for the State Civil Apparatus (ASN), before eventually expanding to students, college students, and the general public.

In 2022, the IKD system was first implemented at the Directorate General of Civil Registration (Dukcapil) as a trial and initial evaluation phase. Subsequently, the system was expanded to civil servants from regional Civil Registration Offices as service implementing agencies. It was then expanded to civil servants from ministries/institutions, and finally to all civil servants in Indonesia. The primary focus was to ensure this group understood the system and assisted in public outreach and education.

In 2023, the IKD system was expanded to non-ASN groups, starting with school students, taking into account their relatively higher levels of digital literacy. This group is considered to be quicker to adopt the IKD and can provide input on its implementation. Furthermore, they contribute to accelerating the digitalization of education services and supporting the national Digital ID ecosystem.

The final stage is the implementation of the IKD for the general public, which is the largest and most diverse group in terms of technological readiness and access to digital services. This process requires broader outreach, improved digital infrastructure in various regions, and policy support that ensures inclusivity for all levels of society. With this phased implementation, the government strives to create a more efficient and secure population administration system that supports digital transformation across various public service sectors.

3.3. The Analysis of SOAR

To generate strategic policy direction for the Digital ID policy in supporting digital transformation in Indonesia, this study uses the SOAR (Strengths, Opportunities, Aspirations, Results) analysis approach as an integrative framework between quantitative and qualitative data. This approach was chosen because it is appreciative and solution-oriented, emphasizing existing internal strengths, exploitable external opportunities, the collective aspirations of stakeholders, and the concrete results desired in the national digital transformation process.

Initially, quantitative data were collected through a survey of 688 respondents from provincial, district/city Civil Registration Offices (Dukcapil), and the Directorate General of Population and Civil Registration. They were asked to assess eight strategic policy alternatives based on three main dimensions: effectiveness,

efficiency, and impact. The average score for each policy was then grouped into SOAR categories, as presented in Table 1.

Table 1. Integration of Quantitative Data and Strategic Categorization of IKD Policies Using the SOAR Approach

Code	SOAR Elements	Strategic Policy	Average Score			Average Total Score
			Effectiveness	Efficiency	Impact	
S1	Strengths	Increased coverage of IKD	4.27	4.21	4.34	4.27 (6)
O1	Opportunities	Inter-institutional collaboration	4.44	4.34	4.38	4.39 (3)
O2	Opportunities	Digital infrastructure improvement	4.42	4.32	4.37	4.37 (4)
O3	Opportunities	Strengthening regulations	4.4	4.28	4.33	4.34 (5)
O4	Opportunities	Incentives for the private sector	3.89	3.96	4	3.95 (7)
A1	Aspirations	Strengthening the security system	4.46	4.34	4.41	4.4 (2)
A2	Aspirations	Community digital literacy	4.38	4.3	4.34	4.34 (5)
R1	Results	Integration with public services	4.47	4.38	4.41	4.42 (1)

Source: Processed from primary data

Qualitative data was obtained from open-ended questions in the same survey. Analysis was conducted using a thematic categorization method based on the SOAR approach to capturing the perceptions, experiences, and expectations of policy implementers in the field. The results of the qualitative analysis are presented in Table 2.

Table 2. Qualitative Thematic Coding SOAR Analysis

Code	SOAR Elements	Theme	Example Quotes	Number of Respondents
S1	Strengths	Digital ID as a national strategic innovation	Digital ID/IKD is a necessity to accelerate the realization of digital transformation in Indonesia.	80
O1	Opportunities	Expansion of internet networks and digital infrastructure	Many areas in Indonesia, especially remote and rural areas, still experience limited internet access.	315
O2	Opportunities	Inter-agency collaboration and mandatory IKD regulatory support	There is no legal umbrella that requires IKD, government and private agencies have not optimally utilized IKD.	210
A1	Aspirations	Community expectations regarding the ease and safety of using IKD	There are still doubts in society about the security of their data.	160
A2	Aspirations	Massive socialization and digital education are needed	Socialization is still lacking and many institutions have not yet accepted its use.	285
R1	Results	Acceptance of IKD by all agencies and public services	Not all public services accept/ utilize IKD	330

