Jambe Law Journal
ISSN 2598-795X (online); 2598-7925 (print)
Vol. 7 No. 1 (2024): 25-58, DOI: 10.22437/jlj.7.1.25-58

Hungary's AI Strategy: Lessons for Indonesia's AI Legal Framework Enhancement

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Abstract

This study analyses Hungary's approach to regulating artificial intelligence (AI) by analyzing their AI Strategy (2020-2030) and provides insights for improving Indonesia's legal framework. In Hungary, although there is no dedicated legislation for artificial intelligence (AI), the country places a high importance on adhering to current regulations to regulate AI technologies. This paper does a comparative analysis to evaluate the influence of Hungary's approach on the advancement of artificial intelligence (AI), the methods used to enforce regulations, the ethical principles followed, the safeguarding of data, and the extent of international partnerships. This research seeks to offer practical insights for enhancing Indonesia's legal infrastructure in the field of AI governance and technology regulation by comparing Hungary's regulatory landscape with Indonesia's current framework. The purpose of the research is to provide guidance to policymakers and stakeholders in Indonesia regarding effective tactics and best practices based on Hungary's experience. This will assist in enhancing Indonesia's regulatory framework for AI and technology.

Keywords: Hungary's AI Strategy; Indonesia; AI Legal Framework

A. Introduction

Artificial intelligence (AI) has become a powerful force that is stimulating creativity and transforming economies, industries, and governance structures on a global level.[1] In the current age of swift technological progress, countries are faced with the challenge of utilizing the capabilities of artificial intelligence while minimizing the risks that come with it.[2] AI has the potential to improve efficiency, accessibility, and the delivery of justice within the legal field. Nevertheless, the implementation of this technology requires a strong regulatory structure to effectively deal with the ethical, legal, and societal consequences.[3]

Regulating artificial intelligence (AI) is challenging considering the complicated characteristics of AI technologies and their wide-ranging consequences.[4] The ever-changing and fast-paced nature of AI surpasses the existing legal frameworks, making it challenging to create effective legislation. The fundamental intricacy of AI systems, distinguished by their lack of transparency, independent decision-making, and capacity to adjust, presents distinctive obstacles for regulators aiming to guarantee responsibility, openness, and ethical utilization. The conventional legislative procedure, which is frequently inflexible and sluggish in adapting, faces difficulties in keeping up with the swift progress in AI, resulting in deficiencies in regulation and enforcement. The disparity between technological advancement and legislative adaptation gives rise to a favorable environment for legal ambiguities, which could impede the safeguarding of individual

1 Klaus-Peter Adlassnig, 'Artificial-Intelligence-Augmented Systems', *Artificial Intelligence in Medicine*, 24.1 (2002), pp. 1–4, doi:10.1016/S0933-3657(01)00102-6.

2 Beny Saputra, 'Modelling Australian Transaction Reports and Analysis Centre (AUSTRAC) for Indonesia in Order to Combat Financial Crime', *NEGREI: Academic Journal of Law and Governance*, 1.2 (2021), p. 81, doi:http://doi.org/10.29240/negrei.v1i2.3822.

3 Dietmar Harhoff and others, 'Outline for a German Strategy for Artificial Intelligence', *SSRN Electronic Journal*, 2018, doi:10.2139/ssrn.3222566.

4 Jay Lee, 'Introduction: The Development and Application of AI Technology', in *Industrial AI* (Springer Singapore, 2020), pp. 1–4, doi:10.1007/978-981-15-2144-7_1.

rights, privacy, and society welfare.

As AI applications become more widespread in industries such as healthcare and finance, it is more important to have laws that are precise, adaptive, and enforced.[5] These regulations are necessary to minimize dangers and maximize the benefits of AI technologies. Integrating soft laws and making roadmap regulation strategy can be effective in addressing the complex challenges of AI governance. This highlights the need for agile and forward-thinking regulatory frameworks to navigate AI regulation successfully.

The key concrete step of forming the AI Coalition is aligning stakeholders from various sectors to ensure a comprehensive and inclusive approach.[6] In Hungary, the stakeholders consist of the government, academics, industry players, and non-governmental organizations, all of whom bring their unique expertise and perspectives to the table. Together, they work diligently to formulate Hungary's goals and targets in the field of AI, aiming to position the country as a leading force in AI advancements both regionally and internationally.

In pursuit of this mission, the stakeholders recently convened for an inaugural meeting, which proved to be a significant milestone in the AI Coalition's journey. During this meeting, they harnessed their collective wisdom and insight to develop a robust strategy that would propel Hungary's competitiveness in the Central Europe region. Moreover, the strategy aims to solidify Hungary's standing as one of the leading AI science nations in Europe, instilling a sense of pride and accomplishment within the nation.

The strategy itself encompasses four distinct stages, each of which plays a pivotal role in the overall vision for AI development. The first stage involves a meticulous analysis of the current state and potential of available resources. By examining the existing landscape,

5 Zsuzsa Farkas and others, 'ZEXPERT - A Prolog-Based Shell for Knowledge Base Development', in *International Conference on Logic Programming*, 1993 <https://api.semanticscholar.org/CorpusID:42133270>.

6 Andrea Szalavetz, 'Artificial Intelligence-Based Development Strategy in Dependent Market Economies - Any Room amidst Big Power Rivalry?', *Central European Business Review*, 8.4 (2019), pp. 40–54, doi:10.18267/j.cebr.219.

the stakeholders gain valuable insights into the strengths and weaknesses of Hungary's AI infrastructure, allowing them to identify areas for improvement and growth.

Moving forward, the coalition embarks upon the second stage, wherein they conduct a comprehensive analysis of future trends and the far-reaching effects of AI on both Hungary and the international stage. This forward-looking approach enables them to anticipate the evolving needs and challenges of the AI landscape, empowering them to craft a strategy that is agile, adaptable, and future proof.[7]

As the coalition progresses to the third stage, they endeavor to formulate clear and ambitious aspirations, goals, and action plans that will drive Hungary's AI agenda. By articulating their vision with precision and clarity, they lay a solid foundation for the future of AI in the country. These goals and plans are carefully crafted to address not only the present concerns but also the long-term societal and economic impact of AI advancements.

