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Reformulation of Electronic Evidence in Forex Trading Manipulation Crimes

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The aim of this study is to find the root causes of problems in legislation and weaknesses of law enforcement officials in maintaining the validity and authenticity of electronic evidence in cases of forex trading manipulation, as well as to reformulate relevant laws after identifying the root causes of the problems.

The method used in this study is a normative juridical method using a legislative approach to analyze regulations related to the examination of electronic evidence and a conceptual approach in reformulating relevant regulations. Data was obtained through analysis of legislation, literature, and relevant legal doctrines.

The novelty of this research lies in its focus on regulatory reform related to electronic evidence in forex trading manipulation crimes. It not only involves reformulation but also determines how the novel aspects of legal practice should be implemented.

The results of this study indicate that regulations on electronic evidence, particularly Artificial Intelligence (AI) in forex trading, still need to be reformulated to accommodate technological developments, especially in terms of authenticity. The lack of knowledge of law enforcement officials in the field of technology is also a priority in determining how law enforcement officials carry out their duties as investigators in technology-based crimes.

The study concludes that the existing weak regulations and the lack of knowledge of law enforcement officials in maintaining the validity of electronic evidence in cases of manipulation need to be strengthened through the reformulation of laws and regulations and the expansion of knowledge in technology for law enforcement officials. With more adaptive and comprehensive reformulation, the evidence system in forex trading cases can be more effective and provide better legal protection.

Keywords: Reformulation; Electronic evidence; Forex trading.

Abstrak

Tujuan penelitian ini untuk menemukan akar masalah dalam peraturan perundang-undangan maupun kelemahan dari aparat penegak hukum dalam menjaga keabsahan dan keautentikan alat bukti elektronik dalam kasus tindak pidana manipulasi trading forex sekaligus melakukan reformulasi terhadap undang-undang yang berkaitan setelah ditemukan akar permasalahan yang terjadi

Metode penelitian yang dilakukan yakni dengan metode yuridis normatif dengan menggunakan pendekatan peraturan perundang-undangan untuk menganalisa regulasi yang berkaitan dengan pemeriksaan alat bukti elektronik serta pendekatan konseptual dalam melakukan reformulasi peraturan yang berkaitan. Data diperoleh melalui analisa peraturan perundang-undangan, studi literatur, serta doktrin hukum yang relevan.

Kebaruan penelitian ini memiliki perbedaan dengan penelitian lainnya dalam aspek reformasi regulasi terkait alat bukti elektronik dalam tindak pidana manipulasi trading forex. Tidak hanya

reformulasi saja, tetapi menentukan bagaimana aspek kebaruan praktik hukum yang harus dijalani.

Hasil penelitian menunjukkan bahwa regulasi mengenai alat bukti elektronik terkhusus pada Artificial Intelligence (AI) dalam kegiatan trading forex masih perlu direformulasikan agar dapat mengakomodir perkembangan teknologi terkhusus pada aspek keautentikan. Kelemahan pengetahuan aparat penegak hukum dalam aspek teknologi juga menjadi prioritas dalam menentukan bagaimana aparat penegak hukum menjalankan tugasnya sebagai penyidik dalam suatu tindak pidana berbasis teknologi.

Kesimpulan dari penelitian ini adalah lemahnya regulasi yang ada dan pengetahuan aparat penegak hukum yang minim dalam menjaga keabsahan alat bukti elektronik jika terjadi manipulasi di dalam nya perlu diperkuat dengan adanya reformulasi peraturan perundang-undangan dan juga perluasan pengetahuan dalam aspek teknologi bagi aparat penegak hukum. Dengan adanya reformulasi yang lebih adaptif dan komprehensif, sistem pembuktian dalam kasus trading forex dapat lebih efektif dan mampu memberikan perlindungan hukum yang baik.

Kata Kunci: Reformulasi; Alat bukti elektronik; Trading Forex.