Source: Processed from primary data

These two tables serve as the basis for integrating the analysis of IKD policy strategies. By combining quantitative analysis and qualitative narratives, the SOAR analysis in this study not only presents a macro picture of actual conditions but also captures the contextual nuances and aspirations of practitioners at the implementation level. This mapping provides a strong foundation for formulating policies that are more responsive, evidence-based, and relevant to field dynamics.

The results of the analysis for each SOAR element are presented systematically as follows:

The first element is Strengths. Based on quantitative data, the policy to increase IKD coverage scored 4.27 for effectiveness, 4.21 for efficiency, and 4.34 for impact, with a total average of 4.27, ranking sixth. This figure reinforces that, in terms of perception, infrastructure, regulations, funding, and institutional support, IKD

development has a solid foundation for continued and systematic improvement. Meanwhile, based on qualitative data, recognition of IKD's strategic position emerged from 80 respondents who affirmed that IKD is part of bureaucratic reform and digital-based public services.

The development of Digital ID (IKD) in Indonesia is also supported by the existence of a robust and centralized basic population infrastructure, namely the Population Administration Information System (SIAK), managed by the Directorate General of Population and Civil Registration. SIAK is regulated by the Minister of Home Affairs Regulation Number 95 of 2019 and functions as an integrated information technology-based system for managing all national population data. SIAK encompasses critical components such as databases, ICT, human resources, database locations, backup data centers, supporting devices, and service centers and call centers. Based on Articles 2 and 3 of the Minister of Home Affairs Regulation, SIAK aims to provide accurate and up-to-date data and ensure systematic data exchange between agencies through a single identification system.

More than just an administrative information system, SIAK has evolved into a key foundation for digitizing population identity. Its reliability in storing, processing, and protecting the data of more than 282 million Indonesians makes it a strategic pillar in realizing national digital transformation. The existence of SIAK also enables integration across digital systems and services in both the public and private sectors, expanding the benefits and utilization of population data nationally.

Another significant strength is the existence of an initial regulatory framework that, while imperfect, demonstrates the government's strong commitment to fostering the development of digital identity. Regulations such as Law No. 24 of 2013, Minister of Home Affairs Regulation No. 95 of 2019, and Minister of Home Affairs Regulation No. 72 of 2022 provide the initial foundation that allows for further policy consolidation. The presence of the Draft Presidential Regulation on Electronic ID Cards and Digital Identity Cards further emphasizes the direction of digital-based policy development. While these regulations do not fully address digital data governance and protection comprehensively, they provide an initial legal basis that can be developed toward the formation of more holistic and adaptive strategic policies.

In addition to institutional and regulatory aspects, another strength comes from international support through Foreign Loan/Grant (PHLN) funding of USD 250 million from the World Bank for the 2023-2027 period. This funding is focused on five main components: (1) strengthening population registration and civil registration (USD 75.2 million); (2) strengthening ICT infrastructure, Digital ID, and electronic Know Your Customer (e-KYC) (USD 107.7 million); (3) integration into services (USD 41.7 million); (4) strengthening institutional and human resource capacity (USD 15.3 million); and (5) project management and coordination (USD 10 million). This funding scheme reflects international institutions' confidence in Indonesia's readiness to implement national-scale projects based on digital data while also opening up space for accelerating the implementation of the Digital Data Enforcement Program (IKD).

Statistical data also strengthens the IKD's position. In the last five years (2020-2024), Indonesia's population increased from 271.34 million to 284.97 million. Meanwhile, the number of people who have registered for e-KTP (Electronic ID Card) registration has also increased from 194.65 million to 203.62 million. This growth demonstrates the enormous potential of the population as a user base for the IKD, which already has valid and unified data. This is crucial because e-KTP registration is a prerequisite for IKD activation.