The potential is extremely high for AI in Hungary, and the technology has an automatic and self-propelling aspect to it. This is a significant concern because if other countries are "running on AI" while utilizing the technology to disarm their strategic AI adversaries, it can result in Hungary being left behind in the technology or being challenged by automatic decisions that are made to protect the strategic interests of other nations. Despite high potential, there are potentially large risks and negative externalities from AI.[8] For example, large-scale job displacement and automation could result in negative effects upon certain areas of society and industries. For instance, it is predicted that by 2037, 47-70% of currently existing jobs in Hungary could be automated.[9] Hungary remains a knowledge-lagging coun-

7 Katalin Feher and Zoltan Veres, 'Trends, Risks and Potential Cooperations in the AI Development Market: Expectations of the Hungarian Investors and Developers in an International Context', *International Journal of Sociology and Social Policy*, 43.1/2 (2023), pp. 107–25, doi:10.1108/IJSSP-08-2021-0205.

8 O. KOSTENKO, 'Analysis of National Artificial Intelligence Development Strategies.', *INFORMATION AND LAW*, 2(41), 2022, pp. 58–69, doi:10.37750/2616-6798.2022.2(41).270365.

9 Seth G Benzell and others, *SIMULATING ENDOGENOUS GLOBAL AUTO-*

try and may lag certain AI implications and effects. AI has the potential to increase the efficiency and effectiveness of various policies and technologies in Hungary, but local implementation of AI could result in Hungary being a passive consumer of foreign technology. Foreign AI technology and AI-induced products are changing the nature of trade and global competition, and the heightened competition in innovative products affects Hungary particularly around multinational R&D investments.

AI technology has the potential to increase Hungary's GDP by almost 1 trillion HUF and create 100,000 job positions.[10] AI has the potential to raise productivity and introduce new industries to Hungary by automating existing mundane processes. AI technology could improve Hungarian healthcare by using predictive analytics to increase the accuracy of patient diagnosis and development of tailored medical treatment. The clean energy sector could see major development with the utilization of AI technology, which could make Hungary more prosperous and less dependent upon energy imports. All the underlying functional AI creates massive opportunity around the data-driven economy. This is because AI largely increases the utility derived from data, and the data-driven economy has been said to be Hungary's growth path for the next period. AI technology has the potential to reform the public sector by automating various administration processes. Finally, AI has the potential to improve Hungarian national security.

AI technology has been rapidly growing, and Hungary is no exception to it. AI technology is widely used in Hungary, such as virtual border guards, the Hungarian government's "smart" purchasing of its allocated daily bond sales, and the increase of AI start-ups being founded in Hungary.[11] Despite Hungary's relatively good AI history,

MATION, 2021 <http://www.nber.org/papers/w29220> [accessed 17 March 2024].

10 Antal Kerekes, *How Will AI Impact the Hungarian Labour Market?*, 2022 <https://www.pwc.com/hu/en/publications/assets/How-will-AI-impact-the-Hungarian-labour-market.pdf> [accessed 20 March 2024].

11 Claudio Feijóo and others, 'Harnessing Artificial Intelligence (AI) to Increase Wellbeing for All: The Case for a New Technology Diplomacy', *Telecommu-*

they are yet to "get serious" when it comes to AI technology and understanding the real potential AI has for Hungary. Each area of economics and society that AI could affect presents its own strategy requirement and implementation timeframe, and this is especially the case for Hungary due to the importance and potential AI technology has for Hungary.

On contrary, the concept of artificial intelligence (AI) is still very new and unknown to the Indonesian laws and policies.[12] In addition to that, the situation is worsened by the lack of awareness and understanding of AI among the society. At the same time, the government of Indonesia is working on legal framework enhancement in almost every sector, to catch up with the development of technology and global trade.[13]

The legal framework for AI in Indonesia is currently weak, particularly in terms of personal data protection and profiling.[14] There is a need to establish a comprehensive regulation for AI, potentially adopting the GDPR framework from the EU. The status of AI in Indonesian civil law is also a topic of discussion, with the suggestion that it could be considered a legal subject with partial legal capacity.[15] The implementation of AI in Indonesia has the potential to drive economic growth, but it also raises concerns about social and economic impacts, including inequality.[16] To address these challenges, a strat-

nications Policy, 44.6 (2020), p. 101988, doi:10.1016/j.telpol.2020.101988.

12 Rofi Aulia Rahman and others, 'Constructing Responsible Artificial Intelligence Principles as Norms: Efforts to Strengthen Democratic Norms in Indonesia and European Union', *PADJADJARAN Jurnal Ilmu Hukum (Journal of Law)*, 9.2 (2022), pp. 231–52, doi:10.22304/pjih.v9n2.a5.

13 Nir Kshetri, 'Artificial Intelligence in Developing Countries', *IT Professional*, 22.4 (2020), pp. 63–68, doi:10.1109/MITP.2019.2951851.

14 Denindah Olivia, 'Legal Aspects of Artificial Intelligence on Automated Decision-Making in Indonesia', *Lentera Hukum*, 7.3 (2020), p. 301, doi:10.19184/ejlh.v7i3.18380.

15 FL. Yudhi Priyo Amboro and Khusuf Komarhana, 'Prospek Kecerdasan Buatan Sebagai Subjek Hukum Perdata Di Indonesia [Prospects of Artificial Intelligence as a Subject of Civil Law in Indonesia]', *Law Review*, 2, 2021, 145.

16 Iwan Nugroho and Lukman Hakim, 'Artificial Intelligence and Socioeconomic Perspective in Indonesia', *Journal of Socioeconomics and Development*,

egy for implementing AI in public services has been proposed, focusing on IoT enablement, AI principles and regulations, and administrative reform.[17] However, overall Indonesian regulator still does not have clear guidance to regulate AI.

With applying comparative law approach and drawing the concept of the limit of law[18] and regulatory capture,[19] this paper would like to analysis and result with give suggest several recommendations as an input for Indonesia's legal framework enhancement related to the development and use of AI, based on Hungary's AI strategy success story. This paper conducts study on Hungary as the country is doing great in digital economy sector and steps to apply AI in all facets of life usually starts from this sector. AI strategy success story here is the situation where a country already has a written policy about the future development and use of AI on each sector, resulting certainty and conducive situation and of course, benefits for AI developers, researchers, and the society.

B. Hungary's Artificial Intelligence (AI) Strategy

Artificial intelligence (will refer further as AI) hubs have been established in Hungary since 2018, where the government has collaborated with universities, start-ups, and large corporations to research AI's applications and implications in different policy fields to form The Hungarian AI Coalition *(MI Koalțció)*.[20] The aim of executing a complete AI strategy for the future. Industry executives anticipate

6.2 (2023), p. 112, doi:10.31328/jsed.v6i2.5187.

17 Edo Aryanto, Hijriatul Mabruk, and Wiryawan Narendroputro, 'Artificial Intelligence Implementation Strategy to Make It Happen Smart Government Indonesia Gold 2045', *International Journal of Science and Society*, 5.5 (2023), pp. 172–97, doi:10.54783/ijsoc.v5i5.877.

