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Legal responsibility for the utilization of artificial intelligence that has occurred system error from the perspective of criminal law

Wawan Fransisco[1]*, Hafrida[2], Retno Kusniati[3]
[1,2,3]*Facult y of Law, Universitas Jambi, Indonesia. E-mail: wawanfransisco@gmail.com*

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ABSTRACT

Every advancement in artificial intelligence and every application built on it must be accompanied by considerations of law, ethics, and humanity. Complex legal issues are inextricably linked to this quick development. The purpose of this study is to determine, examine, and address the legal liability that results from defects in artificial intelligence. Criminal liability is the primary focus of the artificial intelligence issue. The report offers comprehensive insights into recent legal developments, regulatory initiatives, and suggestions to get over these challenges as a result of this investigation. As a result, this study advances knowledge of the legal dynamics surrounding AI legal liability and encourages more conversation in this field.

Corresponding Author:

Wawan Francisco,
Faculty of Law,
Universitas Jambi,
Mendalo Darat, Kec. Jambi Luar Kota, Kabupaten Muaro Jambi, Jambi
Jl. Jambi-Muara Bulian No.KM. 15, Indonesia
Email: wawanfransisco@gmail.com

1. Introduction

The development of artificial intelligence technology has experienced a significant increase throughout the world, including in Indonesia. The implementation of artificial intelligence has penetrated various sectors and industries, bringing broad impacts on efficiency, innovation, and business transformation. In some cases, the implementation of artificial intelligence has changed the way humans interact with technology, bringing capabilities such as advanced data analysis, natural language processing, and automated machine learning.

In accordance with the characteristics of national law, Indonesia apparently does not only refer to positive legal sources, both national, regional, and international, but also to customary law as unwritten law and living in the community. Furthermore, in the context of positive law, Indonesia, which has a hierarchical system of legislation based on Artificial intelligence is inseparable from the legal standards that govern science and technology since Law Number 12 of 2011 concerning the Formation of Legislation has governed the forms and positions of each legislation (Towards & Vision, 2020).

The case of Uber with a Volvo XC90 self-driving car that hit a cyclist to death in Arizona in 2018 has become a topic of discussion about AI malfunctions/damages in the automotive industry.

Not the first time this has happened, the California State Department of Motor Vehicles noted that as of March 6, 2020, there were more than 59 reports of traffic accidents involving self-driving cars (B et al., 2023).

Joshua Brown, the owner of a Tesla Model S in self-driving mode, lost his life in an accident when the vehicle failed to halt when it passed a trailer truck in front of it. Brown, Joshua The New York Times (2016) accessed 2024: Rachel Abrams and Annalyn Kurtz, who perished in a self-driving accident, tested the limits of his Tesla. Tesla case that accident This accident became the first death record in self-driving technology in America, however, the incident did not discourage automotive companies from competing to invest in their industry by using AI robots both as car frame makers and embedding AI for their steering systems. Slightly different from the Uber and Tesla cases, the German Volkswagen automotive company experienced an incident when one of the AI-embedded car frame maker robots in their factory malfunctioned and killed its workers (Lukitasari, 2023).

The case of the murder of an employee of the Volkswagen automotive company in Germany by an AI-powered robot in 2015 (Lukitasari, 2023), makes the author give an initial note, whether criminal law can work to resolve this. The case of Elaine Herzberg's death caused by a detection error in the self-driving system of an Uber test car, this was due to negligence by the safety driver, Rafaela Vasquez, in carrying out her duties as the vehicle supervisor (B et al., 2023).

Indonesia's National Strategy for Artificial Intelligence 2020-2045 seeks to provide direction to answer the challenges of AI technology development in terms of regulatory readiness which is expected to regulate the ethics of responsible AI use. This regulatory challenge is outlined in a vision where Indonesia's national strategy aims to produce relevant policy products that regulate governance, ethics, and legal accountability. In detail in terms of the forms of regulation, regulations governing AI in Indonesia are divided into (1) regulations that specifically regulate AI technology such as automated decision-making or facial recognition (2) laws that particularly control the use of technology or the use of technology in commercial domains including human resource management, finance, and health (3) legal accountability for unintended consequences of the use of AI such as criminal, civil (4) a code of ethics that is made voluntarily, made either by an association of AI business actors or a particular group (Towards & Vision, 2020).

