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Laying the Groundwork for Artificial Intelligence Policy: A Preliminary Assessment of Indonesian Governance Using UNESCO's RAM Framework

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Abstract. *The present study reflects upon the initial evaluation of Indonesia's readiness for the ethical adoption of artificial intelligence (AI) per the available evaluation framework, namely, the UNESCO Readiness Assessment Methodology (RAM). The analysis considers key legal, social, scientific, economic, and technical dimensions pertaining to governance of artificial intelligence in Indonesia, with the view to exploring particular gaps and opportunities for improvement. Following a detailed secondary-document analysis, this study underscores the capacity of the country to apply AI within economic, governance, and sustainable development domains while tackling ethical challenges. The study also makes recommendations for legal systems and frameworks, infrastructure, and interdisciplinary collaboration. The limitations of the present assessment are indicated, alongside guidance for future studies to pursue an inclusive and sustainable AI ecosystem in Indonesia.*

Keywords: *AI, Readiness, Ethics, Indonesia*

1. INTRODUCTION

Artificial Intelligence (AI) is an important force that is working as a game-changer in the 21st century, initiating developments like never seen before in the economic, technological, and governance terrains. By the year 2030, AI is expected to contribute nearly $16 trillion to the global economy, chiefly through increasing productivity, developing new types of business models, and changing the competitive dynamics of business (Smirnov & Lukyanov, 2019). Besides financial contributions, AI is becoming the focal point for potential transformation of the public governance sphere and assisting sustainable development (Kusumasari et al., 2024; Mazzi et al., 2023). The study investigates Indonesia's readiness for adopting AI using UNESCO's Readiness Assessment Methodology (RAM) Framework as a basis for a preliminary assessment. Economically impactful, AI has applications across various industries, such as health care, agriculture, energy, and environmental conservation (Davoyan, 2021; Ginevri et al., 2021). AI applications are based on its ability to handle enormous volumes of data, automate complex processes, and make decisions more reliable (Palakurti, 2024a). Examples would include the improved diagnosis and treatment of diseases through AI systems in health care (O'Connor, 2022).

Companies use AI more and more to achieve corporate social responsibility goals, joining technological change with sustainability. This dual concern for innovation and ethical impact has positioned AI as a key enabling factor for both economic development and environmental protection (Mazzi et al., 2023). Another proposition is the use of AI to

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counter an age-old headache in governance by enhancing transparency, efficiency, and inclusivity in policy formation, processes, and implementation. For example, AI-backed data analytics can facilitate evidence-based decision-making, allowing governments to budget and utilize their resources more effectively and take preventive measures for emerging problems (Taeihagh, 2021). Yet such transformative capabilities require sturdy governance frameworks that can ameliorate risks such as algorithmic bias, data misappropriation, and unethical behavior (Butcher & Beridze, 2019).

The United Nations Sustainable Development Goals (SDGs) set the wider picture for global development in relation to eradicating poverty, improving health, protecting the environment, and fostering prosperity. This is where AI holds great potential to act in favor of the SDGs by contributing to the solution of problems in health, education, and environmental sustainability (Mazzi et al., 2023). For example, the applications of AI have helped in fostering renewable energy technologies, managing supply chain activities for sustainable agricultural practices, and upgrading disaster preparedness with predictive analytics (Palakurti, 2024a). Despite these benefits, the ethic of data privacy, digital equity, and environmental impact remain relevant blocks to the large-scale adoption of AI for sustainable development. Coping with these challenges will require interdisciplinary collaboration, clear governance, and contextualized policy frameworks suited to local needs (Liao & Wang, 2020).