18 Tibor Tajti, 'The Law-Finance-Technology Nexus in the 21ST Century. Is There a Need to Rethink the Limits of Law?', *Society and Economy*, 37.4 (2015), pp. 461–75, doi:10.1556/204.2015.37.4.3.

19 E. Dal Bo, 'Regulatory Capture: A Review', *Oxford Review of Economic Policy*, 22.2 (2006), pp. 203–25, doi:10.1093/oxrep/grj013.

20 'AI STRATEGIES IN HUNGARY', 2020 <https://cms.law/en/int/expert-guides/cms-expert-guide-to-ai-strategies-in-cee/hungary> [accessed 4 March 2024].

that this effort will position the country as a pioneer in AI innovation. The AI Coalition is engaged in the examination of the societal and economic impacts of AI, alongside the development of a comprehensive national policy. In April 2018, the Hungarian government demonstrated its dedication to AI research by signing the EU Declaration on Artificial Intelligence. This agreement involves 24 member states and aims to enhance the EU's global competitiveness in the field of AI through collaborative efforts in research, implementation, and regulation.

In 2020, Hungary's National AI Strategy introduced, is a detailed plan that outlines the vision and specific activities for the development of Artificial Intelligence (AI) in Hungary from 2020 to 2030.[21] The Ministry of Innovation and Technology, in partnership with the Artificial Intelligence Coalition, has devised a strategy to bolster and improve every stage of the AI value chain. This includes data generation and management, as well as the practical implementation of AI technology. The strategy aims to enhance the fundamental elements of the Hungarian AI ecosystem, such as the data economy, research and development, AI adoption, education and skill development, infrastructure implementation, and regulatory and ethical frameworks. In addition, the plan focuses on industries such as manufacturing, healthcare, agriculture, public administration, transportation, logistics, and energy to achieve rapid growth through innovative programmed with ambitious long-term objectives that directly improve the lives of inhabitants.[22] The plan also highlights the significance of education and the development of human capital in the field of artificial intelligence (AI), as well as the need for regulatory frameworks to ensure responsible deployment of AI. Additionally, it emphasizes the promotion of innovation through experimentation and policy ac-

21 *Hungary's AI Strategy*, 2023 <https://oecd.ai/en/dashboards/policy-initiatives/http:%2F%2Faipo.oecd.org%2F2021-data-policyInitiatives-26765> [accessed 8 March 2024].

22 Bea Winkler and Péter Kiszl, 'Views of Academic Library Directors on Artificial Intelligence: A Representative Survey in Hungary', *New Review of Academic Librarianship*, 28.3 (2022), pp. 256–78, doi:10.1080/13614533.2021.1930076.

tions in many sectors.

The government has been in public consultations to consider how to improve Hungary's positions in the new AI world leaders such machine translation and interpretation technologies for the Hungarian language. Should Hungary succeed at this, it could be an influential player on the future global AI stage and could see wide-ranging implications domestically as the public and private sectors can leverage off the value created by the technology. This has the potential to reduce Hungary's transaction costs with the rest of the world. Stated that Expert System for strategic industry projects possesses the highest added value because the state not only sets future goals and resources, but also wants to implement these projects.[23] High-level automation expected in the implementation phase would also see costs decrease over time. The state also wants to streamline the current legislative production process with a prototype system that could increase legislation quality and decrease time and human resources costs. It has been indicated that the government has an interest in promoting AI through public procurement where it promised to promote new and innovative AI solutions for public procurement to create societal value at a lower cost.

Hungary's AI strategy is designed with a vision for it to be a regional hub for AI business in Central Europe and to impact economic and social development. This strategy is managed by the National AI Strategy and Data Office. This strategy outlines projects, funding, and policy details that relate to AI. They define AI as ranging from using simple digital process automation to more complex machine learning and predictive analytics. This strategy centers around three main goals: first, to increase Hungary's competitiveness in the AI field; second, to improve the economy by raising overall productivity; and the final goal is to enhance the overall quality of the country through improving public administration and quality of life in Hun-

23 Mihály Csótó, Zoltán Rupp, and Sára Petényi, 'In the Wake of Algorithmic Decision Making: Mapping AI-Related Advancements in the Hungarian Public Sector', *Central and Eastern European EDem and EGov Days*, 341 (2022), pp. 273–84, doi:10.24989/ocg.v341.20.

gary. This strategy is expected to have a large impact on the Hungarian economy with predictions of AI-related industries reaching 230-260 billion in revenue that will impact roughly 11-14% of Hungarian GNP in 2030.[24]

1. Objectives of Hungary's AI Strategy

The strategy identifies various policy objectives to be pursued. The first, most stated policy objective is to grow AI research and development in Hungary. This involves building human capacity and knowledge, increasing funding for AI research and development, with a focus on creating AI with national security implications. The stated objectives to achieve this are to increase the number of AI and related scientific publications from Hungarian organizations to the EU median, increase the number of researchers working on AI in Hungary to the EU median, notably 500 researchers per million inhabitants, and to increase the number of AI PhD students and teaching faculty. These objectives have clearly articulated success and failure conditions, making them suitable for evaluating future policy success.

The emphasis on AI with national security implications is a sharp contrast with a recent policy directive to banish and eliminate any AI project related to immigration issue obviously supervised by EUB order from Hungarian scientific community forthcoming. This initiative might signal possible human rights issues in Hungary since one of the eight AI flagship initiatives is set in health sciences to improve European healthcare. Though it's doubtful how much the Hungarian government might allocate sources for an area that is not directly related to military R&D.

The strategy aims to develop a European regulatory framework that will allow more AI development with security implications. This will be done by exerting increasing influence in various EU institutions from Hungarian appointed employees. Under the foreign and security policy framework, Hungary has an ambition to create AI

24 'Hungary's AI Strategy Unveiled', *About Hungary*, September 2020 <https://abouthungary.hu/news-in-brief/hungarys-ai-strategy-unveiled> [accessed 10 March 2024].

Table 1. Hungary's AI strategy objective[25]

Issues	Objective
AI value chain from data generation and management	The objective is to enhance and promote all key aspects of the AI value chain, including data collection and management, fundamental and applied research, technology utilization, and creating awareness about the potential of practical AI applications.
The foundation pillars of the Hungarian AI ecosystem	To continue to enhance the fundamental elements of the Hungarian AI ecosystem, it is necessary to focus on the following areas: data economy, research development and innovation (R&D&I), AI adoption, education and skill development, infrastructure implementation, and regulatory and ethical framework.
Policy actions	The objective is to identify the sectors and technology domains in Hungary that have the most potential for rapid growth, including manufacturing, healthcare, agriculture, public administration, transportation, logistics, and energy. Policy actions will be developed specifically for these areas.
Direct benefits to citizens	The objective is to introduce innovative initiatives that have ambitious objectives and provide immediate advantages to the public. These include autonomous systems and self-driving vehicles, promoting health awareness in a digital era, implementing climate-driven agriculture, developing data-wallet and personalized services, utilizing AI to enhance personal skills, automating administrative procedures in Hungarian, and establishing energy networks that priorities renewable sources of energy.