Legal ambiguity and a lack of community protection may arise from the absence of particular legislation. Since AI already appears to be "living" alongside humans and permeating every part of peoples' lives, it is imperative that legislation pertaining to AI entities be harmonized right once. Indonesia has the highest level of AI technology use in Southeast Asia, with a figure of 24.6%, According to some data given by the International Data Corporation or IDC Asia-Pacific Enterprise Cognitive/AI Survey in 2018, Thailand (17.1%), Singapore (9.9%), and Malaysia (8.1%) came next. "Raising Standards: Data and Artificial Intelligence," by Elina Noor and Mark Bryan Manantan (Manantan, 2022).

Government Regulation Number 71 of 2019 concerning the Implementation of Electronic Systems and Transactions (PP PSE), Law Number 28 of 2014 concerning Copyright (UU Copyright), Law Number 11 of 2008 concerning Electronic Information and Transactions (UU ITE), Law Number 27 of 2022 concerning Personal Data Protection (UU PDP), and Regulation of the Minister of Communication and Information Number 5 of 2020 concerning Private Electronic System Organizers (Permen PSE) are some of the current laws in Indonesia that are pertinent to the use of AI (*Praktisi hukum: Pentingnya aturan terkait penggunaan AI di Indonesia*, 2024).

Based on the statements that have been presented, in order to carry out law enforcement that can accommodate the development of society and the use of artificial intelligence-based technology, it is necessary to have harmonization of regulations that can overcome criminal acts, losses, and damage that may arise from the use, misuse, system errors, and negligence related to AI-based products. If related to the realm of criminal law, the authorized government

should fill the draft Criminal Code (KUHP) which has been determined as the National Criminal Code with regulations that are more responsive to technological advances, especially regarding AI entities (Lukitasari, 2023). With the harmonization of regulations that concretely and explicitly accommodate the presence of AI entities, all potential violations of the law by AI that can cause losses and threats to humanity can be anticipated and overcome. The formulation of regulations that specifically discuss AI, especially regarding development, use, feasibility, criminal liability, and applicable sanctions is an important milestone in forming an effective and responsive legal system in facing the development and dynamics of society in the digital era.

Application of the concept of concept of criminal responsibility for AI in Indonesia faces various complex challenges including the existence of a legal vacuum, the legal status of AI, the complexity of AI acts, and the need for special regulations. AI Actions, and the Need for Special Regulations. Selection of perpetration-by-another and natural probable consequences models in the criminal liability for AI reflects the need to adapt the legal framework to the realities of modern technology.

Therefore, in order to safeguard and establish legal clarity for the society, a number of factors must be taken into account while considering the concept of criminal culpability by AI. The government should not disregard the creation of legislation for AI entities, even though Indonesia's development and application of AI technology is not as extensive as that of other nations.

2. Method

Because it analyzes laws and regulations, literature, journals, and papers pertaining to the subject matter under study, this paper employs the normative legal writing method. The information used in this study is secondary data, namely information obtained from library research and documentation, which are already available in the form of literature or documentation and are the results of other people's investigation and processing.

Using the normative method allows for a thorough examination of AI criminal liability in Indonesian positive law. This method provides a framework for exploring legal issues, analyzing existing regulations, and developing policy recommendations to address new challenges posed by technological advancements. By integrating the latest developments in AI regulation in the world, this research provides a comprehensive overview of how a legal framework can be established for AI criminal liability in Indonesia. It includes analysis of international policies, case studies from various countries, as well as challenges and opportunities that exist in the local context.

3. Analysis and Results

3.1. Criminal Liability for the Use of Artificial Intelligence that Resulted in a System Error

Artificial Intelligence (AI) has a very broad scope and implementation, even tending to be biased because some sources have their own opinions. However, the definition of AI can be summarized into 2 main concepts, namely as follows (Hafrida Cheny Berlian & Helmi, 2024): (a) AI is all the things that computers can't do, but will one day be able to do (because they're always learning). (b) AI is intelligence demonstrated by machines.