Indonesia has become a key player in AI-driven innovations in Southeast Asia. The burgeoning digital economy, coupled with the apparent youthfulness and strong inclination toward technology adoption by the population, makes AI adoption feasible. Digital infrastructure gaps, regulatory gaps, and limited institutional capacity like in Africa also pose additional challenges for Indonesia (Arakpogun et al., 2021). For instance, in urban areas like Jakarta and Surabaya, highly advanced digital ecosystems are in operation, whereas, in rural areas, limited internet connectivity and digital literacy continue to be major challenges (Sajida & Ranjani, 2020). The digital divide emphasizes the need for inclusive policies to address these inequalities to foster equitable access to AI technology across the regions (Liao & Wang, 2020).). The Readiness Assessment Methodology (RAM) Framework is meant to provide a comprehensive view of AI readiness. It goes about these evaluations by assessing the readiness for the adoption of AI in a country focusing on five dimensions: legal/regulatory, social/cultural, economic, scientific/educational, and technical/infrastructural (Natorski, 2024). AI is a game-changer for Indonesia in solving pressing governance problems and supporting the country's sustainable development. But

realizing this potential entails an intricate understanding of the country's readiness across various dimensions. Thus, UNESCO RAM Framework provides the most important tool for this assessment and shows the gaps and opportunities that define the Indonesian landscape of AI. The present study sets the stage for future research and policymaking, giving credence to tailored intervention schemes to address Indonesia's unique challenges and harness its advantages. By promoting interdisciplinary cooperation, strengthening the legal framework, and investing in digital infrastructure, other states can propel Indonesia as a regional key player in the responsible innovation of AI.

2. METHODS

A qualitative research approach is adopted to assess the country for AI governance readiness using UNESCO's Readiness Assessment Methodology (RAM) Framework in 2023. In this methodology, we look at the documents via an extensive secondary analysis following previous studies on the same field (Anderson et al., 2022; Sajida, 2024; World Food Programme, 2009). We analyzed regulations, policies, and current government reports to assess the standing of Indonesia on the five dimensions of RAM, i.e. Legal/Regulatory, Social/Cultural, Economic, Scientific/Educational, and Technical/Infrastructural. A set of key documents, starting from the national laws and regulations such as Presidential Regulation No. 95/ 2018 on Electronic-Based Government Systems, Kominfo Circular No. 9/2023, and RPJPN 2025–2045, was subject to critical analysis to establish the strengths, areas of concern, and opportunities for the advancement of AI governance. Data were also intermingled with some international standards and academic literature on the readiness of AI across the globe to situate the performance of Indonesia in context with the global context. The analysis was further enhanced for validation by cross-referencing with the reports of international organizations such as UNESCO and OECD to confirm that the insights are aligned with global trends in AI policymaking and governance. The RAM Framework is employed as a vehicle for performing a multidimensional assessment to pinpoint the sectors demanding policy reform, more strategic alignment, and infrastructural enhancement. This approach therefore lays a solid foundation for actionable recommendations bearing in mind the specific socio-political and economic setting of Indonesia.

3. RESULTS AND DISCUSSION

Legal/Regulatory Dimension

First, it is legal/Regulatory, this dimension examines the extent to which a country's legal framework is effective in dealing with ethical considerations, securing privacy, and ensuring accountability for AI applications. In Indonesia, for instance, user privacy has been given some protection through laws such as the Data Protection Bill; however, effective enforcement of these laws still has gaps. Legal/regulatory framework is the cornerstone of ethical and effective integration of Artificial Intelligence (AI) into governance. The national AI policy landscape of Indonesia is slowly starting to form with initiatives such as the National AI Strategy (STRANAS KA) by BPPT in 2020 and the Long-Term National Development Plan (RPJPN) 2025-2045by BAPPENAS in 2024. These documents present Indonesia's vision of leveraging AI for economic advancement, improving public services, and resolving developmental problems. Great gaps lie in the regulatory framework remaining, especially concerning ethical governance transparency, and accountability of AI systems.

STRANAS KA is the flagship policy of the country promoting AI, which puts focus into such sectors as education, health, agriculture, transportation, and public services. This policy supports global efforts to take AI as an engine for sustainable development and emphasizes the route toward increasing efficiency, cost reduction, and better service delivery. It is also complemented by RPJPN 2025-2045, targeting a digitally inclusive society where AI innovations become the cornerstone of economic resilience and social equity. Both policies reaffirm Indonesia's commitment toward building an AI Ecosystem underpinned by investments into digital infrastructure, talent development, and collaboration across sectors.

