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Legal Transformation of Artificial Intelligence Technology to Strike a Balance Between Law and Technology

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ABSTRACT

Background: Artificial Intelligence (AI) is transforming various sectors globally, including business and healthcare. In Indonesia, this transformation is supported by initiatives like the Palapa Ring project and 5G infrastructure. However, the rapid growth of AI poses legal and ethical challenges. Current regulations, such as the Personal Data Protection Act, are insufficient to address the complexities of AI technology, creating a gap between legal frameworks and technological advancements.

Objective: This study aims to identify the gaps in Indonesia's AI-related legal frameworks and propose strategies for balancing the development of law and technology to ensure ethical and accountable AI integration.

Methodology: Using a normative legal research approach, the study examines existing AI-related legal frameworks, compares international regulations, and analyzes their implications for Indonesia.

Findings: The study reveals that while online motorcycle taxis contribute significantly to the transportation sector, current legislation does not fully recognize them as legitimate public transport providers. This gap affects passenger protection and the certainty of service standards.

Conclusion: To ensure safety, reliability, and legal clarity, it is imperative to establish a comprehensive legal framework that formally categorizes online motorcycle taxis as recognized public transportation.

KEYWORDS

Indonesia, Legal Certainty, Online Motorcycle Taxis, Public Transportation, Transportation Policy.

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INTRODUCTION

Artificial Intelligence (AI) is driving innovation in sectors such as healthcare, education, transportation, and security (Vaishya dkk., 2020). With a population of 280 million and 221 million internet users by 2024, Indonesia has huge potential to harness AI for efficiency and productivity (Tussyadiah, 2020). However, challenges such as bias, ethics, privacy and work disruption need to be addressed. Public concerns are identified in the Ipsos 2024 survey, and the World Economic Forum highlights risks such as misinformation and cybersecurity threats (Tjoa & Guan, 2021) . Despite these issues, AI presents significant economic opportunities: in 2020,

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To realize this, the country needs a strong digital infrastructure, security, and skilled talent (Lee & Yoon, 2021). The government has launched the National AI Strategy 2020-2045, the Digital Indonesia Roadmap 2021-2024, and Presidential Regulation No. 82/2023 to support digital transformation (Jamshidi dkk., 2020). However, AI regulation in Indonesia is still lacking, posing risks to data privacy, cybersecurity, and the workforce. Without clear regulations, innovation could be stifled (Ma dkk., 2020). While developed countries such as the US, EU, Japan, and China have comprehensive AI regulations, Indonesia needs clearer laws to ensure AI is used ethically and responsibly to support the goals of Vision 2045.

RESEARCH METHODOLOGY

This research takes a legal, comparative and conceptual approach. It analyses AI regulations in Indonesia, compares them with those in the EU, the US and China, and explores legal concepts such as justice and ethics (Ma dkk., 2020). The normative legal study uses secondary sources, including literature and international documents such as UN General Assembly Resolution 2024. Through the literature review, data is collected and deductively analysed to propose an AI legal framework to support Indonesia's digital transformation towards Golden Indonesia 2045.

RESULT AND DISCUSSION

Artificial Intelligence Technology

Artificial Intelligence (AI) refers to machine-based systems that generate outputs, such as predictions and decisions, from received inputs. The autonomy and adaptability of AI varies once implemented (Zhang & Zhang, 2022). The concept of the Turing machine, introduced by Alan Turing in 1936, laid the foundation for general-purpose computing by manipulating symbols according to simple rules. This model could solve any computational problem and influenced early computers such as ENIAC and EDSAC in the 1940s and 1950s.

In 1943, Warren McCulloch and Walter Pitts proposed a mathematical model of neural networks inspired by biological processes (Nishant dkk., 2020). Turing later posed the question "Can machines think?" in his 1950 paper and proposed the Turing Test to evaluate machine intelligence based on behaviour. Despite scepticism, including John Searle's Chinese Room argument, the Turing Test remains influential in AI discourse.

The formal establishment of AI as an academic field occurred in 1956 at the Dartmouth Conference, where the term 'artificial intelligence' was coined (Chen dkk., 2020). Early AI research focused on symbolic AI and rule-based systems, with significant milestones such as ELIZA, developed by Joseph Weizenbaum in 1966, which simulated a psychotherapist. Although not truly

intelligent, ELIZA demonstrated how simple programs could create the illusion of understanding and influenced early discussions of machine intelligence and human-computer interaction.