Table 3. Indonesia's Population and e-KTP Registration Numbers 2020–2024

Year	Total population		Record e-KTP	
	Amount	Increase (%)	Amount	Increase (%)
2020	271,349,889	0	194,649,012	0
2021	273,879,750	0.93	197,059,514	1.24
2022	277,749,853	1.41	199,781,570	1.38
2023	280,725,428	1.07	200,012,164	0.12
2024	284,973,643	1.51	203,619,584	1.80
Total		**4.92**		**4.61**

Source: Directorate General of Population and Civil Registration, 2024

Another important strength is the increasing number of institutions collaborating on population data utilization. The number of institutions signing Memoranda of Understanding (MoUs) increased from 53 in 2020 to 65 in 2024 (a 22.64% increase), the number of institutions signing Cooperation Agreements (PKS) increased from 2,891 to 6,777 (a 134.44% increase), and access to population data increased from 5.2 billion to 16.3 billion (a 211.39% increase). This fact indicates that more institutions recognize the importance of digital population data utilization as part of service governance. This growing data utilization ecosystem creates synergy between sectors and strengthens the legitimacy and utility of the IKD nationally.

Table 4. Institutions Signing MoUs and PKS, and Access to Population Data Utilization 2020–2024

Year	MoUs		PKS		Access	
	Amount	Increase (%)	Amount	Increase (%)	Amount	Increase (%)
2020	53	0	2,891	0	5,258,654,221	0
2021	58	9.43	4,516	56.23	7,633,927,205	45.18
2022	62	6.90	5,371	18.93	10,545,090,025	38.13
2023	64	3.23	6,268	16.71	13,523,982,003	28.24
2024	65	1.56	6,777	8.12	16,374,084,325	21.07
Total		**22.64**		**134.44**		**211.39**

Source: Directorate General of Population and Civil Registration, 2024

From an economic perspective, the contribution of IKD to state revenue is beginning to become apparent. Non-tax state revenue (PNBP) from population data utilization reached IDR 793 billion in 2023 and increased to IDR 863 billion in 2024. Although it was recorded at IDR 176 billion as of March 2025 due to the current year, this trend indicates significant revenue potential if maximized.

The second element is opportunities. Based on quantitative data, opportunities encompass four key strategic policies: inter-institutional collaboration, improving digital infrastructure, strengthening regulations, and providing incentives for the private sector. These four policies reflect external opportunities that, if optimally mobilized, can accelerate the adoption and integration of IKD.

The inter-institutional collaboration policy ranked third with an average total score of 4.39. It was the highest in the opportunities element, with scores of 4.44 for effectiveness, 4.34 for efficiency, and 4.38 for impact. This demonstrates the urgency of collaboration between various government and private institutions to integrate systems, unify service platforms, and optimize the use of IKD data across sectors. These findings also align with global trends encouraging interoperability and collaborative digital governance between agencies.

Improving digital infrastructure also presents a significant opportunity, ranking fourth, with an average total score of 4.37, and scores for effectiveness of 4.42, efficiency of 4.32, and impact of 4.37, respectively. This high score confirms that the

availability of technological infrastructure, particularly in the 3T (underdeveloped, frontier, and outermost) regions, is a crucial factor in expanding the reach of IKD and bridging the ongoing digital divide. Without adequate infrastructure support, IKD utilization will remain limited and uneven.

The policy of strengthening regulations ranked fifth with an average total score of 4.34, with scores of 4.40 for effectiveness, 4.28 for efficiency, and 4.33 for impact, respectively. Although not ranked at the top, regulations remain a crucial element in opening up new opportunities, particularly in ensuring legal certainty, personal data protection, and standardizing digital identity technology. Inadequate regulatory challenges present an obstacle that, if addressed, could create opportunities for accelerated implementation.

