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## Digital Transformation of Contract Law: Legal Certainty and Human Rights Protection in AI-Based Contracts

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### *ABSTRACT*

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*The development of artificial intelligence (AI) has driven the digital transformation of electronic contracting practices by introducing automated systems and electronic agents. However, using AI to form and execute contracts raises legal issues, particularly regarding the validity of agreements, legal certainty, and the protection of human rights. According to Indonesian contract law, agreements are valid if they meet the requirements of Article 1320 of the Civil Code (KUHPerdata), which includes mutual agreement and legal capacity. However, AI lacks free will and legal status. This study aims to analyze the discrepancy between applicable legal norms and the practice of using AI in electronic contracts in Indonesia. This study employs normative legal research with a legislative and comparative law approach, focusing on the UNCITRAL Model Law on Electronic Commerce and the United Nations Convention on the Use of Electronic Communications in International Contracts. The results reveal that Indonesian positive law does not explicitly regulate the validity or legal liability of AI-based contracts. This lack of regulation has the potential to cause legal uncertainty and substantive injustice. Therefore, it is necessary to harmonize national law with international standards and integrate a human right-based approach to ensure legal certainty and justice in AI-based contracts.*

**Keywords:** *AI-Based Contract, Legal certainty, Human Rights.*

### **A. INTRODUCTION**

Law has a fundamental role as a regulatory instrument in the life of society because law as a rule or social norm is always related to the values adopted in society.

This means that law can be considered as a reflection and a concrete form of the values

that apply at a certain time in the life of society. In the context of positive law, the rules that apply must be able to reflect the principles of law and the values of justice that underlie it. Positive law, also known as *ius constitutum*, refers to a collection of principles and legal rules that have been established in writing and are currently in effect. These rules are binding, both generally and specifically, and are enforced through the government or courts in the legal system in Indonesia. (Astawa, 2008).

The philosophy of positivism influences Indonesian positive law, which is a school of thought. In the context of law, positivism views that positive legal norms in the legal regulatory system are the main form of valid law. Positivism itself is a philosophical view that emphasizes that valid science comes from natural science, and rejects approaches that are metaphysical or involve things that cannot be verified empirically. These norms are designed to provide legal certainty to society through the existence of clear, structured, and accountable rules. According to Bellefroid, the principle of law is a basic norm described by positive law that legal science does not consider to come from more general rules. The principle of law is the sedimentation of positive law in a society (Mertokusumo, 2005), and according to P. Scholten, the principle of law is the tendencies required by our moral view of law, are general characteristics with all their limitations as a general disposition, but must not be absent (Mertokusumo, 2005).

Therefore, the legal principle functions not only as a technical guideline but also as a reflection of the ethical values that underlie community life. However, the application of legal norms and legal principles cannot be separated from the values of justice. The value of justice in law, as explained by Aristotle, includes distributive justice and commutative justice. Distributive justice is justice that distributes

something to everyone according to their achievements or contributions. Meanwhile, commutative justice gives equal shares to everyone without considering their differences in contribution, especially in the context of the exchange of goods and services. In the modern context, the values of justice also include procedural justice, which ensures that the legal process is fair, transparent, and accessible to all parties.

Law as a system designed to regulate human behavior in society. Along with the development of the times, law is expected to be able to adapt and develop in order to remain relevant to social, economic, and cultural changes. However, in the context of increasingly rapid digitalization, new challenges arise that show that law often cannot keep up with the pace of technological development. AI globally has driven acceleration in digital services, from e-commerce to technology-based financial services (Susiyanto & Naningsih, 2024). As is currently the case in the era of globalization and digitalization, technology has changed almost every aspect of human life. (Puspitosari, 2019). The rapid expansion of artificial intelligence within digital economic ecosystems represents not only a technological shift, but also a structural transformation of business models and regulatory paradigms. Digital transformation involves integrating AI into core business operations, which requires adaptive legal frameworks that balance innovation with regulatory certainty (Reier Forradellas & Garay Gallastegui, 2021).

In line with technological developments, according to Roger Brownsword, there are 3 approaches between law and technology, namely by conceptualizing the evolution of law in facing technological developments into three stages: (Downey, 2021)

Law 1.0: Representation of the traditional mindset, where law is applied based on existing principles, focusing on precedents and rules without considering new technologies.

Law 2.0: Response to the limitations of Law 1.0, with legislatures proactively creating new regulations relevant to address technological challenges such as artificial intelligence and blockchain.

Law 3.0: An innovative stage that uses technology as a regulatory tool to directly shape behavior and social norms, going beyond the traditional normative legal approach.

Brownsword emphasizes the importance of understanding these three mindsets to navigate the future legal landscape, integrating technology into the regulatory framework to create more adaptive and effective governance.

Although there are indications of a shift towards Law 2.0 through the establishment of technology regulations, Indonesia is currently still in the Law 1.0 stage. Several innovations also demonstrate the beginning of a transition to Law 3.0; however, their implementation remains limited. Therefore, accelerating the integration of technology, particularly artificial intelligence, into the regulatory framework is necessary to achieve more adaptive law enforcement in the digital era (Alfithri & Priyono, 2024), including in terms of electronic transactions. Based on the nature of its performance, AI can be divided into general artificial intelligence (GAI) and narrow artificial intelligence (NAI), the difference between the two is that NAI works focused on specific tasks or things, while GAI is intended to be able to imitate various jobs done by humans (Babu & Banana, 2024).

Currently, AI is able to work to help e-commerce in the design process, review contracts in electronic transactions, AI works with systems starting from data input which is then processed / processed which can produce 3 types of Output in the form of Decisions, Predictions, and Recommendations. In essence, artificial intelligence offers solutions to complex tasks, speeds up information processing, and helps in various disciplines (Kusumawardani, 2019).

Looking at the characteristics of how autonomous AI works, in Indonesia this is likened to an electronic agent as defined in Law No. 11 of 2008 concerning Electronic Information and Transactions (UU ITE) and PP No. 71 of 2019 concerning the Implementation of Electronic Systems and Transactions (PSTE). An electronic agent is defined as a technological device that acts on behalf of humans in electronic transactions without direct intervention from the user after the system is programmed. The use of autonomous work systems using electronic agents in electronic transactions is becoming increasingly common, with a significant impact on contract management in electronic transactions (Kurniawijaya, Yudityastri, & Zuama, 2021).

However, this development raises fundamental questions regarding the validity of contracts made by AI. In conventional contract law, the legal subject is a human or legal entity, which has the capacity to act legally. With the involvement of AI, questions arise: can AI be considered a legal subject that has the authority to make contracts, or the use of AI as an extension of a party, can this be said to be valid for contracts made through electronic agents. Although contract law adopts an open system, where every individual has the freedom to enter into agreements without being bound by existing provisions (Busro, 2011), based on the principle of free will and individual responsibility in contract law, while artificial intelligence (AI) technology

operates with algorithms that can learn independently through machine learning. This causes a discrepancy with the principle of contract consensus in civil law, where one of the valid requirements of a contract is an agreement between the parties. (Warka & Damayanti, 2024).