Artificial intelligence, often known as artificial intelligence, is the ability of an artificial organism to exhibit intelligence. A machine (computer) is given intelligence so that it can perform tasks that people can. The study of making computers perform tasks that humans can currently perform more effectively is known as artificial intelligence, or AI for short. It is challenging for both humans and even computers to solve the numerous complicated issues that people face today (Knight, 1991).

The British mathematician Alan Turing was the pioneer of artificial intelligence (AI) in 1936. His ideas concerning the Turing machine, a calculating model, led to the advancement of computers

and informatics. Turing's 1950 study, which served as the foundation for artificial intelligence, examined how robots could be able to think like humans in terms of reasoning, learning, planning, and creativity (Ryan Riefri, 2023).

However, the use of the name AI was introduced in 1956 at the Dartmouth Conference by John McCarthy, a professor from the Massachusetts Institute of Technology. At the conference, the main purpose of artificial intelligence was explained, namely: knowing and modeling human thought processes and designing machines to imitate human behavior.

The idea of criminal culpability for AI is dynamic and changes as society does. Criminal law has been impacted by technology advancements as well as the growing complexity of social and economic relationships. The needs brought about by these technological advancements are the reason for the legal focus on robots and artificial intelligence. Knowing how criminal liability evolved over the course of four major eras aids in understanding the concept's current and future directions.

Individuals were held accountable for the deeds of others during the first era, which was marked by collective responsibility under archaic criminal law. Punishment was primarily intended to satiate the need for vengeance; the offender's guilt was not a major consideration (Kan, 2024).

Because AI is digital, it may be utilized both legally and illegally, which means it may become more prevalent in criminal activity. An investigation into the predictable dangers of AI crimes was carried out by King et al. in 2020. The study's most significant finding was that AI can be used to perpetrate crimes like stealing and sexual assault (King and others, 2020). Additionally, a study on future crimes made possible by AI by Caldwell, Andrews, and Griffin identified 18 danger categories, ranging from forgery to audio/video impersonation (Caldwell et al., 2020).

Although the study admits that AI can help people and organizations, it also shows that AI can be used to perpetrate crimes including extortion, theft, intimidation, terrorism, and blackmail by using phony movies (Caldwell et al., 2020). Most significantly, the study found that AI may be used to help criminals in a number of ways, including deepfakes and personalized phishing. Thus, from a criminal perspective, Dupuont et al. suggest that the three immediate consequences of the dangers offered by AI are the expansion of existing threats, the appearance of entirely new threats, and the modification of threat attributes (Dupont et al., 2024). Furthermore, Brundage et al. outline possible scenarios for malevolent AI exploitation and offer a number of policy suggestions, including the necessity of global cooperation.

AI can be used to perform a variety of crimes, including fraud, hacking, phishing, vishing, stalking, sexual assault, terrorist actions, intellectual property rights violations, and the trafficking of drugs and lethal weapons using autonomous vehicles. From a global perspective, the capacity of criminals to use AI for crime is problematic since it enables them to automate crimes like murders using drones, lethal autonomous weapons, and driverless cars.

Stahl emphasized that terrorists, in addition to governments, have access to autonomous weaponry that can determine who to attack and when (Stahl, 2021). In light of this, Falade used blog mining techniques to gather information about social engineering assaults employing generative AI in order to perform a research on how some of these applications are used in social engineering attacks (Falade, 2023). This study investigates the ways in which cybercriminals can use the AI models WormGPT, FraudGPT, and ChatGPT to launch cyberattacks. Crucially, the study discovered that phishing, pretexting, fraud, and deepfake are the social engineering attack types produced by AI. In particular, the study found that these kinds of attacks can result in a range of breaches, from cybersecurity issues to disinformation. Most significantly, the study found that threat actors participated in the breach by using AI phishing tools, automating cyberattacks, developing deepfake websites, deepfake videos and virtual identities, utilizing AI's adaptive learning capabilities, creating customized phishing emails, and creating deepfake websites.