Incentives for the private sector represent a strategic opportunity with a medium- to long-term focus, ranking seventh. This policy's score is lower (average total score of 3.95), but it still demonstrates that private sector involvement requires fiscal and non-fiscal incentives to support the integration of digital identity-based services. This policy can be a crucial catalyst in driving technology adoption in the non-government sector and expanding the national digital ecosystem.

Based on the qualitative data analysis, two main themes emerged as strategic opportunities that need to be maximized. First, respondents' statements emphasizing the expansion of internet networks and digital infrastructure represent crucial external opportunities for accelerating digital identity adoption. A total of 315 respondents identified this issue as a priority need that has not been optimally met.

The majority of respondents came from areas with low digital penetration, particularly the 3T (frontier and remote) regions. They highlighted that weak signal strength, limited access to stable internet, and a lack of hardware and software facilities at the regional Civil Registration Office (Dukcapil) level are significant obstacles to the implementation of the IKD. Several respondents even asserted that the IKD application cannot be used at all in their areas due to a lack of adequate network connectivity. This supports quantitative data regarding digital infrastructure improvements.

Second, 210 respondents highlighted the importance of interagency collaboration as a prerequisite for promoting cross-sectoral integration in the use of the IKD. Respondents assessed that IKD adoption remains sectoral and fragmented and has not been fully integrated into public and private service systems. Statements such as "Synergy is needed between agencies so that IKD data can be directly used without the need to print ID cards again" reflect the high hopes for the development of an interoperable and efficient system. Collaboration between the Directorate General of Civil Registration, ministries/institutions, local governments, and the private sector is crucial to ensure the success of the digital identity system in supporting a data-based public service ecosystem.

The third element is Aspirations, which represents a collective picture of what the public expects from the future implementation of the Digital Enforcement System (DDI). Quantitative data demonstrates consistency with these findings. The policy for strengthening security systems recorded an average score of 4.40, the second-highest ranking of all policies assessed. The effectiveness aspect scored an average of 4.46, the efficiency aspect scored an average of 4.34, and the impact aspect scored an average of 4.41. Digital literacy also scored high, ranking fifth (4.34), with average scores of 4.38, 4.30, and 4.34 for effectiveness, efficiency, and impact, respectively. This indicates that public aspirations for a sense of security and adequate understanding significantly influence the success of DDI implementation.

Without strengthening these two aspects, public acceptance of DDI will be slow, and resistance to digital technology could increase.

From the qualitative data, two issues stood out: personal data security and digital literacy. A total of 160 respondents expressed concern about potential data leaks and emphasized the importance of strengthening security systems based on encryption and double authentication technology. On the other hand, 285 respondents emphasized the need to improve public understanding of the use of Digital ID (Digital ID), including education on its features, benefits, and safe use.

Another key aspiration is to build a cross-sector and cross-platform digital interoperability system with open standards that can be used by both the government and the private sector, thereby facilitating data exchange and the integration of Digital ID-based services. In the long term, Indonesia aspires to make Digital ID the primary foundation for a national digital ecosystem that is inclusive, sovereign, and adaptive to technological change. However, this aspiration must be accompanied by an understanding of the various obstacles still faced on the ground. Real challenges such as limited digital infrastructure in the 3T (frontier and outermost) regions, low digital literacy among the elderly and those with low education, and a lack of understanding of the benefits of Digital ID reflect that public aspirations have not yet been fully realized. Therefore, strengthening digital literacy and ongoing education efforts must be an integral part of the future Digital ID implementation strategy.

The fourth element is results, which refers to the actual outputs expected from the implementation of the IKD policy. Quantitative data findings indicate that the policy of integrating IKD with public services had the highest average score, ranking first, at 4.42. All assessment aspects demonstrated consistent strength (effectiveness 4.47, efficiency 4.38, and impact 4.41). This is supported by qualitative data, which showed that 330 respondents stated that the success of IKD is determined by the extent to which public services, both at the central and regional levels, adopt and synchronize the IKD system into their business processes. Several cited health services, education, social assistance, and licensing as integration priorities.