Source: OECD.AI observatory

capabilities for common security and defense policy and develop EU strategic autonomy.[26] Given the recent events after COVID-19 national sovereignty discourse and resurface of threat perception from NATO alliance aimed at Russia A2/AD capabilities, Hungary intends to be a player with some leverage in EU security domain dialogue. However, the EU regulatory framework just like the international global order may be shifting and signaling a possible AI Sputnik mo-

25 Hungary's AI Strategy. https://oecd.ai/en/dashboards/policy-initiatives/http:%2F%2Faipo.oecd.org%2F2021-data-policyInitiatives-26765 accessed on 5 March 2024

26 'Future of AI Development for Hungary and the World', *Strategic Direction*, 38.6 (2022), pp. 4–6, doi:10.1108/SD-05-2022-0041.

ment and accelerated technological competition with China and the US from strategic industries AI being one of them.

The capability loss and or technological dependence during a future AI arms race will be hard to evaluate and has a highly uncertain future and implications. These may not be taken into consideration in policy evaluation but should be known when looking at probable future interest shifts in AI development. Overall, Hungary's AI national security aim may see fewer problem areas but also less funds and emphasis within the EU and overly ambitious planning for future security and defense policy development.

2. Key Elements of Hungary's AI Strategy

Hungary's AI Strategy is a progressive plan that outlines the direction for the development of artificial intelligence (AI) in the country from 2020 to 2030. Essentially, this strategy involves a comprehensive approach to strengthen Hungary's AI ecosystem in multiple aspects.[27] The key elements of the strategy are around strengthening the data economy, promoting research and development, encouraging the adoption of artificial intelligence, improving education and skills development, implementing infrastructure, and developing strong regulatory and ethical frameworks. Hungary's AI Strategy focuses on specific sectors including manufacturing, healthcare, agriculture, public administration, transportation, logistics, and energy. The strategy aims to achieve ambitious sector-specific development goals that promote innovation and progress. Ultimately, the strategy aims to benefit citizens through transformative programmed that utilize AI technologies to advance society.

The AI Strategy of Hungary places significant importance on education and the development of human capital.[28] This strategic

27 Ágnes Horváth and Lilla Vicsek, 'Visions of Hungarian Artificial Intelligence Specialists About the Future of Work and Their Roles', *Science, Technology and Society*, 28.4 (2023), pp. 603–20, doi:10.1177/09717218231186105.

28 H. O. Androshchuk, 'Policies and Strategies for the Development of Artificial Intelligence in the Countries of the World: Quo Vadis? (Part 2)', *Science, Technologies, Innovation*, 2(26), 2023, pp. 40–47, doi:10.35668/2520-6524-2023-2-05.

Table 2. Key Elements of Hungary's AI Strategy[29]

Key Element	Explanation
Foundation Pillars	The strategy intends to provide the necessary internal and external circumstances for the growth of artificial intelligence (AI) in Hungary. It does so by implementing foundation pillars that enable society to successfully manage changes and fully capitalize on the advantages offered by AI technology. The pillars are designed to provide support for the AI value chain, encompassing the data economy, research and development, AI adoption, education and skill development, infrastructure implementation, and regulatory and ethical frameworks.
Sector-Specific Development Goals	The plan delineates sectors such as manufacturing, healthcare, agriculture, public administration, transportation, logistics, and energy for the purpose of achieving defined development objectives to expedite progress and foster innovation in these domains. Programmed that aim to bring about significant changes and have ambitious aims are specifically designed to provide immediate advantages to individuals in these specific areas.
Education and Competence Development	The plan places significant emphasis on education and the cultivation of human capital in the field of artificial intelligence. Initiatives encompass the establishment of an AI Innovation Centre to cultivate innovation, devise occupation-specific training methodologies, and bolster the education system to equip the workforce with AI-related proficiencies and aptitudes.
Regulatory and Ethical Framework	Hungary›s AI Strategy prioritizes the establishment of a strong regulatory framework for data assets, promoting the utilization of public data for AI purposes, and formulating financial and legal policies to foster AI innovation. The plan emphasizes the necessity of industry-specific regulations, ethical guidelines, and a complete regulatory framework for artificial intelligence (AI) to guarantee responsible and ethical implementation of AI.
Innovation and Experimentation	The plan promotes innovation by implementing experimental approaches and policy measures across multiple areas. The objective is to cultivate a culture of experimenting by aiding firms to minimize the expenses and uncertainties associated with experimentation. This, in turn, encourages the advancement and acceptance of AI technologies in Hungary.

Source: European Commission Report

approach focuses on providing the workforce with the necessary

29 *Hungary AI Strategy Report*, 2021 <https://ai-watch.ec.europa.eu/countries/hungary/hungary-ai-strategy-report_en> [accessed 15 March 2024].

skills and abilities linked to AI. Hungary seeks to develop a proficient workforce capable of effectively utilizing AI technology and promoting innovation in many industries through the implementation of initiatives such as the creation of an AI Innovation Centre and customized training programmed. Furthermore, Hungary's emphasis on legal and ethical frameworks highlights its dedication to guaranteeing responsible deployment of AI, safeguarding data, and adhering to ethical standards.[30] Hungary's AI Strategy aims to create an environment that promotes creativity, experimentation, and collaboration. This strategy places the country as a vibrant center for AI development, ready to utilize the transformative capabilities of AI technologies to benefit society and drive economic progress.

C. Legal initiative of the of Hungary's AI Strategy

Hungary's legal initiatives in the field of AI are multifaceted, with a focus on information security and data protection. The country has made significant strides in this area, with the government showing a growing interest in cybersecurity.[31] The use of AI in public administration is also a key area of development, with a need for clear legal and ethical guidelines.[32] However, the application of the General Data Protection Regulation (GDPR) to AI systems presents a challenge, with varying interpretations by Hungarian experts.[33] The establishment of autonomous administrative courts, which could play a role in overseeing AI-related legal matters, has been a topic of discussion[34].

30 Vértesy Dániel, 'A Mesterséges Intelligencia Fejlesztéséért Folyó Globáz lis Verseny És Magyarország = The Global Race for AI Development and Hungary', *Köz-Gazdaság*, 15.1 (2020), pp. 197–202, doi:10.14267/RETP2020.01.18.