In the 1990s, AI regained momentum through machine learning, which allowed systems to learn from data rather than manual rules, reaching milestones such as IBM's Deep Blue defeating chess champion Garry Kasparov in 1997. The 2010s marked a new era driven by deep learning (Briganti & Le Moine, 2020), enabling significant advances in computer vision and natural language processing, exemplified by Google DeepMind's AlphaGo defeating world champion Lee Sedol in 2016.

Today, AI applications span various fields, including healthcare and autonomous vehicles, with models such as GPT-4 and DALL-E enhancing creative and language skills. However, ethical concerns about bias and superintelligence remain (Vrontis dkk., 2022). By 2024, the number of internet users in Indonesia is expected to reach approximately 221.56 million (79.5% of the population), with more than 190 million smartphone users. The global AI boom is characterised by rapid advances and widespread adoption across industries, driven by significant investments from tech giants such as Google, Microsoft, Amazon and IBM.

Key developments in AI include: Deep learning: Breakthroughs in pattern recognition, particularly in image and speech recognition. Natural language processing (NLP): Significant advances leading to models capable of generating human-like text.AI applications include; Manufacturing: Process optimisation and quality control (Yang dkk., 2020). Finance: Algorithmic trading, fraud detection and customer service automation. Retail: Personalised product recommendations and inventory management. Transport: Autonomous vehicles and logistics optimisation. Healthcare: AI-driven diagnostics, personalised medicine and robotic surgery.

Challenges facing AI include; Privacy: Concerns about the use of data to train models and individual rights. Bias and fairness: AI systems can inherit biases, requiring fairness and transparency in decision making (Singh dkk., 2020). Job replacement: Automation raises concerns about job losses, even as new opportunities arise. Regulation: The rapid pace of AI development often outpaces existing regulations, prompting efforts to ensure the ethical and safe use of AI.

Globally, the United States is the leader in AI innovation, largely due to the contributions of Silicon Valley tech companies. China is rapidly emerging as a major player, aiming for AI leadership by 2030, particularly in facial recognition and fintech (Laguarta dkk., 2020). Meanwhile, European countries are investing in ethical AI development and regulation, with the EU promoting policies that emphasise privacy and human rights.

Law and Technology

The relationship between law and technology is very close, especially in the current era of digitalisation. Technologies such as artificial intelligence (AI), blockchain and the Internet of Things (IoT) have brought about significant changes in many aspects of life, including law. Technology has made it easier to access legal information and speed up legal processes, but it has also created new challenges such as cybercrime and the protection of personal data. But as the use of technology increases, so do the threats to cybersecurity (Ameen dkk., 2021). Laws need to be able to deal with cybercrime such as hacking and data theft. Personal data has become extremely valuable in the digital age. The law must ensure that this data is protected from misuse.

Technology can improve access to legal services, such as online legal advice and apps providing legal information. Technology can make legal processes more efficient, for example through the use of electronic case management systems (Janssen dkk., 2020). Countries around the world, including the European Union, the United States and China, have regulated AI. Indonesia

already has laws relevant to AI, such as the Personal Data Protection Law and the Electronic Transaction Information Law (ITE Law). AI in Indonesia is often considered an "electronic agent" as defined in Article 1 of the ITE Law. This means that AI is considered a device that can automatically perform actions on electronic information.

The Indonesian government has released the National Strategy for Artificial Intelligence 2020-2045 and Circular No. 9 of 2023 on the Ethics of Artificial Intelligence. This circular serves as a guideline for the ethical use of AI. In addition, the Financial Services Authority (OJK), together with several fintech associations, has also published an AI Code of Ethics Guide for the Financial Sector (Hwang & Chien, 2022). Despite these regulations, many experts argue that Indonesia needs more specific and comprehensive regulations to regulate the use of AI, especially in strategic sectors such as banking, e-commerce and healthcare. Key challenges in AI regulation include the protection of personal data, cybersecurity, and legal liability in the event of harm caused by AI. On the other hand, AI offers great opportunities to improve efficiency and innovation in various sectors.

The relationship between law and technology is ideally balanced, but in reality law often lags behind technological developments. Technology is evolving at a rapid pace, often faster than the legislative process. For example, innovations in artificial intelligence (AI), blockchain and financial technology (fintech) continue to emerge and evolve in a matter of months or even weeks (Letaief dkk., 2022). Legislative and regulatory processes, on the other hand, tend to take longer as they involve various stages, including research, public consultation and approval by various parties.