This reflects public expectations for the concrete use of IKD in daily life. These results also indicate that the public believes that the success of IKD is not sufficient only in technical and policy aspects, but must be realized in the form of easier, faster, and more integrated public services. However, the expected results have not yet been fully achieved. This is indicated by the high volume of procurement and distribution of e-KTP forms, which remains high even though the IKD has been implemented since 2022.

Table 5. Procurement and Distribution of e-KTP Forms for 2022–2024

Year	Procurement		Distribution	
	Amount	Increase (%)	Amount	Increase (%)
2020	41,416,000	0	35,896,187	0
2021	20,879,352	(49.60)	21,894,058	(38.98)
2022	28,163,506	34.86	16,693,000	(23.76)
2023	26,011,119	7.63	26,958,119	61.45
2024	27,769,140	6.76	27,769,140	3.01
Total		**0.35**		**1.72**

Source: *Directorate General of Population and Civil Registration, 2024*

Data shows that during the IKD implementation period (2022–2024), the average procurement of e-KTP forms remained at 27 million per year. The distribution of forms increased significantly from 16.6 million in 2022 to 27.7 million in 2024.

This high demand for physical e-KTPs indicates that the integration of IKD into public services has not been optimal. Some public service institutions still require physical documents as an administrative requirement, indicating that the IKD system is not yet recognized or ready to be used as a full replacement. This indicates a gap between public expectations and tangible results accessible on the ground. Therefore, strategic outcomes of the IKD policy must include accelerating cross-system integration, increasing the legality of IKD use, and incentivizing public service institutions to transition to digital formats.

The desired outcomes also include strengthening a digital-based public service ecosystem that is integrated, efficient, and inclusive. Furthermore, in terms of policy, it is hoped that comprehensive digital identity regulations and governance will be developed, protecting citizens' rights and providing legal certainty for service providers. More broadly, the strategic outcomes of IKD development are expected to strengthen national digital competitiveness, increase bureaucratic efficiency, and encourage socio-economic transformation through digital services that are more transparent, faster, and more adaptive to community needs.

3.4. Policy Alternatives

Based on the integration of quantitative and thematic data using the SOAR approach, eight strategic policy alternatives were formulated, reflecting public responses and the direction of strengthening IKD policies in Indonesia. These eight policies were not only based on their level of urgency and weighted scores for effectiveness, efficiency, and impact, but also took into account their contribution to strengthening internal strengths, optimizing external opportunities, meeting public aspirations, and producing concrete and measurable outcomes.

The first policy alternative, deemed the most strategic, was the integration of IKD with public services. Based on the highest average score (4.42), the public assessed that the success of IKD is largely determined by the extent to which the IKD system can be used in various public service sectors, such as education, health, social assistance, and population administration. This strategic step will accelerate IKD adoption while building public trust in technology as a tool for easier, faster, and more efficient services. Implementation of this policy requires service infrastructure readiness, interoperability between systems, and institutional commitment to no longer requiring physical documents as a form of legal identification and access to public services.

The second alternative with a high score was strengthening the Digital ID security system, with a total score of 4.40. The need for personal data protection is a primary public concern. Therefore, strengthening security aspects such as data encryption, double authentication, and regular system audits is crucial to increasing users' sense of security. This aligns with public concerns about potential data leaks and identity misuse, which were widely expressed in qualitative data. This effort also aligns with digital governance principles that guarantee citizens' right to privacy in the digital age.

Strengthening public digital literacy also emerged as a highly strategic policy, with an average score of 4.34. Indonesians still face significant digital literacy challenges, particularly in rural areas, among the elderly, and those with low levels of education. Therefore, inclusive, contextual, and sustainable digital education programs are

needed to equip the public with knowledge about the benefits, risks, and safe use of the Digital ID. These literacy programs are a crucial prerequisite for implementing the Digital ID, not only technically but also socially and culturally.