Additionally, contracts created by AI often create legal uncertainty. This is related to how principles such as consensus ad idem (agreement of wills) and legal responsibility are applied in this context. Such as the principle of pacta sunt servanda (agreements must be respected) in contract law, the principle of freedom of contract (Nurzaman & Fidhayanti, 2024), In contract law, these principles are the main foundation that regulates the relationship between the parties, ensures equality in the contract making process, and provides legal protection in the event of a dispute.

This research focuses on the novelty in analyzing the validity of contracts made with artificial intelligence (AI) in Indonesian positive law, taking into account the perspective of legal certainty and justice. Several journals used as comparison material to determine the novelty of this research include:

Journal "Utilizing Artificial Intelligence in Contract Design and Its Impact on the Legal Sector in Indonesia" by Aditya Kurniawijaya, Alya Yudityastri, and Ayuta Puspa Citra Zuama (2021). This journal discusses the use of AI in contract creation through the smart contract feature, which provides efficiency in contract design (Kurniawijaya, Yudityastri, & Zuama, 2021).

Journal "Artificial General Intelligence (AGI) and Its Implications for Contract Law" by Wahyudi Umar, Sudirman, and Rasmuddin (2023). This journal discusses the influence of Artificial General Intelligence (AGI) in contract law, including questions about the legal status of AGI as a legal subject, AGI's ability to negotiate contracts,

and AGI's legal responsibilities in implementing contracts (Umar, Sudirman, & Rasmuddin, 2023).

Journal "The Validity of Contracts Made by Artificial Intelligence According to Positive Law in Indonesia" by Jajang Nurzaman and Dwi Fidhayanti (2024). This journal discusses the validity of contracts made by AI by looking at existing regulations in Indonesia and the possibility of AI as a legal subject (Nurzaman & Fidhayanti, 2024).

Journal "Challenges of Using Artificial Intelligence in Contract Drafting: How Should AI Legal Liability Be?" by I Made Mulyawan Subawa (2024). This journal highlights the legal challenges in using AI for contract design, including the risk of data leaks and legal responsibilities that are not yet clearly defined in Indonesian law (Subawa, 2024).

Journal "The Position and Concept of Responsibility of Artificial Intelligence in Indonesian Positive Law" by Shofika Hardiyanti Qurrahman, Safira Ayunil, and Tsabita Aurelia Rahim (2024). This journal discusses that in Indonesian positive law, AI cannot be considered a legal subject that can be held criminally or civilly responsible because it still requires human assistance in its operations (Qurrahman, Ayunil, & Rahim, 2024).

Compared to previous journals, this research focuses more on aspects of the validity of contracts made by AI from the perspective of justice and integrates legal certainty with a human rights-based approach, emphasizing substantive justice and protection of vulnerable parties in AI-based contracts in Indonesia. With this approach, this research contributes to filling legal gaps regarding the enforceability of contracts made by AI and provides recommendations for the

development of regulations that are more adaptive to the development of AI technology in contract law and looks at how liability arises from contracts made with artificial intelligence, by comparing national and international regulations and using the theory of legal certainty and justice as an analytical tool.

Indonesia's contract law is based on the principle of legal certainty, as outlined in Article 1320 of the KUHPerdata and Article 46, paragraph 2, of Government Regulation No. 71 of 2019. This principle requires an agreement, legal competence, a specific object, and a lawful cause for all contracts, including electronic ones. Internationally, the UNCITRAL Model Law on Electronic Commerce and the United Nations Convention on the Use of Electronic Communications in International Contracts acknowledge the validity of electronic contracts, including those involving electronic agents. These contracts are not invalidated simply because they use digital technology. However, Indonesian positive law has not fully accommodated the development of AI-based contracts. This is mainly because AI is not recognized as a legal subject with free will, which is the basis for agreement. Thus, there is uncertainty regarding the validity of AI decisions in the formation and implementation of contracts.

Apart from that, the lack of clarity regarding legal liability in contracts made by AI is also an obstacle. In electronic transactions involving AI, there are no regulations that explicitly regulate who is responsible if there is a default or legal defect in the contract. Indonesian law still does not specify whether responsibility should be assigned to developers, users or other parties involved in the use of AI to enter into contracts. This shows that Indonesian law is still in the Law 1.0 stage according to Roger Brownsword's concept, where regulations are still based on traditional legal

principles without considering technological developments, while several countries have moved to Law 2.0 by starting to draft special regulations related to AI and digital contracts.

There is a significant gap between *das sollen* and *das sein* in AI-based contract arrangements in Indonesia. National law requires agreement and legal competence, while AI as a non-human entity has no free will or legal subject status. Although the UNCITRAL Model Law has recognized electronic contracts made through electronic agents, this standard has not been fully adopted in Indonesian law, creating legal uncertainty, including regarding liability. Therefore, this study emphasizes the urgency of harmonizing national law with international standards in order to achieve legal certainty and protection in AI-based contracts in the digital era.

The research method used in this research is to use a normative approach (Normative Law Research). Legal science has a unique *sui generis* way of working. Because this research is only aimed at written regulations, this research is very closely related to libraries because it will require secondary data in libraries. Research specifications are carried out descriptively analytically, namely by explaining the condition of the object under study, the applicable law and its current implementation. Based on actual facts and data at this time. Also used in this research is a comparative analysis method, namely by comparing existing regulations in Indonesia that apply nationally with existing regulations at the international level.

The analysis in this research uses the Theory of Legal Certainty, namely a theory that applies the principle that the law must be clear and can be applied consistently without any ambiguity or inconsistency in its enforcement. This theory is rooted in the

view put forward by Hans Kelsen which states that the law must apply objectively without being influenced by subjective factors such as morality or politics. Legal certainty is very important because certainty can provide a basis for justice and legal protection.

In the Theory of Legal Objectives put forward by Gustav Radbruch in his book entitled "einführung in die rechtswissenschaften". Radbruch wrote that there are basic values in law, namely: (Rahardjo, 2012) (1) Justice (Gerechtigkeit); (2) Benefits (Zweckmassigkeit); and (3) Legal Certainty (Rechtssicherheit).

Radbruch also emphasized that legal certainty is about certainty in the law itself, which is produced by legislation. This legal certainty is necessary to maintain state order, so positive law must be obeyed even though it may be unfair or not fully achieve the objectives of the law. The state also needs to have an effective mechanism to ensure legal compliance that is desired by all parties.

According to Gustav Radbruch, justice also includes the principles of social justice and morality, which means that the law must reflect moral values and provide equal treatment to all parties, without harming anyone. Thus, justice is not only about the technical application of the law, but also ensuring that the results reflect balance and equality in accordance with the rights of each individual (Santoso, 2021).