Taking a giant leap forward presents major hurdles for the practical implementation of these AI policies. For example, STRANAS KA may outline the areas of priority AI development but does not delve deeply into ethical considerations such as mitigating algorithmic bias, ensuring fairness, or protecting individual privacy. Likewise, while visionary in scope, the RPJPN lacks specifics on mechanisms for addressing the ethical implications of AI in governance and development. Regulatory capabilities that could enforce ethical practices at all stages of the AI lifecycle are a core idea in the context of AI governance. The gap in Indonesia clearly indicates that comprehensive ethical laws regarding artificial intelligence deployment are found wanting. The regulatory regime is

simply inadequate on key ethical issues: data protection, transparency of algorithms, and the accountability of AI developers and users.

Despite the introduction of the Personal Data Protection Act (UU PDP) in 2022 in Indonesia, its enforcement through court practice is lacking. Usually, the ACT stipulates the framework for data privacy in general, but it does not properly fill the gaps with respect to issues AI raises: Using personal data for automated decision-making or mass surveillance. Further, the absence of guidance on AI impact assessments raises additional complexities in the ethical governance of AI technologies. These assessments are a process of identifying and alleviating any potential harm that can arise, such as discriminatory outcomes or invasion of privacy.

In addition, transparency remains another area of concern. Mandatory disclosure requirements for AI systems implemented in public services do not foster public confidence or accountability. For example, no standardized protocols exist for citizen notifications of decision-making processes by AI that directly affect them, such as through welfare distribution or in law enforcement situations. This results in a lack of transparency whereby citizens are left vulnerable to non-transparent decision-making processes that sometimes reinforce inequality or injustice.

Effective governance of AI must be characterized by stronger mechanisms of accountability to resolve grievances and ensure adherence to ethical standards. In Indonesia, the existing regulatory framework lacks dedicated institutions or modalities for overseeing AI grievances. The Ministry of Communication and Information Technology (Kominfo) is a major body in digital governance, but it is not explicitly mandated to oversee AI per se. This regulatory haze presents hurdles in determining accountability for AI harms, like algorithmic bias or data breaches (CIPG, 2018).

There are independent AI ethics commissions or regulatory bodies around the world addressing such issues. In this regard, the European Union's General Data Protection Regulation (GDPR) includes provisions for algorithmic accountability and requires organizations to justify some major automated decisions. This is something that Indonesia would also likely want to consider adopting in its own way. According to UNESCO's RAM Framework, setting up an AI Ethics Commission in Indonesia would be an important initial step to fill these accountability gaps.

Regulatory efforts concerning AI have been slowly converging toward global standards in Indonesia, but tremendous divergence still prevails. The UNESCO RAM Framework focuses on the need for international norms and best practices to be standard in

national policies on AI. However, Indonesia's current legal framework lacks explicit references to global standards, such as the OECD's AI Principles or the UNESCO Recommendation on the Ethics of AI. Integrating these standards could enhance the robustness and credibility of Indonesia's AI governance model.

For instance, the OECD's AI Principles advocate for transparency, explainability, and human-centered values, which are crucial for building trust in AI systems. Similarly, the UNESCO Recommendation provides actionable guidelines for ethical AI development, emphasizing the need for inclusivity, sustainability, and respect for human rights (Singh, 2024). By embedding these principles into national policies, Indonesia can ensure that its AI initiatives are both globally competitive and locally relevant.

Social/Cultural Dimension

The second key element in our AI readiness matrix is the social-cultural dimension which assesses a society's readiness and cultural thought processes in accepting AI. In Indonesia, mitigating gender gaps in STEM education and engendering trust in the AI systems are key components of any effort to build an inclusive AI ecosystem (Palakurti, 2024a, 2024b). The social-cultural dimension of AI readiness in the Indonesian context shows how dependent technology adoption is on societal inclusivity. AI can be a great equalizer, however, its fair implementation is impeded by socio-cultural inequalities, especially gender inclusion, digital literacy, and public participation in the policymaking process. All of these aspects act as significant determinants on how AI technologies are perceived, adopted, and used by different segments of the populace. The section delves into some of the challenges and opportunities toward social and cultural readiness for AI in Indonesia based on the analyses of existing national policies, for example, STRANAS KA, Circular of Minister of Communication and Information No. 9/2023, and the RPJPN 2025-2045, and some supportive research.