Modern technologies are often complex and require in-depth understanding in order to be regulated effectively. Legislators and regulators may need time to understand the full implications of new technologies before they can make appropriate regulations (Deng dkk., 2020). For example, AI technologies require an understanding of algorithms, big data and ethics, all of which are complex and evolving areas.

Laws tend to be more rigid and difficult to change, compared to technologies that can be quickly adapted and improved. This means that existing laws may not always be relevant or effective in regulating new technologies (Hao dkk., 2020). For example, personal data protection laws may need to be regularly updated to address new privacy threats posed by new technologies. New technologies often raise ethical and social challenges that have not been faced before.

Regulation should take these into account to ensure that technologies are used ethically and do not harm society (Barredo Arrieta dkk., 2020). For example, the use of AI in decision-making may raise issues of bias and discrimination that need to be addressed through specific regulation. Too much regulation can stifle innovation

Therefore, there is often a balance to be struck between regulating technology to protect society and allowing innovation to flourish. Many countries are trying to create flexible and adaptable regulations that can evolve with technology, such as the 'regulatory sandbox' approach used in the fintech industry (Ali dkk., 2023). By understanding these challenges, it is hoped that the law can be more responsive and adaptable to technological developments, protecting society without stifling innovation.

Legal Transformation

The law needs to change to accommodate the development of AI technology, which can pose social, economic, and ethical risks if not properly regulated. AI regulation in Indonesia needs to be more specific and adaptable, covering aspects of data protection, transparency of algorithms,

accountability, and ethics and social responsibility (Ahmed dkk., 2022). Regulatory flexibility is essential so that it can be regularly updated to address evolving challenges.

One of the main obstacles is the limited human resources to understand the complexities of AI. Regulations need to cover aspects such as automation, data management and human-machine interaction. Another challenge is that regulations are lagging behind technological developments, so there is a need to accelerate the regulatory process without compromising quality (Bragazzi dkk., 2020). Collaboration between government, industry, academia and society is needed to create relevant and progressive regulations.

Building human resource capacity in AI law through specialised education and training is an important step, not only for legal professionals, but also for technology developers and other stakeholders. The regulatory process should be inclusive, involving all interested parties, including communities affected by AI applications (Glikson & Woolley, 2020). This is important to ensure that regulations protect not only the interests of companies and governments, but also the rights of individuals and community groups. An effective transformation of AI law will provide legal certainty for players in the Successful legal transformation will provide legal certainty and protection, and enhance Indonesia's competitiveness as a centre for AI innovation in Southeast Asia. A comprehensive and multidisciplinary approach is needed to create regulations that support technological innovation while protecting the interests of society.

An important step is to revise existing AI regulations using the omnibus law method, which combines various information and communication technology (ICT) regulations into a single law (Shneiderman, 2020). This approach will simplify and harmonise regulations, allowing the law to be efficiently updated to cover new aspects of AI technology and address shortcomings in existing regulations.

CONCLUSION

Artificial intelligence (AI) is transforming sectors such as healthcare, finance and decision-making. As AI technologies rapidly evolve, they present both challenges and opportunities, requiring a comprehensive regulatory framework to ensure responsible and ethical use. From Turing's early concepts to modern advances in machine learning, the growth of AI underscores the urgency for adaptable regulation.In Indonesia, legislation such as the Personal Data Protection Law and the ITE Law provide a foundation, but more specific AI regulation is needed. Issues such as data management, transparency of algorithms and ethical accountability require collaboration between government, industry, academia and civil society. Building human capacity through education and training is also crucial to equip legal professionals and developers with the skills to navigate the complexities of AI. Striking the right balance between regulation and innovation is key: regulatory frameworks need to be flexible enough to keep pace with technological advances without stifling progress. The proposed omnibus law is a promising approach to harmonizing existing rules and addressing current gaps. By prioritizing ethical standards, protecting individual rights and ensuring legal certainty, Indonesia can position itself as a leader in AI development within Southeast Asia, promoting societal welfare while upholding human rights.

AUTHORS' CONTRIBUTION

Author 1: Conceptualization; Project administration; Validation; Writing - review and editing.
Author 2: Conceptualization; Data curation; In-vestigation.

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