The legal system in Indonesia considers the concept of strict liability as something new, this legal system is even only familiar in European countries that adopt the Continental European legal system with exceptions for violations because in reality the concept of strict liability was originally only found in the common law system. Therefore, strict liability in its implementation in life is prohibited from being contradictory or at least having a different path as far as possible from the original intent. The implementation of an application that must be contradictory to the original formulation of strict liability if ignored will also conflict with Article 28D paragraph (1) of the 1945 Constitution of the Republic of Indonesia which contains the essence that the state with the established law should have the ability to provide everyone with "acknowledgment, assurances, safeguards, and assurance of just legislation and equal treatment before the law (Astiti, 2023).

Regarding the concept of responsibility in criminal law, if AI commits an illegal act or deed, it can be traced back to the creator and user of the AI itself. This is relevant when considering the use of AI from the standpoint of applicable criminal law. because, in accordance with Simons, the criminal must be conscious of, knowledgeable about, and capable of determining the will behind his actions; in this scenario, AI lacks awareness of its actions but is instead controlled by commands and is constrained in its ability to determine the will in accordance with the intent and purpose of its creator, and vice versa, the person who is aware of the actions of the (Muhammad Tan Abdul Rahman Haris, 2022).

Actions of loss that can arise from the use of AI, namely in the form of data leakage or other actions due to inconsistencies in commands such as inputted data with processed data, then the bank can be responsible because from the start the bank should have known that there was a possibility that AI could make mistakes. AI as a determinant for banks that can be charged with legal responsibility as a result of not being classified as any legal subject, either a person (natuurlijk persoon) or a legal entity (rechts person) so that mens rea can be attached to the corporate controller who provides data or orders to AI or a legal entity as an embodiment of AI in acting (actus reus). The attachment of mens rea to the corporate controller (bank) is due to the absence of morality and free will from AI. Mens rea as, 'the voluntary doing of morally wrong act forbidden by penal law' requires legal subjects to have free will to want to act on moral awareness (moral conscience) of good and bad values. This condition is not owned by AI because it is not a legal subject, although technically AI has the ability to analyze and make decisions correctly, but must first enter data by humans. This can indicate the absence of an element of mens rea in the actions taken by AI (Frans et al., 2024).

The issue with AI is whether it can be lawfully held accountable for losses that are unquestionably illegal. As was previously mentioned, legal subjects—which include both natural persons and corporations—are the ones who can be held criminally liable. In Indonesia, there are no formal regulations pertaining to AI, hence it is up to interpretation to decide whether or not AI is a legal topic. According to Indonesian law, if AI commits a crime, it reverts to the idea of criminal responsibility, which states that people who are subject to criminal liability are legal subjects—in this case, humans—because AI is programmed to carry out actions based on the wishes of (Qurrahman et al., 2024).

Actus reus in AI can be demonstrated by illegal decisions or actions taken by AI, such as information manipulation, discrimination, or privacy violation. On the other hand, AI may be trained to absorb information, draw conclusions, and make decisions depending on the data that is given to it, even though it lacks human consciousness and intentions. This makes the point that, although in a different situation than humans, AI may occasionally be thought to possess some sort of mens rea. However, there are a number of factors that must be properly taken into account before AI is recognized as a topic of criminal liability legislation. These involve a thorough comprehension of AI's operation, its capacity to comprehend and adhere to (Sugiarto, 2024).

The legal debate on criminal liability for AI systems has gained momentum. examines their ability to meet the criteria for criminal liability, including Actus Reus, mens rea, and accountability. The study also discusses illegal activities by AI beings (Saud, 2024).