Studies have shown that homogeneous teams are more inclined to create AI models that echo and amplify existing societal biases, such as gender stereotypes and discriminatory hiring practices (CIPG, 2018). Therefore, targeted interventions include scholarships, mentorship programs, and affirmative action policies that encourage greater female participation in the STEM and AI fields.

Also, on inclusion is the nagging rural-urban divide in access to digital technologies and infrastructure. While urban regions benefit from a relatively advanced digital ecosystem, rural communities have various impediments to accessing AI-enabled services stemming from limited connectivity and restricted awareness of digital tools. As STRANAS

KA states, while less than 50% of rural households have reliable internet access, more than 80% of people living in urban centers do. The gap in access prevents AI benefits from being fairly distributed and further aggravates already entrenched inequalities in education, healthcare, and commercial opportunities.

Digital literacy underpins the assurance that the population understands, trusts, and effectively utilizes AI technologies. However, digital literacy levels in Indonesia vary substantially across demographic categories. RPJPN 2025-2045 recognizes the need to improve digital skills among students, workers, and underprivileged communities; however, large-scale implementation of digital literacy programs is inconsistent.

For example, while digital literacy has become a prime agenda for initiatives like Siberkreasi under Kominfo, these programs are usually deprived of further integration into AI policies and do not reach marginal groups. Moreover, digital literacy programs frequently focus on basic skills, such as internet usage, rather than equipping individuals with the critical thinking and ethical awareness needed to navigate the complexities of AI systems (Menkominfo, 2023)

Scientific/Educational Dimension

Next comes the scientific/educational dimension: In this dimension, the focus is on educational activities and research ideas that can support innovation in AI. While AI-related curricula have been introduced in Indonesian universities, there is a need to improve collaboration between the industry and academia for talent development (Arakpogun et al., 2021). This scientific and educational aspect in the UNESCO RAM framework is crucial in determining the readiness of Indonesia for integrating artificial intelligence (AI) within its national system. This dimension analyzes the ability of higher education to deliver appropriate AI programs and research outputs, as well as collaboration with the aim of talent development and innovation. From the analysis of the present state in Indonesia, progress as well as gaps are seen in terms of the AI-related scientific and educational objectives. Benchmarking against Australia, a frontrunner in AI education and research, also highlights valuable insights for Indonesia (Bratanova et al., 2022).

Indonesia's higher education system plays a key role in preparing the workforce for an AI-laden future. STRANAS KA states attempts to include AI topics within university curricula. Yet the coverage and depth of such programs varies from institution to institution. Some programs focus on technical skills, such as machine learning and data science, while often neglecting ethical, social, and policy implications of AI (STRANAS KA; RPJPN 2025-2045).

As reported in a document issued from the Ministry of Education, Culture, Research, and Technology, there are fewer than 20% of Indonesian universities offering a specialized degree in AI or an AI course integrated into computer science engineering curriculum (Permendagri No. 15/2024). There exists a huge disparity in access to these programs, as rural students are often excluded from teaching due to poor infrastructure and resources (STRANAS KA). These disparities created on the backdrop of this digital divide will hurt AI talent development in ways that perhaps the country may never build a robust AI ecosystem.

To overcome these hurdles, Indonesia should immediately expand its higher education with comprehensive AI programs that party equally technical knowledge with ethical considerations, societal impacts, and interdisciplinary applications. These standardized curricula for AI should be developed with collaborative efforts from both the government and universities so that they can be made concurrent with worldwide standards (Exner-Stöhr et al., 2017; Kabashkin et al., 2023).

The early stages of AI research development in Indonesia seem promising but still have a long way to go to even begin to catch up to global standards. But there is indication that Indonesia falls behind regional neighbors in publications and patents related to AI (CIPG, 2018). While a number of the leading universities have been carrying out AI research, much of this is done in isolation, with little collaboration between universities, government agencies, and industry players. Such fragmentation undermines the capability to forge effective solutions and diminishes the visibility of Indonesian AI research globally.