Digital transformation in electronic contracts, particularly through *artificial intelligence (AI)*, cannot be separated from *legal certainty* and *justice* as the main pillars of the modern legal system. Digital contracts that are valid under civil law must still fulfill the elements of a valid contract, such as agreement between the parties, a specific object, and a lawful cause; however, legal certainty that focuses solely on normative formalities without considering human rights has the potential to cause

structural injustice, especially in the context of automated standard contracts managed by AI. These types of contracts are often 'take-it-or-leave-it' in nature, thereby weakening the bargaining position of the weaker party without any effective mechanism for rights recovery (Novel et al., 2025). The principle of balance requires equality of rights and obligations in contracts, and imbalance can be grounds for cancellation even if the formal requirements are met. In AI-based digital contracts, standardized algorithmic clauses have the potential to reinforce inequality, especially for consumers with weak bargaining power (Kurniawan et al., 2022).

Thus *The human rights-based approach* places respect for human dignity, non-discrimination, accountability, and access to legal remedies as fundamental values in the development and application of legal technology, including AI-based digital contracts. According to academic literature on AI governance, HRBA not only integrates human rights values into technology regulation, but also provides a stronger framework to ensure that the rights of individuals and vulnerable groups are not sacrificed for the sake of efficiency or legal certainty alone (Hogan et al., 2024).

Therefore, the human rights analysis in this article must be considered a corrective normative framework, rather than a marginal addition, to the positivistic approach that has dominated the study of AI-based contract law. Such an approach, which places too much emphasis on fulfilling the formal elements of contract validity, has the potential to neglect dimensions of substantive justice and the protection of the basic rights of the parties involved. Therefore, a human rights perspective must be incorporated to ensure that, alongside normative certainty and effectiveness, contract law also guarantees substantive justice and respect for human dignity in the context of increasingly complex digital transactions ( Mpinga et al., 2022).

*The human rights-based approach* in AI-based digital contracts emphasizes the following key principles:

- a. Respect for Human Dignity, AI must be regulated and used with respect for the fundamental values of dignity of all parties in the contract, without marginalizing certain groups due to their economic or digital status (Hogan et al., 2024) .
- b. Non-Discrimination, AI systems must be designed in such a way that they do not produce algorithmic biases that discriminate against certain parties based on race, gender, social status, or economic conditions. International declarations such as *The Toronto Declaration* emphasize that responsible AI practices must protect the rights to equality and non-discrimination.
- c. Accountability, Responsibility for the impact of AI on human rights must be clear; parties who design, implement, or use AI in digital contracts must be legally accountable for decisions made by automated systems (Rodrigues, 2020).
- d. Access to Remedy. Parties to digital contracts must have effective access to legal remedies in the event of rights violations caused by AI decisions, whether through the courts or alternative mechanisms( Niklas, 2020) .

This approach is relevant for assessing the extent to which AI-based contracts provide clear and fair legal protection. Legal uncertainty resulting from AI involvement requires testing the validity of contracts based on the Theory of Legal Certainty. By integrating the perspectives of legal certainty and human rights, the analysis of AI-based contracts is expected to not only focus on formal certainty, but also guarantee justice and the protection of fundamental rights in the digital age.

This study uses various types of data sources, including primary, secondary, and tertiary data. Primary data is obtained directly from the object being studied and is

directly related to the research problem. Secondary data is obtained through a literature study of various relevant legal materials, which are divided into three categories.

The first category is primary legal materials, such as laws, regulations, and legal instruments with binding force. These include the Civil Code (*KUHPerdata*); Law Number 11 of 2008, concerning Electronic Information and Transactions; Government Regulation Number 71 of 2019, concerning the Implementation of Electronic Systems and Transactions; and the UNCITRAL Model Law, which serves as an international reference. Second are secondary legal materials, which provide explanations and analyses of primary legal materials. These materials are obtained from books, scientific literature, and journals discussing the correctional system and its functions. The third category is tertiary legal materials, which provide guidance, definitions, or additional explanations of primary and secondary legal materials. Examples include the Big Indonesian Dictionary (*KBBI*), legal dictionaries, and internet sources relevant to the research topic.

## **B. RESULT AND DISCUSSION**

### **1. Legal certainty of the validity of contracts made using artificial intelligence under Indonesian Law**

Discussing the validity of contracts cannot be separated from the legal basis for the validity of the agreement, namely 1320 of the Civil Code, namely:

- a. Agreement: There is an agreement between both parties regarding the matters agreed upon. This agreement must be reached freely and without coercion.
- b. Legal Capability: Both parties making an agreement must have legal skills to carry out legal actions. This means they must be adults and of sound mind.

- c. A certain thing: The object of the agreement must be clear and definite, so that it does not give rise to different interpretations.
- d. Halal cause: The purpose of the agreement must not conflict with law or public order.

The legal basis for agreements is found in the Civil Code (KUH Perdata): In Indonesia, the main legal basis for agreements is the Civil Code. Article 1313 of the Civil Code states that "an agreement is an act by which one or more people bind themselves to one or more other people". This means that when two or more parties agree to do something, an agreement is created which has legal force.

It needs to be emphasized that the meaning in Article 1313 of the Civil Code is that an action creates an agreement, which contains a "statement of will" between the parties involved. Thus, the agreement is a "conformity of will" between the parties. Furthermore, it is also explained that not all actions or actions can give rise to legal consequences, only legal actions can produce legal consequences.

Then the use of artificial intelligence in drafting contracts, especially in this case in e-commerce transactions, E-commerce, or electronic commerce, has revolutionized the way buying and selling transactions are carried out, allowing interaction between sellers and buyers without physical meetings. In this context, in principle, electronic transactions in online commerce often create an imbalance of bargaining power between sellers and buyers. This happens because sellers often use pre-made standard contracts, giving them an advantage in negotiations (Aji, 2022). Electronic agents act as intermediaries who facilitate these transactions. According to the ITE Law and PP PSTE electronic agents, electronic agents are devices from an electronic system that

are created to carry out actions on certain electronic information automatically which are organized by people.

Electronic agents provide a platform that allows transaction processes to take place efficiently. They are responsible for the organizers to ensure that transactions can be carried out smoothly, including providing features such as cancellation and reconfirmation.

An electronic contract is a legal agreement made and agreed upon by the parties through digital means, particularly in electronic commerce activities. These contracts stem from an electronic offer and acceptance process through a computer system, application, or digital platform functioning as an electronic agent. Thus, electronic contracts are legally binding even if the parties are not conducting business face-to-face, as long as they meet the requirements for a valid agreement stipulated in applicable laws and regulations. This means that interactions between electronic agents can result in agreements without the need for direct supervision from individuals.

Related to the validity of contracts made with artificial intelligence in this case is an electronic agent. In Indonesia, the validity of contracts made through electronic agents is regulated by several regulations, including the Civil Code (KUHPerdata), Law Number 11 of 2008 concerning Electronic Information and Transactions (UU ITE) and Government Regulation No. 71 of 2019 concerning Implementation of Electronic Systems and Transactions. The following is an analysis of the validity of electronic contracts in the context of Indonesian law (Sari, 2022).