3.2. Global Challenges in Conceptualizing Criminal Liability for AI Crimes

a. European Union

Generally speaking, it requires a regulatory structure that may be utilized to create and finally introduce it. The final report with the "Guidelines on the Regulation of Robotics," which was presented on September 22, 2014, is the most significant result of RoboLaw. In order to create a strong legal foundation for the advancement of robotics technology in Europe, this paper is addressed to the European Commission. The European Commission is supposed to utilize the Guidelines to address practical and ethical concerns about the use of developing technology. Regarding liability, the Guidelines on the Regulation of Robotics acknowledge that, in the end, robot autonomy presents concerns concerning their character in relation to current legal categories, including whether they ought to be regarded as legal persons or (European Parliament, 2016). Therefore, robots cannot be held accountable for actions or inactions that hurt other parties under the current legal system.

As a result, where a particular human agent—such as the manufacturer, company, user, or operator—can be held responsible for the robot's actions or inactions, the present liability rules are applicable. These actors could be held strictly liable for the robot's acts or inactions. Furthermore, regardless of the legal solution applied to robot liability in cases other than property damage, the Robotics Regulatory Guidelines believe that future legislative instruments should allow the application of strict liability as a rule, requiring only proof that damage has occurred and the establishment of a causal link between the injured party's damages and the harmful behavior of the robot.(European Parliament, 2016) In this case, it might be said that Europe favors the application of robot civil liability.

b. American

The Executive Office of the President, National Science and Technology Council's Committee on Technology carried out a study titled "Preparing for the Future of Artificial Intelligence" in an effort to get the US ready for a future where AI will play a bigger role "(Bundy, 2017). This study examines the state of artificial intelligence (AI), its current and future usage, and the issues that these developments bring up for society and public policy. But it also examines the legal issues surrounding new AI-based technologies like unmanned aerial systems and driverless cars. (UAS, or "drones")(Bundy, 2017). We might infer that this study is merely a preliminary investigation to learn more about artificial intelligence (AI) and the possible hazards associated with its regulation. The second study, titled "National Artificial Intelligence Research and Development Strategic Plan," was created by the Networking and Information Technology Research and Development Subcommittee of the National Science and Technology Council"(Science et al., 2016).

The ultimate objective of this research is to develop new AI knowledge and technologies that minimize harmful effects while maximizing good ones for society. This study's discussion of AI's obligations is constrained. Furthermore, neither regulatory regulations nor a more comprehensive examination of AI duties are addressed in the AI R&D Strategic Plan. Furthermore, the US government has concentrated more on regulating AI in terms of national security than on regulating AI's responsibilities. One of the major technologies that "ensure [the United States] will be able to fight and win future wars" is artificial intelligence, according to the US National Defense Strategy, which was published in January 2018 "(Suhirwan et al., 2021).

c. Asia

In Asia-Pacific, the Chinese government has taken the lead in creating and putting into practice cutting-edge laws and plans for the advancement of artificial intelligence. China unveiled its comprehensive AI development program in July 2017 with the ultimate objective of

becoming a "global innovation hub and leader in AI" by 2030 (UN.ESCAP, 2017). The Chinese government is implementing AI-related policies through Beijing's AI policy named the "Development Plan for Next Generation Artificial Intelligence" (Lee et al., 2017). According to the proposal, China should lead the charge in creating a legal framework that promotes AI development and reduces any potential risks (Lee et al., 2017).

As a result, China's recent AI policies have prioritized the advancement of AI technology and its industrial uses over concerns like security and ethical laws. As a result, China's government still lacks explicit laws governing AI obligations. Although China still has a big plan, it doesn't explain how to deal with the disruptive technology trend of artificial intelligence. Along with China, the Japanese government is regarded as a sophisticated Asian nation with creative AI development plans and initiatives. The "Japan New Robot Strategy," which was released in 2015, is the most comprehensive legal plan among the chosen nations to address the growing number of robots. This (Eka Nanda Ravizki, 2019).

Consumer safety when using autonomous or remotely controlled household robots for daily tasks, how to gather data and look into the causes, whether and when robots cause serious accidents, and what technological standards should be followed before the device is classified as a household electrical appliance based on technological advancements and development trends for particular products are the liability issues incorporated into Japan's New Robot Strategy. In terms of responsibility, the document focuses on figuring out how much the maker is liable for. As a result, manufacturers and manufacturing facilities in Japan are still subject to liability regulations regarding AI.