1. INTRODUCTION

The Industrial Revolution 4.0 emphasizes legal systems that are capable and responsive to rapid technological developments. Sajipto Rahardjo stated that "laws are for humans, not humans for laws," meaning that if laws are not in line with the needs of society, they must be adapted to the developments of the times and the needs of humans at that time.¹ This poses challenges and pressures for law enforcement officials and other judicial institutions, namely the emergence of new crimes that follow technological developments and the difficulty of maintaining the authenticity of evidence, including electronic evidence, due to the absence of comprehensive regulations or guidelines governing the maintenance of the authenticity of electronic evidence in the event that such evidence is manipulated.

In uncovering a criminal act, the stage of proof is the most important stage in the criminal justice process because it is during this examination that the material truth is investigated, and this proof is already laid down in the Criminal Procedure Code (KUHP). In legal science, there are four types of evidence or theories of evidence, namely the theory of positive evidence (*positief wettelijke bewijs theorie*), which is based solely on the conviction of the judge (conviction in time), based on the conviction of the judge with rational reasons (*conviction raisonnee*), and negatively (*negatief wettelijke bewijs theorie*).² The Criminal Procedure Code accommodates a negative proof system, which means that in order to impose a criminal sentence, at least two pieces of evidence must be presented in accordance with the Criminal Procedure Code, and the judge must also be convinced that the defendant is guilty.³

¹ H Supandi, "Modernisasi Peradilan Tata Usaha Negara Di Era Revolusi Industri 4.0 Untuk Mendorong Kemajuan Peradaban Hukum Indonesia," *Professor Inauguration Speech Universitas Diponegoro*, 2019. Retrieved by <https://scispace.com/papers/modernisasi-peradilan-tata-usaha-negara-di-era-revolusi-21h5orvbsa>.

² Ni Putu Riyani Kartika Sari and Ni Luh Putu Geney Sri Kusuma, "Eksistensi Teori Pembuktian Positif Wettelijk Bewijstheorie Dalam Pembuktian Perkara Perdata," *Jurnal Akses* 12, no. 2 (2020): 132–40. DOI: <https://doi.org/10.70358/jurnalakses.v12i2.695>.

³ Aidil Akbar and Fadillah Sabri, "Kekuatan Pembuktian Dalam Persidangan Perkara Pidana Secara Elektronik,"

If one of these elements is not fulfilled, the judge cannot pass sentence on the defendant.

In the judicial system, there is an expansion of evidence tools, namely electronic evidence. The role of electronic evidence is significant because electronic information and/or electronic documents and/or their printed outputs are valid evidence, which constitutes an expansion of evidence tools under the applicable procedural law in Indonesia, provided that such electronic information and/or electronic documents are created using an electronic system in accordance with the provisions of Law No. 11 of 2008 on Information and Electronic Transactions, as amended by Law No. 1 of 2024 on the Second Amendment to Law No. 11 of 2008 on Information and Electronic Transactions, hereinafter referred to as the ITE Law.⁴

The rapid development of information technology has changed several aspects of life, one of which is the economy and trade. From this aspect, one of the most prominent activities today is investment. Investment is the activity of placing capital for a certain period of time with the aim of making a profit. Generally, this activity uses tangible goods such as land, gold, houses, and bonds as objects of capital investment. Investment activities have been increasingly updated with the advent of stocks, forex, and crypto.⁵ The high returns attract people to electronic investment because it is easy to invest using software that can be accessed anywhere and anytime. Because of this, criminals take advantage of people's interest by turning investment activities in the form of forex trading into their *modus operandi*.

Investment activities in the form of foreign exchange trading are included in Commodity Futures Trading, specifically under Futures Brokers. Commodity Futures Trading is the buying and selling of goods, services, rights, and other interests through margin trading, with settlement based on contracts regulated under the "Law No. 10 of 2011 Amending Law No. 32 of 1997 on Commodity Futures Trading."⁶ In conducting Futures Brokerage activities, several stages must be carried out, starting from registration to licensing in accordance with the "Decree of the Head of the Commodity Futures Trading Supervisory Agency Number 4 of 2018 concerning Technical Provisions on the Conduct of Futures Brokers." The decision also stipulates that "such activities may only be conducted by companies in the form of a limited liability company that are registered as members of a futures exchange and have obtained a business license from the Commodity Futures Trading Supervisory Agency (BAPPEBTI) for both the business activities and the systems used" in forex trading activities.⁷

Soumatara Law Review 4, no. 1 (2021): 120–34. Retrieved by <https://scientiacatalysis.org/index.php/soumlaw/article/view/367>.