The validity of the contract is regulated in Article 1320 of the Civil Code, which stipulates four main conditions:

- a. Agreement: There is an agreement between the parties involved.

- b. Skills: The parties must have the skills to carry out legal actions.
- c. Specific Object: The contract must have a clear and specific object.
- d. Halal Cause: The contract must have a cause that does not conflict with the law.

In the context of electronic contracts, these conditions remain valid, the same thing is also regulated regarding the validity of electronic contracts as also stated in Article 46 paragraph (2) PP No. 71 of 2019:

- b. There is an agreement between the parties.
- c. carried out by competent legal subjects or those authorized to represent them in accordance with statutory provisions;
- d. There are certain things; and
- e. The object of the transaction must not conflict with statutory regulations, morality, or public order.

The ITE Law provides recognition for electronic contracts, but there is still legal uncertainty regarding their validity. Article 18 of the ITE Law states that electronic contracts are binding on the parties. Constitutional Court Decision Number 20/PUU-XIV/2016 also confirms that electronic contracts can be used as evidence, thereby providing further legal certainty regarding the validity of electronic documents. (Surdani, 2023)

Contracts made with the help of artificial intelligence (AI), especially electronic agents, give rise to legal challenges regarding their validity, especially in fulfilling the terms of the agreement and legal subject matter skills as regulated in Article 1320 of the Civil Code and Article 46 paragraph (2) PP No. 71 of 2019 (Wendra, 2024).

Agreement in the context of contract law requires a conscious statement of will from the parties involved (Lie et al., 2023). This will refers to human consciousness to give approval or accept an offer. In the case of electronic agents, AI does not have consciousness or free will like humans. AI only runs algorithms based on data and instructions that have been previously programmed by the developer or user.

In this context, the current position of Indonesian law tends to assume that agreements must still involve humans as legal subjects. Therefore, contracts that are completely made by electronic agents without human intervention have the potential to be deemed not to meet the requirements for the validity of an agreement (Ravizki, & Yudhantaka, 2022).

Then competence refers to the ability of legal subjects to carry out legal acts, which is further regulated in Article 1330 of the Civil Code, namely that only humans have legal capacity except those who are excluded (for example, minors, people with mental disorders, etc.). In this case, artificial intelligence has not been recognized as a legal subject in Indonesia, but only as a legal object (Mahardika & Priancha, 2024).

AI, as a tool or technology, does not have the legal personality required to become a legal subject (Mahardika & Priancha, 2024). Therefore, even though electronic agents can act automatically, these actions are still considered an extension of the human or legal entity (such as a company) that uses the AI.

By considering these two conditions, Consent, AI cannot fulfill the terms of an agreement because it does not have free will or consciousness as a basis for consent; Skills, AI is not recognized as a legal subject in Indonesia, so it cannot meet the skills requirements for making contracts. AI-based contractual actions must still be attributed to humans or corporations without explicit recognition, meaning that AI

does not yet satisfy the traditional contract law elements of consent and legal capacity (Talimonchik, 2021).

Therefore, contracts made entirely by electronic agents without human involvement cannot be considered valid under current Indonesian law. However, if a human or legal entity acts as the party responsible for the actions of an electronic agent, the contract can be considered valid, provided that other conditions are met, although in Indonesian law there are currently no regulations that specifically state that contracts made with the help of AI or electronic agents can be considered valid.

Alternative forms of AI accountability in Indonesian positive law can be implemented through several mechanisms. Currently, AI is not included in the two categories of legal subjects recognized in Indonesia, namely humans (natural persons) and legal entities (recht persons). Without clear legal status, AI cannot be held legally responsible for the actions it carries out. Therefore, legal responsibility for AI can be assigned to the parties involved in its development and use (Qurrahman, Ayunil, & Rahim, 2024).

However, regarding its validity, take a look at the regulations issued by UNCITRAL (the United Nations Commission on International Trade Law), also known as the United Nations International Trade Law Commission in Indonesia. The UN General Assembly established UNCITRAL in 1966 to promote the unification and harmonization of international trade law.

Through the Model Law issued by UNCITRAL (United Nations Commission on International Trade Law) as a draft model law designed to assist countries in drafting or updating their domestic laws in accordance with international standards. Model Law is not binding like international conventions, but functions as a guide or reference that

can be adopted directly or modified by countries. The *UNCITRAL Model Law on Electronic Commerce* provides a clearer framework regarding the validity of electronic contracts made with electronic agents. *Article 11 (1)* states:

*(1) In the context of contract formation, unless otherwise agreed by the parties, an offer and the acceptance of an offer may be expressed by means of data messages. Where a data message is used in the formation of a contract, that contract shall not be denied validity or enforceability on the sole ground that a data message was used for that purpose.*

In essence, the article states that a contract cannot be denied its validity just because it uses data messages (data messages) for its formation (Latifah, 2007). Actions performed by electronic agents in electronic systems can be equated with data messages as regulated in the UNCITRAL Model Law, because the results of these actions are manifested in electronic information. Electronic agents operate automatically without direct human intervention, so that their legal consequences can be regarded as part of a data message. The United Nations Convention on the Use of Electronic Communications in International Contracts affirms that contracts formed through electronic communications remain valid and binding, even though it does not specifically regulate when offers and acceptances occur in the formation of contracts (Kadly, Rosadi, & Gultom, 2021).

In addition, Article 12 of the United Nations Convention on the Use of Electronic Communications in International Contracts recognizes that contracts can be made by automatic systems (electronic agents) without human intervention at every step. For example, transactions carried out by chatbots, AI, or automated ordering systems are still considered valid even if there is no human directly supervising the process.

However, Article 11 confirms that just because a party provides an automated ordering system, it does not mean that they are automatically bound to every order that comes in. For example, if an online store has a system that allows customers to place automatic orders, that does not necessarily mean they are obliged to accept all incoming orders unconditionally. In short, electronic contracts and automated transactions have the same legal force as traditional contracts, but the intention or form of agreement to be bound remains the primary factor in determining their validity. So that internationally the use of electronic agents in preparing electronic contracts can be considered legal.

Based on the current regulations in Indonesia, it is not yet possible to provide certainty about the validity of electronic contracts made using artificial intelligence or in this case specifically electronic agents. To be able to provide legal certainty, where legal certainty regarding the validity of the contract can also become a basis for legal protection for the parties regarding liability arising from the existence of the contract. Legal certainty in contract law fundamentally depends on interpretative clarity and the predictability of contractual obligations. Comparative on contractual ambiguity demonstrate that even textual inconsistencies may generate significant interpretative disputes when legal frameworks lack specific regulatory guidance (Mikryukov, 2022). In AI-based contracts, automated decisions can lead to ambiguity because the parties often fail to grasp the system's logic. Without specific regulations, this could increase uncertainty in Indonesian positive law. The doctrine of 'change of circumstances' permits contract adjustments in the event of unforeseen circumstances (Cahyono et al., 2025). Although it is not explicitly regulated, Indonesian courts have implicitly applied it. In AI-based contracts, unpredictable outcomes raise issues of risk sharing and the

need for adjustments to contracts. The concept of anticipatory breach shows how a contract may be deemed to have been broken even before the other party has failed to perform. In Indonesia, the absence of explicit regulation concerning anticipatory breach creates uncertainty in contractual enforcement (Sulistianingsih et al., 2024). In AI-based contracts, system malfunctions or algorithmic deviations may indicate impending non-performance before a breach actually occurs. This makes clearer doctrinal guidance on preventive remedies and legal accountability necessary.