One problem is funding for AI research. The STRANAS KA and RPJPN recognize the importance of investment in research and development (R&D) to endorse innovations and technological advancement and highlight even further the need for R&D investments in Indonesia. Even today, Indonesia only allocates 0.2% of its GDP on R&D, compared to an OECD average of 2.4% (RPJPN 2025-2045). This funding constraint limits universities from establishing pure AI research centers, employing great talent, and engaging in international cooperations.

To dismantle these challenges, Indonesia should prioritize investment in AI research by increasing government support, providing incentives for the private sector to contribute, and facilitating public-private partnerships (PPP). Especially in education sector, this PPP scheme can also establish national AI research hubs for academia, industry, and policymakers to engender knowledge transfer and expedite innovation (Sajida & Kusumasari, 2023a, 2023b).. Additionally, joining global AI research networks such as

UNESCO's AI observatory will provide Indonesian researchers access to the latest insights and research facilities.

Economic Dimension

Also, Economic dimension that assesses the economic infrastructure and investment climate for AI technologies. Indonesia’s burgeoning startup ecosystem presents opportunities for AI-driven innovation, yet attracting foreign investment requires targeted policy interventions to enhance competitiveness (Smirnov & Lukyanov, 2019). In this case, the different economic dimensions of the framework under UNESCO RAM assess the potential of a country to leverage AI in fostering economic growth, innovation, and competitiveness. Opportunities and challenges arise from this particular dimension for Indonesia. Though AI has a tremendous ability to transform the economy, Indonesia is faced with a competitive regional landscape and must combat structural barriers to truly realize this potential. An in-depth analysis of secondary documents reveals a great deal of information regarding Indonesia's economy being ready for AI integration purposes.

AI is seen as one of the key contributors to economic growth since it optimizes processes, productive growth, and new business model generation. AI can provide huge opportunities in Indonesia's economy that include sectors like agriculture, health, finance, and manufacturing (Mishbah, 2023). The STRANAS KA, short for *Strategi Nasional Kecerdasan Artifisial*, National Strategy for Artificial Intelligence, explains that AI adoption could highly contribute to growth in the GDP, solving challenges of inefficiencies and decision making in various sectors. Optimally, AI intervention in agriculture can be defined as management of resource allocation with respect to yield improvement and minimizing wastage, to ensure profitability and sustainability. In the financial sector, it is already making incredible changes with fraud detection systems, predictive analytics, and automated customer service (Mendagri, 2024).

Leading financial institutions in Indonesia, including state-owned banks, are active in the investment of AI-driven technology with a view toward efficiency in the operations and customer experience. The manufacturing sector, which is another major contributor to Indonesia's GDP, is also now beginning to apply AI technologies for supply chain optimization, predictive maintenance, and quality control; this is maintaining consistency with global trends, where AI integration is becoming a prerequisite for competitiveness in manufacturing .

With such developments, currently pulling down Indonesia's AI-led economic growth is the lack of investment in research and development and restricted access to high-quality

data. The RPJPN 2025-2045 recognized some of these gaps and continues to emphasize the aspirations of directing investments into AI infrastructure and capacity-building, which can then trigger economic opportunities .

Indonesia's unique strengths ought to be utilized in the regional AI landscape. Large domestic markets and growing digital economies provide significant opportunities for AI-driven solutions. AI enabled logistics and e-commerce platforms, including Gojek and Tokopedia, exemplify how Indonesia can harness opportunities to capitalize on its large consumer base to spearhead AI innovation (Hasan & Mardhani, 2021). Location-wise, Indonesia builds obvious strength with its participation in ASEAN, providing scope for cooperation in the region and positioning itself as an important player in the Southeast Asian AI ecosystem.

AI investment needs an ecosystem that combines regulatory support, skilled talent, and technological infrastructure. In this regard, Indonesia grapples with numerous challenges. Firstly, attracting and retaining foreign investors becomes difficult due to an absence of a coherent national AI strategy with concrete implementation pathways. While the STRANAS KA outlines broad objectives, it lacks detailed targets, timelines, and metrics for success, providing uncertainty for potential investors.