⁴ Supardi, "Mengukur Kekuatan Alat Bukti Elektronik Dalam Pembuktian Perkara Tindak Pidana Korupsi," *Syntax Literate: Jurnal Ilmiah Indonesia* 6, no. 5 (2021), Retrieved by <http://jurnal.syntaxliterate.co.id/index.php/syntaxliterate/article/view/2724>.

⁵ Mohamamd Farosi and Widhi Cahyo Nugroho, "Investasi Ilegal Berkedok Robot Trading Menurut Hukum Pidana Di Indonesia," *Bureaucracy Journal: Indonesia Journal of Law and Social-Political Governance* 2, no. 1 (2022): 590–603. Doi: <https://doi.org/10.53363/bureau.v2i1.152>.

⁶ Undang-Undang Republik Indonesia Nomor 10 Tahun 2011 Tentang Perubahan Atas Undang-Undang Nomor 32 Tahun 1997 Tentang Perdagangan Berjangka Komoditi. Diakses dari <https://peraturan.bpk.go.id/Details/39186/uu-no-10-tahun-2011>.

⁷ Imelia Santoso, "Peraturan BAPPEBTI Yang Penting Dalam Trading Forex," blog.hsb.co.id, 2025, Diakses dari <https://blog.hsb.co.id/forex/regulasi-trading-forex-bappebti/>.

The perpetrators carried out their crimes by offering investment services using trading robots, which are a type of software that automatically analyzes the forex market to identify profit opportunities and execute transactions according to the robot's programming. Participants do not need to conduct manual analysis, as all trading activities are handled by the trading robot. Trading robots have high analytical accuracy, thereby minimizing potential losses. This method is employed by criminals to avoid detection by law enforcement agencies, as the investment activities appear to be legitimate.⁸

The emergence of forex trading activities has provided numerous opportunities for individuals and institutions to participate in global currency trading. However, this has also increased the opportunities for criminals to carry out their activities in manipulating forex trading. The Ombudsman has reported 20 (twenty) cases of forex investment fraud, accumulated from 2021 to 2023, with total losses amounting to Rp. 63,000,000,000 (sixty-three billion rupiah).⁹

With the emergence of such cases, new challenges have arisen in terms of transaction security and integrity, with transactions being manipulated to make participants believe that the data they receive is accurate, thereby causing losses to various parties. Therefore, it is necessary to reformulate the regulations governing the handling of forex trading cases.

The complexity of licensing makes forex trading a lucrative field for criminals. Several complaints received by BAPPEBTI from customers include the financial and economic backgrounds of customers being unknown to futures brokers, margin deposits being made before the signing of transaction agreements, and failure to disclose that the investment carries high risks to be faced by clients, providing misleading information, including profit sharing with robots and promises of fixed income; transactions conducted unilaterally by Futures Brokerage Representatives without written instructions or notification from clients, clients were not given the opportunity to use a demo account for investment testing, or the demo account was only used as an example and operated by the Futures Brokerage Representative, Online administrative registration is not done by the customer themselves; funds are deposited through the brokerage agent's account, whereas customers should make direct deposits to the brokerage firm; there is no risk disclosure by the brokerage firm; and customers cannot withdraw funds within an undefined timeframe.¹⁰

Previous research entitled "The Use and Issues of Artificial Intelligence in Human Life and Its Legal Regulation" explains the benefits and issues faced by law enforcement officials in determining the category of Artificial Intelligence.¹¹ However, the study did not include detailed regulations on the supervision of robot use to prevent manipulation during

⁸ Farosi and Nugroho, *Op.cit.*

⁹ Kumparan Bisnis, "Ombudsman Minta Bappebti Tuntaskan Kasus Investasi Bodong, Kerugian Rp 63 M," *kumparan.com*, 2023, Diakses dari <https://kumparan.com/kumparanbisnis/ombudsman-minta-bappebti-tuntaskan-kasus-investasi-bodong-kerugian-rp-63-m-1zl2f4VXfEB>.