31 Tamás Szádeczky, 'Information Security Law and Strategy in Hungary', *Academic and Applied Research in Military and Public Management Science*, 14.4 (2015), pp. 281–89, doi:10.32565/aarms.2015.4.2.

32 Csótó, Rupp, and Petényi.

33 Gizem Gültekin Várkonyi, 'Case Study on the Interaction Between the General Data Protection Regulation and Artificial Intelligence Technologies', *Pro Futuro*, 10.4 (2021), doi:10.26521/profuturo/2020/4/9570.

34 Anita Boros and Imre Robotka, 'A 21. Századi Önálló Magyar Közigazgatási

The legal initiative of Hungary's AI Strategy is substantial, as the strategy seeks to influence Hungarian legislation to address future economic challenges and govern the advancement and implementation of AI technology within the nation. An essential factor is the implementation of a regulatory and ethical structure, encompassing the building of a comprehensive regulatory atmosphere for data assets to facilitate the utilization of public data in AI applications, as well as the formulation of pertinent financial and legal rules.[35] In addition, the approach suggests creating an Artificial Intelligence Regulation and Ethics Knowledge Centre to handle legal matters concerning the implementation of AI. In addition, the plan underscores the significance of tailoring EU ethical norms to suit the specific circumstances in Hungary. It emphasizes the necessity of regulatory involvement to effectively address the potential concerns that arise from the swift progress of AI technology. Implementing these legal measures is essential to guarantee adherence to forthcoming AI rules, foster openness, thwart the malevolent exploitation of AI, and tackle concerns pertaining to accountability, intellectual property rights, and the confidentiality and data protection.

Hungary's AI Strategy 2020-2023 (Strategy) is poised to significantly influence Hungarian legislation by addressing future economic concerns and shaping the regulatory landscape to accommodate the development and utilization of artificial intelligence (AI) technologies within the country.[36] The Strategy, as outlined in the sources, emphasizes the need for overarching legislation that can effectively govern the evolving AI landscape in Hungary. By advocating for the development of a regulatory and ethical framework, the Strategy

Bṭróság Felállṭásának Kihṭvásai', *Pro Publico Bono - Magyar Közigazgatás*, 7.4 (2019), pp. 22–45, doi:10.32575/ppb.2019.4.2.

35 M. Duraipandian, 'Review on Artificial Intelligence and Its Implementations in Digital Era', *Journal of Information Technology and Digital World*, 4.2 (2022), pp. 84–94, doi:10.36548/jitdw.2022.2.003.

36 Aron Matyas Somogyi and Eszter Dorottya Rupnik, 'Hungary: AI Language Models and the EU AI Act – The Urgent Need for Overarching Legislation', *CEE Legal Matters Magazine.*, 2023 <https://ceelegalmatters.com/hungary/24525-hungary-ai-language-models-and-the-eu-ai-act-the-urgent-need-for-overarching-legislation> [accessed 17 March 2024].

aims to establish a conducive environment for AI-related activities, including the utilization of public data assets and the implementation of relevant financial and legal regulations. Additionally, the Strategy proposes the creation of an Artificial Intelligence Regulation and Ethics Knowledge Centre to address legal issues related to AI deployment, ensuring compliance with ethical standards and regulatory requirements. Through these measures, the Strategy seeks to shape Hungarian legislation to support responsible AI development, protect data privacy, and foster innovation in alignment with the evolving AI landscape both domestically and within the broader European context.

Moreover, the Strategy emphasizes sector-specific development goals in critical areas like manufacturing, healthcare, agriculture, public administration, transportation, logistics, and energy. This sector-specific approach is expected to drive the formulation of tailored legislation that fosters AI advancements within these key sectors, promoting innovation and competitiveness. The Strategy also envisions transformative programs with ambitious long-term goals that directly benefit citizens, such as climate-driven agriculture, renewable energy grids, fully autonomous systems, AI-supported personal competence development, and automated administration processes.

In the realm of education and competence development, the Strategy underscores the importance of retraining the workforce to meet the demands of the AI-driven economy. By aiming to educate a significant portion of the population in AI-related subjects and enhancing digital literacy through initiatives like the Csopa science center in Budapest, Hungary seeks to equip its workforce with the necessary skills to thrive in an AI-centric environment. The Strategy also highlights the establishment of a National Lab for basic research in AI, further enhancing AI development through collaborative efforts and research initiatives.

Furthermore, the Strategy addresses the need for a regulatory framework that adapts EU ethical guidelines to the Hungarian context, ensuring alignment with international standards. By fostering networking and visibility of AI efforts through initiatives like the AI

portal, Hungary aims to enhance collaboration and awareness within the AI community. The Strategy also emphasizes the importance of data infrastructure, proposing the establishment of a National Data Asset Agency to facilitate responsible and efficient data utilization in the public sector, complemented by initiatives like public data portals and data market platforms.

Hungary's AI Strategy for the period of 2020-2023 outlines a thorough plan designed to utilize the capabilities of Artificial Intelligence (AI) while simultaneously tackling the related problems and hazards. This strategic roadmap is positioned to have a significant impact on Hungarian legislation, moulding laws, and regulations to adapt to the changing landscape of AI technology. Several key aspects of the strategy are likely to inform legislative initiatives:

1. Regulatory Framework Development

The Hungarian AI strategy aims at increasing the competitiveness of Hungary. It seeks to redefine the role of the state in economic development and support smart automation and digitalization by fostering research, development, and innovation in the areas of artificial intelligence and machine learning. To create and improve conditions for R&D&I in the private sector, the government aims to double the country's R&D expenditure to 1.8% of the GDP. Measures include supporting and encouraging R&D activities in the private sector and enhancing public-private partnership. During the AI strategy's implementation, it is important to ensure that the regulatory burden on R&D activities is monitored and evaluated. This should help understand how and why certain R&D activities succeed or fail and how regulation may have an impact on this. By doing so, more effective regulation can be put in place that stimulates R&D and innovation without jeopardizing other social, economic, or environmental objectives. This is intended to be supported and measured by the application of Regulatory Impact Assessments (RIA), which can, in practice, mean negotiation with the European Union since Hungary must comply with EU law by incorporating EU directives in national

laws. RIA is a systematic process to assess the impact of regulation, from the early stages of the design and new regulations to existing ones. It has been used in the OECD countries and in the EU and is seen as an important state process to test the quality of regulation and ensure its benefits outweigh the costs. There are two main legal initiation to develop regulatory framework.

a. The AI Strategy highlights the necessity of a strong regulatory framework to oversee the development, deployment, and utilization of AI. The legislative agenda is expected to priorities the implementation of rules and regulations that offer clear guidelines and direction regarding AI-related activities, such as data governance, privacy protection, and ethical concerns.
b. Hungary may introduce legislation to establish standards and certification processes for AI systems, ensuring transparency, accountability, and safety in their operation. These legal measures will be instrumental in fostering trust among users and stakeholders while mitigating potential risks associated with AI technologies.