Secondly, although the country is working on improving its digital infrastructure, some areas still remain too far behind . As stated in Kominfo Circular No. 9/2023, the internet penetration in rural areas is still low, hurting AI solutions' scalability. Furthermore, weak data governance frameworks discourage investor confidence in the security and the data ecosystem of Indonesia.

Thirdly, while Indonesia's talent base is growing, this growth is stunted by skill mismatch. The STRANAS KA and RPJPN emphasize the importance of AI talent, but progress has been slow due to gaps in educational programs and limited industry-academia collaboration . Without a steady pipeline of skilled professionals, Indonesia risks falling behind in the race to attract AI investments .

Technical/Infrastructural Dimension

Last, Technical/Infrastructural dimension. This dimension examines the technical infrastructure, including data management capabilities and IT infrastructure, necessary for AI implementation. Enhancing data-sharing frameworks and expanding broadband access are critical priorities for Indonesia (Liao & Wang, 2020).

Concerning the preparedness of nation's digital infrastructure in contributing to AI development, deployment, and scalability, the technical and infrastructural dimension of

UNESCO's RAM framework indicates the status of advancement in AI for a country. In the case of Indonesia, that particular dimension represents an urgent area for improvement, as current gaps in digital infrastructure could deter the country's ability to compete regionally and globally in AI innovation. Analysis of government provides an overview of Indonesia's technical readiness, key challenges, and recommendations toward strengthening the technical foundation of AI development in this section.

Digital infrastructure includes everything AI-basic components or backbones of any AI system-high-speed internet, data centers, and cloud computing. Indonesia has achieved some measure of success in the digital infrastructure sector; however, its development remains uneven. From the RPJPN 2025-2045, sophisticated connectivity and technological endowments are found in urban areas, mainly Jakarta and Bandung, whereas several rural areas still show considerable technological disparity in respect to broadband penetration and reliable internet services, Circular No. 9/2023 elucidates concerning Government programs to improve on last-mile connections to foster rural internet access. Unfortunately, a lack of investment and tardy implementation have inhibited this endeavour. In the absence of robust, reliable, and high-speed internet, AI applications in education, healthcare, and public services cannot be effectively adopted or scaled (Landers, 2017; Pick & Sarkar, 2020; Skaletsky et al., 2017).

The limited local data center capacity in support of data-heavy AI technologies presents Indonesia with a severe challenge. Most companies use international cloud providers, raising questions of data security and sovereignty as well as increasing operational costs. As outlined in the previous report, There is a lack of data centers for domestic situations, which in turn propels the relative underachievement of our country regarding data storage and processing, especially when dealing with sectors like finance and healthcare where highly confidential data comes about (CIPG, 2018).

STRANAS KA which recommends to the government to set up national data centers in response to the increasing demand from AI-based applications. However, the initiation of this process needs collaboration from both public and private stakeholders to secure sustainability and scalability. Despite the improvements in mobile broadband penetration in Indonesia, the fixed broadband adoption is still wanting. According to STRANAS KA, around 60% of the populace has reliable Internet services, though they get these mainly through mobile networks. The contrast between urban and rural areas is indeed severe, whereby the latter are hardly provided with basic Internet connectivity.

Bridging the digital divide as espoused in the RPJPN 2025-2045 hinges on satellite broadband setting and expanding fiber-optic networks. Closing this gap will open access for inclusive AI-powered services such as digital marketing and telemedicine. Otherwise, the inequality generated by underdeveloped Internet infrastructure will further thwart national development. Specialized AI infrastructure needs supercomputing facilities, AI research laboratories, and efficient data management systems (BAPPENAS, 2024b; KemenPUPR, 2023). Indonesia's High-performance computing (HPC) resources are now inadequate to support significant AI R&D. While several universities and research institutes have set up AI research labs, they are limited in their infrastructure and are therefore incapable of supporting cutting-edge research.

Previous report calls for standardized data governance frameworks to secure data interoperability and quality (CIPG, 2018). Such frameworks would enable efficient data utilization while ensuring ethical compliance, thereby fostering trust among stakeholders.