## **2. Human Rights Analysis in Artificial Intelligence-Based Contracts**

Although Indonesian positive law provides a formal framework for the validity of electronic contracts, the increasingly widespread use of *artificial intelligence (AI)* in contract formation gives rise to broader normative concerns regarding the protection of human rights. Therefore, alongside assessing legal validity and certainty, it is necessary to examine AI-based contracts from a human rights perspective, ensuring that substantive justice and fundamental rights are protected in digital transactions.

The integration of human rights into digital contract law is not merely a normative addition, but a refinement of the principle of *dignified justice* that is often discussed in contemporary human rights law literature. This approach emphasizes that contract law should not only guarantee technical formalities, but must also create a substantive space of protection for all parties to enjoy their economic rights fairly and equally in the digital space. Human rights approach becomes a relevant theoretical foundation for upholding this principle in a digital era that is increasingly influenced by AI-based automated decisions (Hogan et al., 2024)

Applying the principle of dignified justice to AI-based contract law means recognizing that it requires more than just formal consent and legal certainty. It

demands substantive safeguards to prevent weaker parties from being systematically disadvantaged by automated contractual mechanisms. Just as antitrust law balances freedom of enterprise with consumer and small business protection, contract law in the digital era must balance technological innovation with human dignity and economic justice protection (Akyuwen & Labetubun, 2025).

The digital transformation in contract law, particularly through the use of *artificial intelligence (AI)* in electronic contracts, cannot be understood solely as a value-neutral technical development. The relationship between AI and *human rights* principles is now recognized as an area of study that requires attention because AI technology can affect the exercise of fundamental human rights, both directly and indirectly. In a systematic study exploring the relationship between AI and human rights, it was found that the use of AI has the potential to have a complex impact on fundamental rights such as privacy, equality, and protection against discrimination (Mpinga et al., 2022).

In the context of electronic contracts, the use of AI in the process of drafting, negotiating, and executing contracts has the potential to impact the fulfillment of economic rights. AI that is designed without prioritizing the principles of non-discrimination and transparency can reinforce structural inequalities between parties in contractual relationships, for example between large businesses and consumers with limited resources. The issue of biased or unfair algorithms is also seen as a potential violation of human rights norms, as it can create unequal outcomes in automated actions that affect the bargaining position or economic conditions of certain parties (Lawson & Tremblay, 2023).

In addition, the application of AI in electronic contracts is closely related to the right to justice and access to effective law enforcement. The unclear legal status of AI, accountability mechanisms, and transparency of algorithm operations pose challenges for parties who suffer losses in accessing fair dispute resolution processes. Without an adequate legal framework, the use of AI can undermine the principle of *equality before the law* and access to remedies when rights are violated as a result of automated decisions. Similar concerns are noted in the literature, which emphasizes the need for AI governance oriented towards human rights principles so that procedural and substantive rights remain protected( *AI in Justice Administration and Access to Justice*, 2025) .

In the context of AI contracts, traditional *legal certainty* tends to focus on formal legal aspects such as the validity of electronic signatures and the fulfillment of contractual requirements under civil law. However, human rights studies on AI show that these automated systems can produce decisions that are non-transparent, non-accountable, or even discriminatory, which in turn affect the right to fair treatment in private legal relationships. This means that even though digital contracts may have formal certainty, without adequate human rights protections, these contracts risk reinforcing social and structural injustices (Rodrigues, 2020).

One of the fundamental risks in the use of artificial intelligence (AI) in electronic contracts is the erosion of the principle of *free and informed consent*. In civil contract law, consent is the meeting of the minds of the parties, made consciously and without coercion, as reflected in the principle of *consensus ad idem* (Lie et al., 2023). However, in the practice of AI-based contracts, particularly in standard contracts that are generated or executed automatically, the weaker party often lacks sufficient

understanding of the content, consequences, and algorithmic logic underlying the contract.

This situation has the potential to eliminate full awareness (informed awareness) on the part of the weaker party, because consent is given through a digital interface that is fast, complex, and offers minimal room for negotiation. As a result, the consent that emerges tends to be formalistic and superficial, creating an illusion of consent (*illusory consent*) rather than substantive consent born of free will (Nurzaman & Fidhayanti, 2024). From a human rights perspective, this practice has a direct impact on the right to justice and fair treatment in economic transactions, because the parties agreeing to the contract are not on an equal footing in terms of information or control (Subawa, 2024). Thus, the use of AI in electronic contracts creates a normative tension between technological efficiency and the protection of the right to meaningful consent, which is an integral part of contractual justice in a state governed by the rule of law.

The use of AI in digital contracts also reinforces *asymmetric bargaining power*, especially in standard contracts used on digital platforms and cross-border e-commerce transactions. AI enables large businesses to unilaterally design, optimize, and standardize contracts based on large-scale data analysis, while consumers or small businesses only play the role of contract recipients without any real opportunity for negotiation (Aji, 2022).

This situation creates a new form of digital discrimination, in which parties with low technological literacy or limited access to information are in an increasingly vulnerable position. This inequality has the potential to violate the principle of equality before the law, because contract law no longer functions as an instrument to balance

the interests of the parties, but instead reinforces the economic dominance of certain parties (Susiyanto & Naningsih, 2024).

From a human rights perspective, this practice also intersects with the right to consumer protection and the economic rights of vulnerable groups, as AI-based contracts may contain clauses that systematically disadvantage weaker parties without adequate corrective mechanisms. Therefore, even though such contracts meet the formal requirements for validity, substantively AI-based contracts have the potential to create structural injustices that contradict the values of social justice in modern economic law (Kusumawardani, 2019).

The next significant human rights risk in AI-based contracts is the absence of clear legal accountability. In the Indonesian legal system, AI is not yet recognized as a legal entity, so it cannot be held directly accountable for its actions or decisions (Qurrahman, Ayunil, & Rahim, 2022). This ambiguity raises serious issues when losses or breaches of contract occur in contracts generated by AI systems.

The ambiguity of the responsible legal subject, whether the developer, user, or electronic system operator, impedes victims' access to effective legal *remedies*. From a human rights perspective, this condition contradicts the basic principle that everyone has the right to fair and effective remedies when their rights are violated (Warka & Damayanti, 2024).

Furthermore, the absence of a clear accountability mechanism also has the potential to weaken the function of law as a means of protecting rights and justice. Without accountability, the use of AI in contracts can actually create a space for normative impunity, where losses suffered by weaker parties cannot be legally traced. Therefore, from the perspective of international human rights and justice theory, AI-

based contract regulations must ensure clarity of legal responsibility and access to effective remedies, as part of the protection of human rights in digital transactions (Subawa, 2024).