2. Promotion of AI Research and Innovation

The AI research and development ecosystem is an important component in advancing the frontier of AI while also enhancing its scientific, technological, and economical impact. The objective of the Hungarian AI Strategy is to elevate the country into the European regional elite in AI research and development by utilising the existing competencies and potential in the public and private sector and by tapping into new EU and national R&D funds. This will be done by creating a new strategic model and governance structure through a National Laboratory for AI which will serve as a framework for the coordination and resource allocation for various AI university and industry R&D initiatives. An important factor for leveraging public sector AI adoption is to increase the absorptive capacity for AI first solutions, therefore the carry out AI research on the needs and efficiency of AI applications in public administration is a necessary step

towards more intelligent public services. The strategy identifies multiple high AI impact industries such as healthcare, manufacturing, mobility and agriculture with the potential for collaborative R&D and through applying for EU Recovery and Resilience funding, aims to initiate AI flagship projects in these sectors which would serve as best practices and reference points to further encourage AI adoption. Job growth in the AI sector is highly dependent on the supply and demand of research and industry, the strategy aims to sustain and incite new researcher and industry talent by introducing and integrating AI into various public and private R&D intensive projects and the funding of AI Diplomas on ED level and international preparatory vocational school level for AI technology expert job profiles. There are two legal initiation activity to foster this.

a. The AI Strategy prioritizes investment in AI research, innovation, and talent development. Legislative initiatives may include funding allocations, tax incentives, and grants to incentivize AI research and development activities.
b. Hungary's legislative agenda may also involve the creation of innovation hubs, research clusters, or special economic zones dedicated to AI and emerging technologies. Legislative support in these areas can foster collaboration between academia, industry, and government, driving technological advancement and economic growth.

3. Data Governance and Privacy Protection

By introducing policies specifically catered to AI, the Hungarian government is demonstrating a proactive stance towards its technology. It is recognized that the advancement of artificial intelligence can pose a potential threat to privacy and personal data should it be applied irresponsibly. In consideration, the Hungarian government aims to advance its policies on data privacy. Task 3.4 highlights the nation's efforts to "ensure the personal and data privacy regarding AI usage". This is addressed through two objectives: firstly, to "establish state control over personal and non-personal data". It is stated that a single

body will be entrusted with the management of said data across all sectors, while defining rules for data usage and forbidding its misuse. The second objective is "creating transparency and expected level of data protection". This approach is more aggressive as firms using AI will be forced to report on whether their data protection meets the expected level, and if not, they are obliged to cease using AI on such data. In the case where the activity of AI is not beneficial to the level of data protection, the state will provide corrective action or compensation. This will effectively deter the processing of personal data with AI unless it is for the betterment of a clearly defined higher standard in data protection. Although AI development may find such constraints inhibitive, these measures serve to protect the public and act in the interest of societal benefit. There are 2 legal initiations to address these issues through Hungary's AI strategy.

a. Given the importance of data in AI applications, Hungary's legislation is likely to focus on data governance and privacy protection measures. This may involve amendments to existing data protection laws to align with evolving AI technologies and data processing practices.
b. Legislative efforts may also address issues such as data access, sharing, and interoperability, ensuring that AI systems have access to high-quality and diverse datasets while safeguarding individual privacy rights.

4. Ethical Guidelines and Standards

AI technology cannot develop in a social, economic, legal, and ethical vacuum. AI systems should be used to enhance and empower human beings, and consideration should be given to the impact of AI technologies on individuals and society, both in terms of implementation and outcomes.[37] The AI in Society Subgroup envisions a future in which AI technologies have a positive and empowering impact on individuals and communities and will seek over the next 3-5

37 Luciano Floridi, 'The European Legislation on AI: A Brief Analysis of Its Philosophical Approach', *Philosophy & Technology*, 34.2 (2021), pp. 215–22, doi:10.1007/s13347-021-00460-9.

years to take concrete steps to implement its vision. This will involve a wide range of stakeholders, including policy and lawmakers, industry, civil society, and individual citizens. The Subgroup will develop policy and guidance that can maximize the societal benefits of AI and mitigate or avoid any behaviors or outcomes that are detrimental to the well-being of individuals and communities. This involves ongoing work to identify and evaluate specific opportunities where AI technologies can have a positive impact, as well as undesirable consequences of existing systems or new proposals. The Subgroup will also seek interdisciplinary research into the root causes and mechanisms of negative outcomes with the aim of developing methods and technologies that can predict and mitigate undesired results. Another vital aspect of this work will be to inform and empower a wide range of individuals and organizations to advocate for their own best interests, as well as the interests of others who may be impacted by AI technologies. This advocacy work may involve development of tools and technologies that can increase access to information or enable individuals and communities to assess the likely impact of a given AI system. there are two guidelines for the legal initiation.

a. Hungary's AI Strategy emphasizes the importance of ethical considerations in AI development and deployment. Legislative initiatives may involve the establishment of ethical guidelines, principles, or codes of conduct for AI practitioners and organizations.
b. Hungary may enact laws to promote ethical AI design, implementation, and use, incorporating principles such as fairness, transparency, accountability, and human dignity. Compliance with ethical standards may become a legal requirement for AI developers and users, shaping the regulatory landscape.

5. Education and Competence Development Legislation

The purpose of the first step is to ensure that there will be a recurring supply of AI professionals for the private and public sectors. To do this, Hungary aims to increase the capacity of AI and IT profes-

sionals from its current level to a predicted minimum level of 5000 IT professionals and 1000 AI professionals. This initiative will broaden the scope of automation and IT to encompass a larger number of sectors and fields and will cater to the increased demand for AI professionals in all areas of industry and academia. This initiative also envisions a greater level of cross-discipline integration where IT and AI professionals are working with professionals from other fields to bring automation, IT, and AI assistance to those fields. Measures to evaluate the success of this initiative can include the level of AI automation and assistance in various sectors, the number of IT and AI professionals, and the demand for AI professionals in various sectors. Measures include an increase in the level of foreign direct investment (FDI), which is one indicator of success.