Strengthening regulations and the legal framework is a crucial part of strategic policy, with a score of 4.34. Although Indonesia already has several technical regulations, such as Ministerial Regulation No. 95 of 2019 and Ministerial Regulation No. 72 of 2022, these legal frameworks are insufficient to comprehensively regulate digital identity governance. Therefore, the development of comprehensive regulations, including personal data protection, system interoperability, and digital service standards, is urgently needed. This legal strengthening will lay the foundation for building a sustainable, trustworthy, and legally accountable national digital identity system.

In terms of external opportunities, the policy of improving digital infrastructure was also deemed highly urgent, with a high score (4.37). Equalizing internet access, increasing server capacity, improving network security, and digitizing civil registration services at the regional level must be implemented simultaneously. Robust infrastructure will be the backbone of IKD operations, especially in the 3T (frontier and outermost) regions, which have historically experienced service disparities. Implementing this policy requires collaboration between the central and regional governments, as well as synergy with the private sector and telecommunications service providers.

Within the collaborative context, strengthening collaboration between government and private institutions is also a strategic policy, with an average score of 4.39. This policy is crucial for promoting system interoperability and service efficiency. Secure and efficient use of population data must involve various stakeholders, from the banking, health, and education sectors to law enforcement agencies. Strategic collaboration enables real-time, accurate, and legal data exchange within the national digital ecosystem.

Increasing IKD coverage remains a key foundation for supporting the strengthening of the national digital identity system. Despite scoring lower than other options (4.27), equitable IKD coverage will ensure that all citizens have equal access to civil rights and public services. This effort must be accompanied by an inclusive approach, such as mobile enrollment services, outreach services (Jebol), online activation, and stakeholder collaboration.

Finally, incentive policies for the private sector in supporting the digital identity ecosystem also need to be considered. The lower average score (3.95) does not necessarily indicate that this policy is unimportant but rather indicates that incentive implementation must be designed to be more targeted, transparent, and results based. The government can encourage private sector involvement through tax incentives, regulatory easing, or providing access to technology for the development of digital identity-based applications.

Overall, these eight policy alternatives represent the results of empirical data processing and public expectations regarding the future of the national digital identity system. Policy development based on the SOAR approach allows for appreciative, participatory, and transformative formulation, based on existing strengths and a shared vision for change. Thus, strategic digital identity policies not only strengthen the foundation of Indonesia's digital transformation but also encourage more efficient, transparent, and inclusive governance in the digital era. This aligns with the view of Mislawaty et al. (2022), who argue that digitalization of government systems is an integral part of bureaucratic reform and public governance

innovation efforts in Indonesia. This transformation is seen as a necessity in responding to the dynamics of technology and the public's need for more efficient and transparent services.

3.5. Policy Recommendations

Based on the results of a comprehensive analysis of quantitative and qualitative data using the SOAR approach, the following are several strategic policy recommendations that can be used as a direction for developing and strengthening the national IKD system:

a. Accelerate the integration of digital identity (IKD) with all public services

Central and regional governments need to mandate the integration of digital identity (IKD) into public service business processes through binding and implementable regulations. This acceleration should include priority service sectors such as education, health, social assistance, and licensing. This step will expand the utilization of digital identity (IKD) while reducing reliance on physical documents such as e-KTPs.

b. Strengthen digital identity security systems

To increase public trust, policies need to focus on strengthening digital security aspects, including the implementation of data encryption, multifactor authentication, a periodic security audit system, and compliance with personal data protection principles. This must be an integral part of national IKD regulations and management systems.

c. Increase digital literacy in an inclusive and sustainable manner

The government needs to develop a national digital literacy strategy that targets various segments of society, particularly those in underdeveloped regions, the elderly, and those with low levels of education. Educational programs should cover the benefits, security, and procedures for using digital identity (IKD) in a way that is easy to understand and based on local needs.

d. Strengthening digital infrastructure equitably, extending to the 3T (United, Disadvantaged, and Transmigration) regions