Based on the results of an analysis of Indonesian positive law and its comparison with international standards in the regulation of electronic contracts, it can be concluded that the regulation of artificial intelligence (AI)-based contracts in Indonesia is still oriented towards formal legal certainty and has not adequately integrated the protection of human rights as the main normative framework (Rodrigues, 2020). This approach tends to treat technology as a neutral instrument, without seriously considering the social, discriminatory, and structural impacts that the use of AI systems in contractual relationships can have (Lane, 2022).

Developments in international legal practice and discourse show a strong tendency to place human rights as the main normative framework in the regulation of digital technology and AI-based economic activities. Various studies emphasize that AI cannot be separated from the obligations of states and the responsibility of business actors to respect, protect, and fulfill human rights, particularly the rights to equality, non-discrimination, and access to justice (Bello y Villarino & Vijayarasa, 2022).

Therefore, normative recommendations in the form of reconstructive measures are needed to guarantee not only formal legal certainty, but also substantive justice and the protection of human dignity in AI-based digital contracts. This legal reconstruction is important to prevent digital contract law from becoming trapped in normative positivism, which ignores the social implications and human rights aspects of automated technology use (Agustianto & Situmeang, 2025).

First, Indonesian national law needs to explicitly recognize human rights principles as an integral part of electronic contract regulation and AI utilization. This recognition can be realized through the affirmation of the norm that any use of AI in the formation and execution of contracts must respect the fundamental rights of the parties, including the right to free and informed consent, equality before the law, and protection of parties in a weaker position (Lane, 2022).

This explicit recognition is important so that legal certainty is not narrowly understood as compliance with formal procedures, but rather as legal certainty oriented towards justice and the protection of rights. Thus, digital contract law is not trapped in normative positivism that ignores the social and human rights impacts of AI technology.

Second, normative regulations are needed that require human rights due diligence for developers, operators, and users of AI systems used in electronic contracts. This obligation includes identifying, preventing, mitigating, and taking responsibility for the potential negative impact of AI on human rights before and during the use of such systems in contractual transactions (McCorquodale et al., 2017).

This approach aligns with international business and human rights standards that emphasize businesses' responsibility for both economic profits and the social and human rights impacts of their activities. In the context of AI-based contracts, human rights due diligence is a preventive measure that helps prevent algorithmic bias, digital discrimination, and violations of the right to justice and consumer protection (Pietropaoli, 2022).

Third, AI-based electronic contract regulations need to strengthen protection mechanisms for vulnerable parties, particularly consumers and small businesses, who

are susceptible to bargaining power imbalances in automated standard contracts (Lane, 2023). This strengthening can be achieved through normative recognition of minimum rights, including:

- a. The right to explanation regarding the use of AI in the formation or execution of contracts, including an explanation of the general logic of the automated system that affects the rights and obligations of the parties;
- b. The right to object to decisions or contractual clauses that are entirely generated by AI systems;
- c. The right to cancel or review automatic contracts, especially if they cause disproportionate harm or are proven to contain structural unfairness.
- d. The strengthening of these rights is a concrete manifestation of human rights principles in digital contract law and serves as a corrective to the dominance of technology in contractual relationships.

Fourth, systematic efforts are needed to harmonize Indonesian national law with international standards for electronic contracts that recognize the use of automated and electronic systems, while emphasizing the importance of protecting rights and accountability (Fatahillah et al., 2025). This harmonization cannot be achieved simply through the technical adoption of international norms, but must be accompanied by the internalization of human rights values in the implementation of national law.

With human rights-sensitive harmonization, Indonesian contract law can move from an approach that is solely oriented towards formal certainty to an approach that balances legal certainty, justice, and the protection of human dignity in the digital age (Rodrigues, 2020).

This normative recommendation emphasizes that AI-based contracts should not be treated solely as a matter of technological efficiency and formal legality, but rather as a legal phenomenon that has direct implications for human rights. Therefore, the integration of human rights into electronic contract regulations is a prerequisite for realizing a digital economy law that is fair, inclusive, and dignified.

### C. CONCLUSION

This study shows that contract arrangements made or facilitated by artificial intelligence (AI) under Indonesian law are inadequate and do not provide comprehensive legal certainty. Although electronic contracts are recognized as valid under the Civil Code, the Electronic Information and Transactions Law, and Government Regulation No. 71 of 2019, these national regulations do not explicitly acknowledge AI's autonomous role in contract formation.

Consequently, legal uncertainty remains, particularly regarding the fulfillment of the elements of agreement and legal competence required by Article 1320 of the Civil Code, as AI lacks free will and legal subject status. The analysis also reveals a clear gap between *das sollen* and *das sein*.

International legal instruments, such as the UNCITRAL Model Law on Electronic Commerce and the United Nations Convention on the Use of Electronic Communications in International Contracts, recognize the validity of contracts formed through electronic systems and electronic agents. However, Indonesian national law has not fully aligned with these international standards, creating uncertainty about the validity, applicability, and determination of legal liability in AI-based contracts.

Furthermore, this study emphasizes that a legal approach focusing solely on formal legal certainty is insufficient. Using AI in digital contracts, especially automated standard contracts, can lead to substantive injustice. For example, it can weaken the principle of free and informed consent, create an increasingly unequal bargaining position between parties, and result in an unclear mechanism for legal accountability in the event of losses. From a human rights perspective, these conditions could violate the principles of equality before the law, non-discrimination, access to effective legal remedies, and protection of vulnerable parties.

Therefore, this study concludes that the regulation of AI-based contracts in Indonesia must focus not only on normative legal certainty, but also on substantive justice. Integrating a human rights-based approach is urgent to ensure that the use of AI in electronic contracts upholds human dignity, guarantees legal accountability, and provides fair protection for all parties. This can be achieved by affirming human rights principles in electronic contract regulations, establishing a clear legal accountability framework for AI use, providing special protection for economically and digitally disadvantaged parties, and harmonizing national laws with international legal standards.

Thus, AI-based contracts should be viewed as legal relationships with direct implications for social justice and human rights protection, not solely as instruments of technological efficiency. As Indonesia develops its contract law in the digital era, it must ensure that technological innovation goes hand in hand with protecting humans as the main subjects of law.