¹⁰ BAPPEBTI, "PENGATURAN DAN PENINDAKAN DI BIDANG PERDAGANGAN BERJANGKA KOMODITI," 2022. Diakses dari https://bappebti.go.id/bahan_literasi/detail/7271.

¹¹ M.D.Akbar, "Pemanfaatan Dan Permasalahan Artificial Intelligence Dalam Kehidupan Manusia Serta Pengaturannya Secara Hukum," *Media Hukum Indonesia* 2, no. 2 (2024). <https://doi.org/10.5281/zenodo.12169651>.

inspections by law enforcement officials.

The study entitled "The Effectiveness of Electronic Evidence in the ITE Law as an Extension of the System of Evidence in the Criminal Procedure Code" explains the effectiveness of electronic evidence as an extension of evidence in court proceedings. However, efforts by law enforcement officials to expand this policy are still minimal, especially with regard to the role of judges.¹² Therefore, this study will discuss legal regulations regarding updated regulations in terms of law enforcement efforts to maintain the authenticity of electronic evidence itself.

In his study entitled "The Urgency of Formulating Regulations on Artificial Intelligence Technology," M. Wildan Mufti only explains the important aspects of drafting a law on AI and the problems encountered in the formulation of the law.¹³ This study will design a reformulation related to the clarity of Artificial Intelligence as electronic evidence and provide recommendations for the creation of guidelines for law enforcement officials in maintaining the authenticity of electronic evidence.

Then, in an article entitled "Forex Law in Indonesia, Is There Any Regulation?" discusses the legality of forex trading, which is indeed regulated by Law No. 32 of 1997 on Commodity Futures Trading, further reinforced by the Jakarta Futures Exchange (BBJ) Decision No. 037/DIR BBJ/11/02 on Margin Forex Trading.¹⁴ However, there are no detailed regulations regarding the supervision of robot use to prevent manipulation during inspections by law enforcement officials.

Legally, Indonesian law on evidence has not yet accommodated electronic systems and/or electronic documents. However, "new laws have regulated electronic evidence as a valid means of evidence, including Law No. 30 of 2002 on the Corruption Eradication Commission, Law No. 24 of 2003 on the Constitutional Court, the ITE Law, and Law No. 30 of 2014 on Administrative Governance, which regulates decisions by officials in electronic form, thereby shifting the concept of the subject matter in administrative disputes from written to electronic form."¹⁵

The examination of electronic evidence, particularly trading robots as a means used in carrying out the *modus operandi* of forex trading, is important in handling cases of technological manipulation. However, the examination of such evidence has not been discussed in detail in the current legislation. This creates a gap in assessing whether the tools and infrastructure used by criminals are correlated with the crimes they commit, meaning whether the crimes are the fault of the robot itself or whether there is human manipulation

¹² N. Rahmad et al., "Efektivitas Bukti Elektronik Dalam Uu Ite Sebagai Perluasan Sistem Pembuktian Dalam Kuhap," in *Prosiding University Research Colloquium*, 2023, 96–111. Retrieved by <https://repository.urecol.org/index.php/proceeding/article/view/2279>.

¹³ M. W Mufti et al., "Urgensi Pembentukan Peraturan Perundang-Undangan Teknologi Berbasis Artificial Intelligence," *Socius: Jurnal Penelitian Ilmu-Ilmu Sosial* 1, no. 11 (2024). DOI: <https://doi.org/10.5281/zenodo.11422903>.