Equitable digital infrastructure must be a priority, particularly in providing a stable internet network and technological devices throughout Indonesia. The government needs to accelerate network development in areas that have experienced disparities, including providing device support for the activation and use of digital services (IKD).

e. Developing and strengthening a regulatory framework for digital services (IKD) governance

New laws and regulations need to be developed that comprehensively regulate digital services (IKD) governance, including personal data protection, system interoperability, and the role of the private sector. These regulations must be adaptive to technological developments and capable of guaranteeing citizens' digital rights.

f. Strengthening collaboration across institutions and stakeholders

The government needs to establish effective coordination mechanisms between central and regional institutions and encourage strategic partnerships with the private sector, fintech companies, state-owned enterprises, and public service providers. This collaboration is key to building an interconnected and efficient digital ecosystem.

g. Increasing the coverage of IKD activation

The national strategy to increase the coverage of IKD activation needs to focus on proactive efforts, such as mass activation through public facilities, integration with social assistance programs, and synergy with village governments, schools, universities, and others. Wide coverage is an early indicator of the success of the national IKD system.

h. Providing incentives for the private sector that supports IKD adoption

The government can provide fiscal and non-fiscal incentives to businesses, banks, and digital service providers that adopt and integrate IKD into their systems. Incentives can include reduced tax burdens, access to verification systems, or ease of technology licensing.

i. Regular monitoring and evaluation of IKD implementation

A mechanism for regular monitoring and evaluation of IKD implementation based on key performance indicators (KPIs) is needed. The government needs to develop a national real-time IKD monitoring dashboard to monitor activation, usage, public satisfaction, and system security.

These recommendations collectively aim to encourage the establishment of an inclusive, secure, adaptive, and sustainable digital identity ecosystem, serving as the primary foundation for Indonesia's national digital transformation. With strong regulatory support, increased public literacy, and optimal multi-stakeholder engagement, Indonesia has a significant opportunity to realize an efficient and trusted national digital identity system.

4. Conclusion

This study demonstrates that the SOAR (Strengths, Opportunities, Aspirations, Results) approach is an effective framework for analyzing strategic policy directions in digital identity development. By integrating qualitative and quantitative data from 688 respondents, this analysis not only describes the actual conditions on the ground but also maps the most strategic and applicable policy priorities for driving national digital transformation.

From a strengths perspective, the centralized SIAK (Indonesian information System), initial regulatory support such as Ministerial Regulations 95/2019 and 72/2022, and collaborative projects with the World Bank provide a strong foundation for digital identity development. Furthermore, data demonstrates a significant increase in e-KTP (e-KTP) registration and population data utilization, which serve as indicators of basic system readiness.

From an opportunities perspective, the acceleration of digital transformation through the Priority SPBE policy, the launch of GovTech INA Digital, and the use of digital identity in the banking and fintech sectors (such as BNI, Allo Bank, and Dana) represent significant opportunities to expand digital identity adoption across sectors. However, infrastructure challenges, limited devices, and the digital divide remain serious obstacles that require special attention in inclusive policies.

The aspirations aspect highlights two key public expectations: strengthening digital identity security systems and improving digital literacy. Qualitative and quantitative results confirm the importance of these two aspects in building public trust and encouraging widespread adoption of digital identity. These aspirations also reflect public awareness of the importance of transparency, personal data protection, and technological readiness.

In terms of results, the findings indicate that the integration of IKD with public services is the most desired strategic outcome for the public. However, empirical evidence, such as the persistently high demand for e-KTP printing and the suboptimal adoption of IKD in public services, indicates a gap between the policy vision and the reality of implementation on the ground.

Overall, this analysis confirms that the successful development of IKD requires a systemic and sustainable approach that includes strengthening regulations, literacy, infrastructure, and incentives for all stakeholders. IKD must not only serve as an administrative instrument but also serve as a strategic foundation for a national digital system that is inclusive, secure, and adaptive to global dynamics.

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