4. Conclusion

In the case of strict liability, the prosecutor only needs to prove a causal relationship between the accident and the disaster that occurred, and does not need to prove negligence (intentional or negligent) of the perpetrator. As is known, artificial intelligence (AI) does not know what it is doing, nor can it predict the possibility of a crime. This means that developers and users of artificial intelligence (AI) bear full responsibility for all activities produced by artificial intelligence (AI). In criminal law, humans are absolute legal subjects who have knowledge and a certain level of intention regarding actions and actions carried out by artificial intelligence (AI).

Hallevy suggests employing three potential liability models—the Perpetration-by-Another liability model, the Natural-Probable-Consequence liability model, and the Direct liability model—to impose criminal liability on AI entities. Individual liability is still the focus of Hallevy's proposal, but corporate liability is not addressed. As a result, corporate liability should be taken into account as a potential liability model. It is not assumed by Perpetration-by-Another responsibility that AI entities possess any human characteristics. AI systems are regarded as harmless agents. The most pertinent people to be held accountable for AI crimes in this version are programmers and operators or users. Assuming the programmer or user/operator is deeply involved in the day-to-day operations of the AI entity, the Natural-Probable Consequence liability model does not have the

The proposed concept of criminal liability can be practically integrated into the Indonesian criminal justice system. This will not only increase accountability for the use of AI technology but also protect the rights of the public from potential misuse of such technology. The Indonesian government can develop national policies that not only support technological innovation but also protect people's rights. This will create a safe and responsible ecosystem for the use of AI in various sectors, and ensure that technological development does not come at the expense of the public interest.

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References

Astiti, N. M. Y. A. (2023). Strict Liability of Artificial Intelligence: Pertanggungjawaban kepada Pengatur AI ataukah AI yang Diberikan Beban Pertanggungjawaban ? *Jurnal Magister Hukum Udayana*, *12*(4), 962–980. https://doi.org/10.24843/JMHU.2023.v12.i0

B, D. L., Hartiwiningsih, H., & Wiwoho, J. (2023). Proceedings of the International Conference for Democracy and National Resilience 2022 (ICDNR 2022). In *Proceedings of the International Conference for Democracy and National Resilience 2022 (ICDNR 2022)*. Atlantis Press SARL. https://doi.org/10.2991/978-2-494069-75-6

Bundy, A. (2017). Preparing for the future of Artificial Intelligence. *Ai & Society*, *32*(2), 285–287. https://doi.org/10.1007/s00146-016-0685-0

Caldwell, M., Andrews, J. T. A., Tanay, T., & Griffin, L. D. (2020). AI-enabled future crime. *Crime Science*, *9*(1), 1–13. https://doi.org/10.1186/s40163-020-00123-8

Dupont, B., Stevens, Y. Y., Westermann, H., & Joyce, M. (2024). Artificial Intelligence in the Context of Crime and Criminal Justice. *SSRN Electronic Journal*, *November*. https://doi.org/10.2139/ssrn.4883392

European Parliament. (2016). *AI and robotics Recommendations*. *2103*.

Falade, P. V. (2023). Decoding the Threat Landscape : ChatGPT, FraudGPT, and WormGPT in Social Engineering Attacks. *International Journal of Scientific Research in Computer Science, Engineering and Information Technology*, *October*, 185–198. https://doi.org/10.32628/cseit2390533

Frans, M. P., Buana, Y., Indah, A., Sari, I., Panji, K., & Raharjo, C. (2024). *Pertanggungjawaban Pidana Bank Sebagai Pengguna Artificial Intelligence The Bank ' s Criminal Liability as a User of Artificial Intelligence*. *7*(2), 2–7.

Hafrida Cheny Berlian, & Helmi. (2024). The Urgency of Artificial Intelligence Criminal Responsibility as Cybercriminals. *International Journal of Scientific Multidisciplinary Research*, *2*(4), 297–310. https://doi.org/10.55927/ijsmr.v2i4.8762

KAN, C. H. (2024). CRIMINAL LAW : AN EVALUATION IN THE CONTEXT OF THE GENERAL THEORY. *International Journal of Eurasia Social Sciences*, *Vol: 15*(Issue: 55), 276–313.