D. Potential Adaptation of Hungary's AI Strategy in Indonesia

The Hungary's AI strategy mentions the importance of investing in education to overcome the digital skill gap and to ensure widespread understanding of AI technology.[38] The strategy also mentions the need for creating a proper regulatory environment which will encourage innovation and experimentation of AI technology. The strategy then promotes the usage of AI technology in increasing the efficiency of the public administration system and creating an AI-based innovative economic and business environment. The strategy's long-term aim is to create a national cognition that will contribute to AI technology development at the European level.[39] If Indonesia also shares the same strategic aim to create a world-class research and innovative ecosystem which will contribute to technology development at the Asian level, we believe that AI strategies used by Hun-

38 'Hungary's Artificial Intelligence Strategy', 2020 <https://digitalisjoletprogram.hu/hu/kiadvanyaink/download/Hungary's%20Artificial%20Intelligence%20Strategy.pdf/en> [accessed 29 March 2024].

39 Yuchen Jia, 'Application and Development of Artificial Intelligence Based on Computer Science', *Applied and Computational Engineering*, 6.1 (2023), pp. 745–49, doi:10.54254/2755-2721/6/20230947.

gary can be a useful reference for Indonesia.

Despite the number of differences in their current social and economic conditions, Hungary's strategy presents a useful reference for Indonesia. Indonesia could gain much insight from the generally applicable strategic considerations in the Hungarian AI Strategy document. Furthermore, since Hungary's social and economic conditions a decade ago shows some similarities with Indonesia today[40], Indonesia can learn several 'dos' and 'don'ts' from Hungary's experience in implementing these strategic considerations. In this section, we aim to identify strategic considerations in Hungary's AI strategy which could be generally applicable for both countries, and then to identify several useful lessons from Hungary's experience.

More challenging to address than the issues likened to a period of transformative and tumultuous change in the larger world order, Indonesian scholars of international relations and policy practitioners have had difficulty deciding what kind of role Indonesia should play in the world. Described both the policy elite and the bureaucracy as having a 'sense of ambivalence' in defining Indonesia's role in global affairs which at times has led to a less than coherent foreign policy. This is a challenge for the implementation of an AI strategy because it requires strong government leadership to coordinate action between ministries and to fund strategic AI projects. Failure to do so will result in Indonesia being a passive rule taker in global AI governance with policy and standards that do not reflect its own interests or capabilities. Good coordination and leadership in AI implementation in turn requires a clear and unified vision of what kind of role Indonesia want to play in the AI and data driven world and how it sees itself contributing to global AI governance. An Indonesia which is unsure of itself or lacks confidence in how it fits into the global AI order, will struggle to mobilize the resources necessary to be a rule maker and shaper of the global AI governance system.

Adapting Hungary's AI Strategy for implementation in Indone-

40 Beny Saputra, 'Strengthening ADR System in Indonesia: Learning from ADR Practices in Hungary', *Indonesian Comparative Law Review*, 6.2 (2024), doi:10.18196/iclr.v6i2.21984.

sia requires a clear approach that considers Indonesia's unique socio-economic context, regulatory environment, and technological landscape. While direct replication may not be feasible, Indonesia can draw inspiration from Hungary's experiences and tailor key elements of the strategy to suit its own needs. Here are potential adaptations of Hungary's AI Strategy for Indonesia:

1. Customized Regulatory Framework

Indonesia's adaptation of Hungary's AI Strategy involves customizing its regulatory framework to suit its unique socio-economic context and technological landscape. Drawing inspiration from Hungary's approach, Indonesia should develop laws and regulations that provide clear guidance, foster accountability, and accommodate rapid technological advancements in AI development and deployment. This tailored regulatory framework should prioritize ethical principles, data privacy standards, and human rights considerations, ensuring responsible AI adoption while promoting innovation and competitiveness in Indonesia's digital economy.

Hungary's AI strategy prioritizes the creation of a strong regulatory framework and governance structure to supervise the development and use of AI. This method guarantees that AI technologies are created with ethical considerations and employed in a responsible manner. Indonesia can derive advantages from implementing a comparable structure by formulating all-encompassing AI legislation that tackle ethical issues, data protection, and security. Indonesia can cultivate a reliable AI environment that promotes creativity and protects public welfare by implementing explicit regulations and establishing oversight organizations to supervise AI operations.

2. Investment in AI Research and Innovation

Furthermore, Indonesia should prioritize investment in AI research, innovation, and talent development to drive technological advancement and economic growth. Building on Hungary's initiatives, Indonesia can establish funding mechanisms, tax incentives, and grants

to incentivize AI research and entrepreneurship. Collaborative partnerships between academia, industry, and government can facilitate knowledge exchange, skill development, and technology transfer, fostering a vibrant AI ecosystem in Indonesia.

Education and talent development are fundamental elements of Hungary's AI strategy. Hungary is making significant investments in AI education across all educational levels, ranging from primary schools to universities. The objective is to develop a highly competent workforce that can effectively contribute to the advancement of AI innovation. Indonesia can include artificial intelligence (AI) and related technologies into its school curriculum, following Hungary's model. By establishing AI research institutes, implementing specialized training programs, and awarding scholarships for AI studies, Indonesia can cultivate a reservoir of skilled workers who can actively contribute to the expansion of the AI sector.

3. Enhanced Data Governance and Privacy Protection

Enhancing Indonesia's data governance and privacy protection measures is crucial for promoting responsible AI implementation and fostering confidence among users and stakeholders. Indonesia should learn from Hungary's initiatives and implement comprehensive legislation to protect individual privacy rights, encourage data transparency, and assure ethical data usage. Hungary's AI plan incorporates rigorous data protection legislation that conforms to global norms, including the General Data Protection Regulation (GDPR). Indonesia should strengthen its legal framework to safeguard personal data and prevent its unauthorized use by implementing comparable standards.

Well-defined protocols regarding the gathering, retention, dissemination, and utilization of data are essential for promoting progress and competitiveness in businesses propelled by artificial intelligence, while simultaneously addressing public apprehensions regarding the confidentiality and protection of data. Indonesia ought to develop procedures for acquiring user consent, anonymizing data

to safeguard identities, and implementing strong security measures to avert data breaches. In addition, establishing a centralized data protection authority can guarantee adherence to legislation and offer a means of redress for individuals whose data rights are infringed upon.

An essential component of successful data governance is the use of transparent data practices. It is imperative for Indonesia to enforce a requirement for firms to divulge their data management procedures, encompassing the methods of data collection, processing, and sharing. By providing transparency, consumers will be able to make well-informed decisions regarding their data and develop confidence in AI systems. In addition, the promotion of open data projects can enable controlled data exchange among stakeholders, fostering innovation while upholding privacy norms.