## REFERENCES

- Agustianto, A., & Situmeang, A. (2025). Legal Validity Of Smart Contracts For Investment Purposes: Analysis Of Indonesia's Legal Politics And Emerging Challenges. *Masalah-Masalah Hukum*, 54(2), 269–282. <https://doi.org/10.14710/mmh.54.2.2025.269-282>
- AI in justice administration and access to justice: Governing with Artificial Intelligence*. (2025, September 18). OECD. [https://www.oecd.org/en/publications/governing-with-artificial-intelligence\\_795de142-en/full-report/ai-in-justice-administration-and-access-to-justice\\_f0cbe651.html](https://www.oecd.org/en/publications/governing-with-artificial-intelligence_795de142-en/full-report/ai-in-justice-administration-and-access-to-justice_f0cbe651.html)
- Akyuwen, R. J., & Labetubun, M. A. H. (2025). *Human Rights Protection in Antitrust Law: Integrating the Principle of Dignified Justice into Antitrust Policy in Europe and Asia*. 7(1), 184–217.
- Aji, Himawan Bayu. (2022). Pengaturan Jual Beli Secara Online Berdasarkan Undang-Undang Perlindungan Konsumen Dan Undang-Undang Informasi Dan Transaksi Elektronik. *Jurnal Hukum Progresif*, Vol.10, (No.1), pp.12-24. <https://doi.org/10.14710/jhp.10.1.12-24>
- Al Fithri, Muhammad Najiib., & Priyono, Ery. Agus., Issue and Possibilities in Regulating Artificial Intelligence (AI) Related To Copyright in Indonesia. *International Journal of Social Science and Human Research*, Vol.7, (No.6), pp.4151-4158. <https://ijsshr.in/v7i6/74.php>
- Babu, Swori. & Banana, Krishna. (2024). A study on narrow artificial intelligence—an overview. *The International Journal of Engineering, Science and Advanced Technology* Vol.24 (No.4), pp.210-219. [https://www.ijesat.com/ijesat/files/V24I0428\\_1714383466.pdf](https://www.ijesat.com/ijesat/files/V24I0428_1714383466.pdf)
- Bello y Villarino, J. M., & Vijayarasa, R. (2022). *International Human Rights, Artificial Intelligence, and the Challenge for the Pondering State: Time to Regulate?* (SSRN Scholarly Paper No. 4193208). Social Science Research Network. <https://doi.org/10.2139/ssrn.4193208>
- Busro, Ahmad. (2011). *Hukum Perikatan Berdasar Buku III KUH Perdata*. Yogyakarta: Pohon Cahaya.
- Cahyono, A. B., Pangaribuan, T. M. P., & Raumanen, V. D. (2025). A Change of Circumstances and Contract Adjustment: Indonesian Law and Beyond. *Journal of Indonesian Legal Studies*, 10(1), 349–390. <https://doi.org/10.15294/jils.v10i1.1592>
- Downey, Cameron. (2021). Roger Brownsword (2020) Law 3.0: Rules, Regulation and Technology. *Law, Technology and Humans*, Vol.3,(No.1),pp.151-153. <https://doi.org/10.5204/lthj.1838>
- Fatahillah, J. N. Y., Sabani, A., Najib, R. F. H., & Rajib, R. K. (2025). Analisis Hukum

Keabsahan Kontrak Elektronik sebagai Salah Satu Bentuk Kesepakatan Transaksi Elektronik Berdasarkan Perundang-undangan di Indonesia. *Amandemen: Jurnal Ilmu Pertahanan, Politik Dan Hukum Indonesia*, 2(4), 227–238. <https://doi.org/10.62383/amandemen.v2i4.1414>

Hogan, L., Lasek-Markey, M., Hogan, L., & Lasek-Markey, M. (2024). Towards a Human Rights-Based Approach to Ethical AI Governance in Europe. *Philosophies*, 9(6). <https://doi.org/10.3390/philosophies9060181>

Kadly, Eureka. Inola., Rosadi, Sinta. Dewi., & Gultom, Elisatris. (2021). Keabsahan Blockchain-Smart Contract Dalam Transaksi Elektronik: Indonesia, Amerika Dan Singapura. *Jurnal Sains Sosio Humaniora*, Vol.5, (No.1), pp.199-212. <https://www.researchgate.net/publication/353606809>

Kitab Undang-Undang Hukum Perdata (KUHP)

Kurniawijaya, Yudityastri, & Zuama, (2021). Pendayagunaan artificial intelligence dalam perancangan kontrak serta dampaknya bagi sektor hukum di Indonesia. *Khatulistiwa Law Review*, Vol.2,(No.1),pp.260-279. <https://e-journal.iainptk.ac.id/index.php/khalrev/article/view/108>

Kurniawan, F., Nugraha, X., Putra, G. A., Taniady, V., & Jansen, B. (2022). The Principle of Balance Formulation as the Basis for Cancellation of Agreement in Indonesia. *Lex Scientia Law Review*, 6(1), 121–156. <https://doi.org/10.15294/lesrev.v6i1.55468>

Kusumawardani, Qur'ani. Dewi. (2019). Hukum Progresif Dan Perkembangan Teknologi Kecerdasan Buatan. *Veritas et Justitia*, Vol.5, (No.1),pp.166-190. <https://journal.unpar.ac.id/index.php/veritas/article/view/3270>

Lane, L. (2022). CLARIFYING HUMAN RIGHTS STANDARDS THROUGH ARTIFICIAL INTELLIGENCE INITIATIVES. *International & Comparative Law Quarterly*, 71(4), 915–944. <https://doi.org/10.1017/S0020589322000380>

Lane, L. (2023). Artificial Intelligence and Human Rights: Corporate Responsibility in AI Governance Initiatives. *Nordic Journal of Human Rights*, 41(3), 304–325. <https://doi.org/10.1080/18918131.2022.2137288>

Latifah, Emmy. (2007). E-Contract Dalam Perspektif Hukum Perdagangan Internasional. *Syiar Hukum*, Vol.9,(No.3),pp.232-247. <https://doi.org/10.29313/sh.v9i3.480>

Lawson, A., & Tremblay, D. (2023). AI Bias as a Human Rights Violation: Legal Standards and Judicial Remedies in Automated Decision Systems. *Legal Studies in Digital Age*, 2(1), 53–67.

Lie, Cathleen., Clarosa, Vivian., Yonatan, Yohanes. Andre., & Hadiati, Mia. (2023). Pengenalan Hukum Kontrak dalam Hukum Perdata Indonesia. *Jurnal Kewarganegaraan*, Vol.7, (No.1),pp.918-924. <https://journal.upy.ac.id/index.php/pkn/article/view/4831>