¹⁴ Adi Nugroho, "HUKUM FOREX DI INDONESIA, ADAKAH YANG MENGATURNYA ?," www.foreximf.com, 2021, Diakses dari <https://www.foreximf.com/blog/forex/hukum-forex>.

¹⁵ D Asimah, "Menjawab Kendala Pembuktian Dalam Penerapan Alat Bukti Elektronik To Overcome The Constraints Of Proof In The Application Of Electronic Evidence," *Puslitbang Hukum Dan Peradilan Ditjen Badan* 3, no. 2 (2020). DOI: <https://doi.org/10.25216/peratun.322020.97-110>.

involved.

Although there is already the ITE Law as a basis for expanding electronic evidence and several other regulations, it cannot yet be said that procedural law accommodates electronic evidence in its proceedings. Due to the binding nature of procedural law for all parties, including judges, further regulations regarding electronic evidence are urgently needed to maintain the validity and authenticity of such evidence.

The difficulty of determining the existence of AI manipulation in forex trading activities and the weaknesses in various regulations pose a challenge for law enforcement officials in carrying out their duties in detecting criminal acts of manipulation in forex trading activities. This makes it difficult to find visible or clear evidence to prove the existence of an electronic crime.

In light of this, the author aims to propose a reformulation of existing regulations regarding the examination of electronic evidence, particularly in cases involving the use of robots in forex trading manipulation crimes, to ensure that there is no legal vacuum for law enforcement authorities and the public, and to prevent similar criminal acts that result in significant losses for victims.

2. METHOD

This article was written using the normative legal method. Normative legal study is a process of searching for legal regulations, legal principles, or legal doctrines that can provide answers to legal problems accompanied by primary legal materials in the form of the Criminal Procedure Code, the Electronic Information and Transaction Law, the European Union AI Act, Government Regulation No. 71 of 2019, Minister of Communication and Information Technology Regulation No. 3 of 2021, and Indonesian National Police Regulation No. 10 of 2009, as well as secondary legal materials in the form of journals, books, and related documents. Using the normative legal method, this study does not need to resolve the legal issues that arise by directly visiting the field, as this method emphasizes existing legal norms. The materials used as "support for the author in analyzing these legal issues" the author employs qualitative analysis and interpretation techniques, which involve processing data from the legal materials obtained, accompanied by a regulatory approach as evidence to strengthen comparisons. Additionally, a conceptual approach is used in constructing regulatory reformulations, and a case study approach is employed to explore the legal issues present in this problem.

3. DISCUSSION

3.1. Challenges Faced by Law Enforcement Officials in Maintaining the Validity of Electronic Evidence in Forex Trading Manipulation Crimes

Evidence is an important step in the legal process in court, especially in preventing cybercrime. The use of law to prevent and combat cybercrime is very important given the threats and losses to various parties arising from the development of information technology. The purpose of law enforcement is to find perpetrators of criminal acts through the application

of appropriate laws aimed at finding material truth.¹⁶ To find the material truth, one of the elements is the need for supporting evidence. This is stipulated in Article 184 of the Criminal Procedure Code, which relates to criminal acts and is not limited to objects that can be used as evidence, ranging from witness statements, expert testimony, documents, clues, and statements made by the defendant. The purpose of evidence is to enable the judge to form a conviction that the defendant has committed the criminal act.¹⁷

With the emergence of legal issues related to technology, known as cybercrime, criminal procedure law continues to evolve. Therefore, cyber law has emerged as a response to legal issues in the field of technology that are developing in society, particularly those related to electronic information and transactions. "The Law of the Republic of Indonesia Number 11 of 2008 concerning Electronic Information and Transactions, hereinafter referred to as the ITE Law, is the initial regulation governing cyber law, which has since been amended by the Law of the Republic of Indonesia Number 1 of 2024 concerning the Second Amendment to Law Number 11 of 2008 concerning Electronic Information and Transactions." The scope of evidence has been expanded as stated in Article 5 (1) of the ITE Law: "Electronic information and/or electronic documents and/or their printed outputs are valid evidence." This provision serves as the foundational guideline for law enforcement authorities to seek a broader range of evidence in cases involving electronic information and transaction-related crimes.¹⁸