Indonesia's data governance structure must include ethical issues as an essential component. This involves creating ethical principles for the development of AI that give priority to fairness, accountability, and non-discrimination. By incorporating ethical concepts into data governance, Indonesia can guarantee that AI technologies are created and implemented in manners that are advantageous to society. By emulating Hungary's proactive approach, Indonesia has the potential to establish a harmonious ecosystem that fosters both data protection and AI innovation. This, in turn, can result in sustainable economic growth and bolstered public confidence in AI applications.

4. Ethical AI Principles and Guidelines

It is crucial to prioritize the advancement and acceptance of ethical AI principles and norms to guarantee that AI technologies effectively serve the public interest and effectively tackle societal concerns in Indonesia. Indonesia can adopt ethical norms, like Hungary's initiatives, that stress fairness, openness, accountability, and human dignity. These concepts can be included into AI rules and regulations, providing guidance for the ethical advancement and implementation

of AI systems. Ensuring fairness entails developing AI models that are impartial and just, refraining from any form of prejudice based on race, gender, or socioeconomic class. Transparency requires that AI processes and choices are comprehensible and accessible for examination, promoting confidence among users.

Integrating ethical issues into the design, implementation, and utilization of AI will be essential in reducing bias and discrimination. Indonesia might learn from Hungary's approach by requiring thorough audits and evaluations of AI systems to detect and correct biases. This can entail the utilization of varied training data, involving multidisciplinary teams in the development of AI, and consistently monitoring AI systems for unintended biases. Implementing systems for accountability, such as comprehensive record-keeping and the ability to track AI actions, guarantees that developers and operators are held accountable for the results of their AI applications. Legal and regulatory actions can strengthen this accountability structure by imposing sanctions for unethical AI practices.

To effectively address societal problems and establish public trust in AI technology, it is necessary to actively involve several stakeholders, such as the state, commercial sector, academia, and civil society. Indonesia could organize public consultations and establish platforms for debate around AI ethics in order to include a wide range of opinions in the process of formulating policies. Education initiatives and available materials have the capacity to enhance public understanding of ethical artificial intelligence (AI) practices and the potential societal consequences of AI. Indonesia can guarantee that AI technologies have a beneficial impact on social well-being, economic development, and human rights by promoting an ethical AI culture. By emulating Hungary's proactive approach, Indonesia may establish a strong ethical framework that promotes the responsible and fair advancement of artificial intelligence within the country.

5. Capacity Building and Awareness-Raising Initiatives

It is crucial to invest in projects that create capacity and raise aware-

ness to improve AI literacy, promote responsible adoption of AI, and empower stakeholders in Indonesia. Indonesia might emulate Hungary's approach and establish all-encompassing training initiatives targeting various groups, such as students, professionals, and government officials. These curricula encompass essential AI principles, ethical deliberations, and practical implementations, guaranteeing a comprehensive comprehension of AI's capabilities and hazards. Incorporating AI education into school curriculums and higher education institutions can foster a new cohort of AI-savvy individuals who are well equipped to make valuable contributions to the AI ecosystem.

Education efforts should go beyond traditional schooling and encompass public awareness campaigns that clarify the nature of AI technologies and their consequences. These campaigns can employ diverse media platforms to effectively reach a broad audience, elucidating the influence of AI on everyday life and emphasizing the significance of ethical AI principles. Indonesia can cultivate a better-informed and actively involved population capable of engaging in conversations on AI policy and governance by increasing public awareness. Public participation is essential for establishing trust in AI technologies and guaranteeing that their advancement is in line with societal values and requirements.

Interdisciplinary collaboration, information exchange platforms, and stakeholder engagement forums play a crucial role in promoting well-informed decision-making, policy creation, and consensus-building on AI governance challenges in Indonesia. Facilitating interdisciplinary collaboration among specialists in technology, ethics, law, and social sciences will improve the quality and applicability of AI legislation. Knowledge exchange venues, such as conferences, workshops, and online forums, facilitate ongoing learning and adjustment to the fast-changing AI environment. Involving a wide array of stakeholders in these conversations, ranging from prominent figures in the industry to groups representing civil society, guarantees that AI governance is comprehensive and incorporates the viewpoints and requirements of all sectors of society. Indonesia can fully

utilize AI technology in a responsible and fair way by developing a solid understanding of AI and promoting a cooperative approach to governing AI.

Indonesia is currently at a critical point in its efforts to establish AI governance and foster innovation.[41] By incorporating essential components from Hungary's AI Strategy, Indonesia can effectively navigate towards the responsible and influential deployment of AI. By implementing a tailored set of regulations that carefully weigh innovation against ethical concerns, and by making strategic investments in AI research, talent cultivation, and data management, Indonesia has the potential to create a thriving environment that empowers all parties involved while also protecting the interests of society. Indonesia should leverage the revolutionary power of AI to tackle urgent challenges, promote sustainable development, and create a future where technology benefits society by giving priority to ethical principles, fostering transparency, and enhancing AI literacy. By engaging in cooperative endeavors and making well-informed choices, Indonesia can effectively manage the intricacies of AI governance, ensuring a more comprehensive, resilient, and successful digital future.

E. Conclusion

In conclusion, Hungary's AI Strategy serves as a valuable blueprint from which Indonesia can draw essential lessons for enhancing its own Artificial Intelligence (AI) legal framework. By examining Hungary's sector-specific development goals, emphasis on education and workforce development, and establishment of a robust regulatory framework, Indonesia can glean insights to shape its AI initiatives effectively. The strategic focus on tailoring AI strategies to specific sectors, promoting education in AI-related subjects, and ensuring compliance with ethical standards and data protection principles offers Indonesia a roadmap to foster innovation, competitiveness, and

41 Wa Ode Zuliarti, Haris Yusuf, and Asri Sarif, 'Artificial Intelligence: History and Its Legal Framework in Indonesia', *Scholars International Journal of Law, Crime and Justice*, 5.6 (2022), pp. 191–96, doi:10.36348/sijlcj.2022.v05i06.002.

responsible AI deployment.

Moreover, Indonesia can benefit from Hungary's proactive approach to raising public awareness and engagement in AI technologies. By implementing initiatives that enhance digital literacy, promote AI-related competencies, and engage citizens in the AI ecosystem, Indonesia can prepare its population for the opportunities and challenges presented by AI advancements. This emphasis on human capital development and awareness-building underscores the importance of equipping Indonesia's workforce and society with the necessary skills and knowledge to thrive in an AI-driven economy.

In essence, by adapting Hungary's AI Strategy to suit Indonesia's unique context and priorities, the country can position itself at the forefront of AI innovation and governance. By incorporating the lessons learned from Hungary's approach, Indonesia can enhance its AI legal framework, foster a culture of innovation, and leverage AI technologies to drive economic growth, societal development, and sustainable progress in the digital age.

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