Discussion: Proposing Strategic Policy Development

Several policy recommendations based on UNESCO's Readiness Assessment Methodology (RAM) framework and conclusions drawn from assessments that are global and local have been proposed for improving AI governance and ethical preparedness in Indonesia. Starting from governance, Indonesia must have stronger legal and regulatory frameworks for the ethical governance of AI technologies. This includes the adoption of ethical guidelines aligned with the recommendations of UNESCO, which are principles like transparency, accountability, privacy, and right to explanation, to synchronize national policies with global standards (Neuwirth, 2024; Ramos et al., 2024). The establishment of a National AI Ethics Commission is crucial for overseeing AI governance, monitoring ethical compliance, and providing expert advice regarding policy development of AI. The commission could potentially learn from such recent successful experiences as the European Commission's High-Level Expert Group on Artificial Intelligence to institute effective governance (Rajamäki et al., 2022). Moreover, sectoral AI policies concerning particular ethical challenges and regulatory requirements need to be developed in Indonesia for different sectors such as healthcare, education, and finance. These policies should involve algorithmic bias and data privacy violations to make sure that AI deployment meets ethical standards and societal needs.

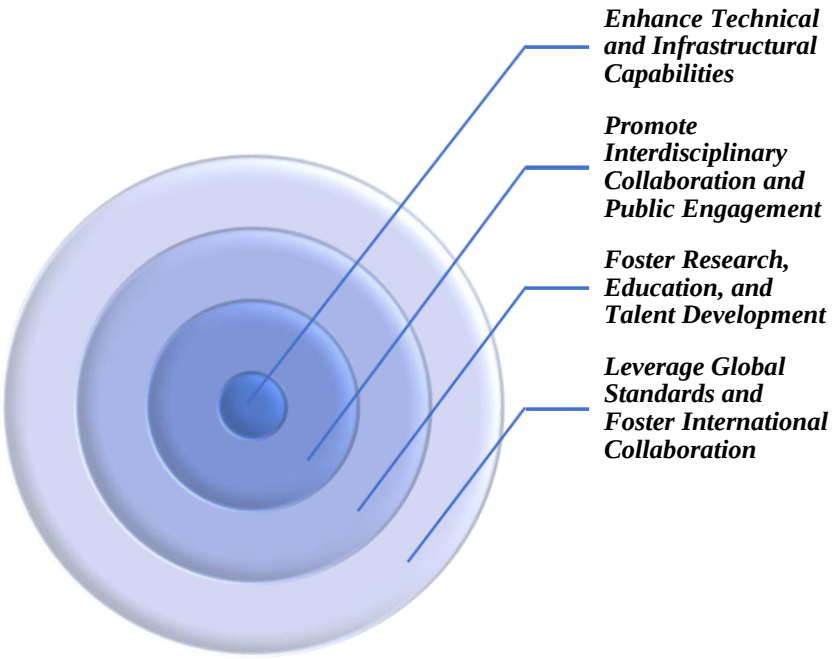

Figure 1. Proposal of Strategic Policies in improving AI governance in Indonesia
Enhance Technical and Infrastructural Capabilities

In revamping AI deployment, Indonesia must prioritize the enhancement of technical and infrastructure capabilities as seen on Figure 1. Investment in digital infrastructure such as high-speed internet connectivity, cloud computing facilities, and advanced data centers will form a solid foundation for AI technologies (Blanchard et al., 2024). The establishment of regional AI innovation hubs will attract investment from domestic and foreign stakeholders, making Indonesia a competitive player in the Southeast Asian AI ecosystem. Using Singapore as an example could serve as a benchmark for actionable insights regarding strengthening technical capability in AI: Its position as a leading country in AI excellence is owed entirely to infrastructure and help from the government (Herdhiyanto & Rachmadi, 2023). Furthermore, integrating ethical considerations into infrastructure planning, such as ensuring data privacy and cybersecurity, will enhance public trust in AI systems.