Knight, E. R. dan K. (1991). *Artificial Intelligence*. McGraw- Hill.

Lee, K.-F., Triolo, P., Ventures, S., & Group, E. (2017). China embraces AI: A Close Look and A Long View. *Eurasia Group*, *December*, 1–13.

LUKITASARI, D. (2023). *ADOPSI MODEL PERTANGGUNGJAWABAN PIDANA KORPORASI TERHADAP MALFUNGSI PENGGUNAAN ARTIFICIAL INTELLIGENCE DI INDONESIA*. PROGRAM DOKTOR ILMU HUKUM PROGRAM PASCASARJANA FAKULTAS HUKUM UNIVERSITAS SEBELAS MARET. https://digilib.uns.ac.id/dokumen/detail/98652/ADOPSI-MODEL-PERTANGGUNGJAWABAN-PIDANA-KORPORASI-TERHADAP-MALFUNGSI-PENGGUNAAN-ARTIFICIAL-INTELLIGENCE-DI-INDONESIA

Manantan, E. N. dan M. B. (2022). Raising Standards: Data and Artificial Intelligence in Southeast Asia," makalah disajikan oleh Asia Society Australia dan The Australian National University College of Asia and the Pacific. In *Makalah* (p. 86). Crawford School of Public Policy.

Muhammad Tan Abdul Rahman Haris, T. (2022). ANALISIS PERTANGGUNGJAWABAN HUKUM PIDANA TERHADAP PEMANFAATAN ARTIFICIAL INTELLIGENCE DI INDONESIA. *JURNAL KOMUNIKASI HUKUM*, *8*(1), 308.

Qurrahman, S. H., Ayunil, S., & Rahim, T. A. (2024). *Kedudukan dan Konsep Pertanggungjawaban Artificial Intelegence Dalam Hukum Positif Indonesia*. *6*(4), 12687–12693.

Praktisi hukum: Pentingnya aturan terkait penggunaan AI di Indonesia, (2024). https://www.antaranews.com/berita/3939732/praktisi-hukum-pentingnya-aturan-terkait-penggunaan-ai-di-indonesia

Ravizki, E. N. (2019). *Criminal Liability Of Artificial Intelligence (Ai): The Legal Conceptual Study And The Regulating Challenges In Global Disruptive Technology Era*. 1–100. https://etd.repository.ugm.ac.id/penelitian/detail/179596

Ryan Riefri, A. T. (2023). *Pioner Awal Terciptanya Komputer Digital*. https://www.codepolitan.com/alan-turing-pioner-awal-terciptanya- komputer-digital-58c686f4cdcef

Saud, A. (2024). Criminal Liability about the Use of Artificial Intelligence: Investigating the Actus Reus Element of AI-driven Technology. *American Journal of Law*, *6*(1), 1–25. https://doi.org/10.47672/ajl.1648

Science, N., Council, T., Technology, I., & Subcommittee, D. (2016). *the National Artificial Intelligence*

Research and Development. *October*.
Stahl, B. C. (2021). *Addressing Ethical Issues in AI*. https://doi.org/10.1007/978-3-030-69978-9_5
Sugiarto, A. (2024). Criminal Law Accountability in the Application of Artificial Intelligence in the Digital Era. *Jurnal Multidisiplin Sahombu*, *4*(01), 51–58.
Suhirwan, S., Pertahanan, U., Indonesia, R., Prakoso, L. Y., Toruan, T., Indonesia, U. P., & Pramono, B. (2021). *National Defense Strategy*. *August*.
Towards, A. I., & Vision, I. (2020). *Strategi nasional Kecerdasan Artifisial Indonesia tahun 2020-2045*.
UN.ESCAP. (2017). *Artificial Intelligence and Broadband Divide: State of ICT Connectivity in Asia and the Pacific*. 1–106. https://www.unescap.org/sites/default/files/publications/State_of_ICT2017-Final_16Nov2017.pdf