- Mahardika, Zahrashafa Putri., & Priancha, Angga. (2024) Pengaturan Hukum Artificial Intelligence Indonesia Saat Ini. Retrieved from <https://law.ui.ac.id/pengaturan-hukum-artificial-intelligence-indonesia-saat-ini-oleh-zahrashafa-pm-angga-priancha/>
- Mertokusumo, Sudikno. (2005). *Mengenal Hukum*. Liberty: Yogyakarta.
- Mertokusumo, Sudikno. (2009). *Penemuan Hukum*. Liberty: Yogyakarta.
- McCorquodale, R., Smit, L., Neely, S., & Brooks, R. (2017). Human Rights Due Diligence in Law and Practice: Good Practices and Challenges for Business Enterprises. *Business and Human Rights Journal*, 2(2), 195–224. <https://doi.org/10.1017/bhj.2017.2>
- Mikryukov, V. A. (2022). Legal Analogy in the Cases of Overcoming a Contract's Verbal and Numerical Ambiguity. *Laws*, 11(5), 76. <https://doi.org/10.3390/laws11050076>
- Mpinga, E. K., Bukonda, N. K. Z., Qailouli, S., & Chastonay, P. (2022). Artificial Intelligence and Human Rights: Are There Signs of an Emerging Discipline? A Systematic Review. *Journal of Multidisciplinary Healthcare*, 15, 235–246. <https://doi.org/10.2147/JMDH.S315314>
- Niklas, J. (2020). Human Rights-Based Approach to AI and Algorithms: Concerning Welfare Technologies. In W. Barfield (Ed.), *The Cambridge Handbook of the Law of Algorithms* (pp. 517–542). Cambridge University Press. <https://doi.org/10.1017/9781108680844.025>
- Novel, M., Ardianto, B. C., Athayya, K. A., Meiliani, M., & Yuwono, L. G. (2025). Penggunaan Artificial Intelligence dalam Penyusunan Kontrak Digital: Analisis Validitas dan Kepastian Hukum di Indonesia. *Journal of Community Development*, 6(1), 547–554. <https://doi.org/10.47134/comdev.v6i1.1758>
- Nurzaman, J., & Fidhayanti, D. (2024). Keabsahan Kontrak yang dibuat oleh Artificial Intelligence Menurut Hukum Positif di Indonesia. *Al-Adl : Jurnal Hukum*, 16(1), 140–159. <https://doi.org/10.31602/al-adl.v16i1.12710>
- PP No. 71 Tahun 2019 tentang Penyelenggaraan Sistem dan Transaksi Elektronik (PSTE).
- Puspitosari, Hervina. (2019). Implikasi Globalisasi Teknologi Internet Terhadap Perubahan Sosial Dengan Merebaknya Perdagangan Online Melalui Perusahaan Pialang Berjangka Dan Perlindungan Hukum Terhadap Nasabahnya. *Jurnal Pro Hukum: Jurnal Penelitian Bidang Hukum Universitas Gresik*, Vol.8, (No.1), pp.52–71. <http://journal.unigres.ac.id/index.php/JurnalProHukum/article/view/865/726>
- Pietropaoli, I. (2022). Artificial Intelligence And Data Governance A Business and Human Rights Approach. *Singapore Academy of Law Journal*, 34(1), 795–833.

- Qurrahman, Hardiyanti Shofika., Ayunil, Safira., & Rahim, Tsabita Aurelia. (2022). Kedudukan Dan Konsep Pertanggungjawaban Artificial Intelegence Dalam Hukum Positif Indonesia. *UNES Law Review*, Vol.6, (No.4), pp.12687-12693. <https://doi.org/10.31933/unesrev.v6i4.2108>.
- Rahardjo, Satjipto. (2006). *Hukum dalam Jagat Ketertiban*. Jakarta: UKI Press.
- Rahardjo, Satjipto. (2012). *Ilmu Hukum*. Bandung: Citra Aditya Bakti.
- Ravizki, Eka. Nanda., & Yudhantaka, Lintang. (2022). Artificial Intelligence Sebagai Subjek Hukum: Tinjauan Konseptual dan Tantangan Pengaturan di Indonesia. *Notaire*, Vol.5, (No.3),pp.351–376. <https://doi.org/10.20473/ntr.v5i3.39063>
- Reier Forradellas, R. F., & Garay Gallastegui, L. M. (2021). Digital Transformation and Artificial Intelligence Applied to Business: Legal Regulations, Economic Impact and Perspective. *Laws*, 10(3), 70. <https://doi.org/10.3390/laws10030070>
- Rodrigues, R. (2020). Legal and human rights issues of AI: Gaps, challenges and vulnerabilities. *Journal of Responsible Technology*, 4, 100005. <https://doi.org/10.1016/j.jrt.2020.100005>
- Santoso, Hari Agus. (2021). Perspektif Keadilan Hukum Teori Gustav Radbruch Dalam Putusan Pkpu “PTB”. *JATISWARA*, Vol.36, (No.3), pp.325–334. <https://doi.org/10.29303/jtsw.v36i3.341>
- Sari, Ikka. Puspita. (2022). Keabsahan Perjanjian Kontrak Elektronik Dalam Transaksi E-Commerce Di Tinjau Dari Hukum Perdata. *AL WASATH Jurnal Ilmu Hukum*, Vol.3, (No.2), pp.105-112. <https://doi.org/10.47776/alwasath.v3i2.613>
- Subawa, I Made Mulyawan. (2024) Challenges of Using Artificial Intelligence in Contract Drafting: How Should AI Legal Liability Be?. *Kertha Patrika*, Vol.46,(No.2),pp.143-156, <https://ojs.unud.ac.id/index.php/kerthapatrika/article/view/113769>
- Sudarini, N. L. P. (2023). Keabsahan Kontrak Secara Elektronik Sebagai Alat Pembuktian Di Tinjau secara Hukum Perdata. *Jurnal Hukum Dan Sosial Politik*, Vol.1, (No.4), pp.1-18. <https://doi.org/10.59581/jhsp-widyakarya.v1i1>
- Susiyanto, Dian., & Naningsih. (2024). Pengaruh Artificial Intelligence Terhadap E Business dan E Commerce. *Neraca: Jurnal Ekonomi, Manajemen dan Akuntansi*, Vol.2, (No.1), pp.482-486. <https://jurnal.kolibi.org/index.php/neraca/article/view/820/768>
- Sulistianingsih, D., Wijaya, C. C., Yusoff, R. M., & Adhi, Y. P. (2024). Juridical Consequences of Anticipatory Breach as a Form of Breach of a Contract. *Journal of Indonesian Legal Studies*, 9(1), 131–154. <https://doi.org/10.15294/jils.vol9i1.4537>

Talimonchik, V. P. (2021). The Prospects for the Recognition of the International Legal Personality of Artificial Intelligence. *Laws*, 10(4), 85. <https://doi.org/10.3390/laws10040085>

Umar. Wahyudi, Sudirman, Rasmuddin, (2023) Artificial General Intelligence (AGI) and Its Implications For Contract Law. *Indonesian Journal of Artificial Intelligence and Data Mining*, Vol.6,(No.1),pp.116-121. <http://dx.doi.org/10.24014/ijaidm.v6i1.24704>

UU No. 11 Tahun 2008 tentang Informasi dan Transaksi Elektronik (UU ITE)

Warka, Made., & Damayanti, Miranda. (2024). LEGALITAS HUKUM PENGGUNAAN ARTIFICIAL INTELLIGENCE (AI) DALAM PEMBUATAN PERJANJIAN. *Hukum Dinamika Ekselensia*, Vol.6,(No.4),pp.105-112. <https://journalpedia.com/1/index.php/hde/article/view/3767>

Wendra, Ario. (2024). Study Of Raw Contracts in Electronic Contracts in The Digital Era Based on Indonesian Contract Law. *Strata Law Review*, Vol.2,(No.1),pp.20-50. <https://doi.org/10.59631/slr.v2i1.103>.