Promote Interdisciplinary Collaboration and Public Engagement

Interdisciplinary collaboration and public engagement are, therefore, critical constituents of strong governance of AI. To develop a comprehensive AI governance framework, Indonesia should encourage collaboration among policymakers, academia, the private sector, and civil society at large. In doing so, important insights will flow into the discourse from a variety of disciplines, including law, technology, and social sciences, to contribute in the design of a robust strategy for facing the numerous complex ethical challenges presented by AI (Ramos et al., 2024). Equally significant is the engagement of

the public in generating trust and ensuring AI policies reflect societal values and priority. The organization of awareness campaigns and public consultation will help bridge the knowledge gap and empower citizens to discuss AI ethics and governance (Demaidi, 2023). In addition, promoting digital literacy in these areas will support greater inclusion and alleviate risks associated with a digital divide.

Foster Research, Education, and Talent Development

Building a highly skilled AI workforce and prioritizing relevant research are fundamental aspects of developing Indonesia toward AI readiness. Expansion of AI academic programs at universities and vocational training centers for the purpose of building a pipeline to nurturing future experts is crucial (Al-Obeidi & Al-Mulla, 2022). Knowledge transfer and joint research endeavors with institutional partners in Australia could further enhance Indonesia's ability to address ethical and technical dimensions in AI development. Moreover, funding mechanisms would stimulate research and innovation in AI for application in healthcare, agriculture, and environmental sustainability, thus aligning the local context with national priorities and global sustainable development goals (Neuwirth, 2024; Suer & Muftuoglu, 2024)

Leverage Global Standards and Foster International Collaboration

Aligning Indonesian artificial intelligence policy with existing global practices and fostering cooperation will be vital to address cross-border nature AI governance challenges. Involving Indonesia in multilateral activities, such as UNESCO's global observatory on AI ethics, will put the country in the way of acquiring best practices and platforms to share experiences (Natorski, 2024) Such a harmonization of national regulations with those of the international community, for example, the AI Readiness Index (AIRI) and the Assessment List for Trustworthy AI (ALTAI), would boost Indonesia's credibility and competitiveness while leading to AI globally (Rajamäki et al., 2022). Furthermore, engaging in bilateral cooperation with countries that host advanced AI ecosystems, such as Australia and Singapore, will provide insights and resource support to consolidate Indonesia's AI governance.

Therefore, implementing these policy recommendations can significantly enhance Indonesia's readiness for ethical AI adoption. By addressing gaps in legal frameworks, fostering collaboration, investing in infrastructure, and aligning with global standards, Indonesia can position itself as a leader in responsible AI development and deployment. These measures will not only support national priorities but also contribute to global efforts in creating an inclusive and sustainable AI-driven future.

4. CONCLUSION

This comprehensive, multidimensional assessment allows an evaluation as to the readiness within Indonesia for ethical AI governance undertaken via the UNESCO RAM Framework. It appears that progress has been made toward some of the factors contributing to policy development, such as STRANAS KA and RPJPN, but at the same time they expose crucial gaps in respect of legal, social, and infrastructural dimensions. In Indonesia, algorithmic bias, data privacy, and digital literacy need some serious consideration, for these three factors of concern form the bedrock of any equitable AI adoption. At the same time, inadequate infrastructure and limited access to digital tools are likely to halt the potential of Indonesia in becoming a front-runner in AI adoption on the regional level. Policy recommendations stress the establishment of a National AI Ethics Commission, reform of regulatory frameworks, and increased investment in infrastructure and talent development. These conditions would greatly benefit from promoting interdisciplinary collaboration and international partnership, which are pertinent to aligning Indonesia's AI policies with global standards while fostering a responsible and sustainable AI ecosystem. This study utilizes secondary data almost exclusively, which may not capture the entire spectrum of Indonesia's unique AI landscape. Future research should work toward greater granularity in understanding AI readiness by incorporating primary data through interviews and surveys with stakeholders. They could also issue reports comparing AI performances with that of other Southeast Asian nations in order to glean valuable insights into regional best practices. The consideration of the role of private sector innovations and impacts of AI on marginalized communities would further enhance the understanding of Indonesia's AI readiness and its consequences for governance and sustainable development.

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