In Article 1 Paragraph (3) of the ITE Law, information technology can be defined as a method for collecting, preparing, storing, processing, announcing, analyzing, and/or disseminating information. With the ITE Law in effect, new regulations regarding electronic evidence have emerged. Furthermore, Article 5 Paragraph 3 of the ITE Law states that "electronic information and/or documents are deemed valid if used by an electronic system in accordance with the regulations set forth in the ITE Law." Therefore, the use of "electronic information and documents as evidence may be considered valid provided that the electronic system meets the requirements of Article 6 of the ITE Law, namely that it is accessible, displayable, its confidentiality is guaranteed, and it can be held accountable for explaining" an event.¹⁹

Due to its unstable nature, digital evidence cannot be directly used as evidence in court. Therefore, there are certain requirements for digital evidence to be legally recognized, namely the data must be acceptable to all parties and usable for legal purposes from the investigation stage to the court stage, the evidence used must be original and related to the actual events and not fabricated, the evidence presented must be complete, containing and producing clues that can assist the investigation, and the evidence must be credible to all parties if it is indeed related to the case in question, and this requirement is mandatory.

¹⁶ I Putu Krisna Adhi, "Rekaman Elektronik Personal Chat Pada Social Media Sebagai Alat Bukti," *Media Iuris* 1, no. 3 (2018). DOI: <https://doi.org/10.20473/mi.v1i3.9829>.

¹⁷ N. Rahmad et al., *Op.cit.*, Hal.4.

¹⁸ Ramiyanto Ramiyanto, "Bukti Elektronik Sebagai Alat Bukti Yang Sah Dalam Hukum Acara Pidana," *Jurnal Hukum Dan Peradilan* 6, no. 3 (2017): 463–84. DOI: 10.25216/JHP.6.3.2017.463-484

¹⁹ Asimah, *Op.cit.*

The ITE Law stipulates the minimum requirements for evidence that can be used in court, including²⁰ able to retrieve electronic documents and information that have been collected in their entirety and comprehensively in accordance with the retention period stipulated by law, able to maintain the integrity, accuracy, confidentiality, and accessibility of electronic data in the operation of electronic systems, capable of operating in accordance with the operating instructions of the electronic system used, The availability of procedures or instructions in the form of information language or symbols that can be understood by all parties involved in the operation of electronic systems; and having a sustainable mechanism to maintain the currency, clarity, and accountability of established procedures or instructions.

The evidence mentioned in Article 184 of the Criminal Procedure Code, which is considered as *lex generalis*, is limited to witness testimony, expert testimony, documents, clues, and the defendant's testimony as valid evidence, so there is a need to expand the evidence to accommodate evidence in cybercrime, namely the ITE Law as *lex specialis*. In cybercrime cases, the provisions of the Cybercrime Criminal Procedure Code share similarities with the provisions of the Criminal Procedure Code.²¹ In cybercrime, the scope and types of evidence have been expanded to include electronic evidence, which requires special attention from law enforcement officials. However, positive law in Indonesia does not explain in detail the steps to be taken to protect the authenticity of electronic evidence in the event of manipulation during or after examination.

The European Union Artificial Intelligence Act (EU AI Act) is a regulation governing the use of artificial intelligence in Europe. This law aims to create a balance between the protection of rights, fundamental freedoms, and responsible innovation. With a risk-based approach, the EU AI Act classifies artificial intelligence systems based on their level of risk to society, the risks they pose, and the regulations that govern them. For example, high-risk AI systems must undergo rigorous evaluation, including impact analysis and the implementation of risk mitigation measures. To prevent manipulation, transparency of information is a key factor, such as providing users with notifications when they interact with AI systems. Additionally, national authorities have the authority to oversee the implementation of these regulations and impose sanctions on those who violate them.²²

To date, there has been no comprehensive discussion in Indonesia regarding Artificial Intelligence, hereinafter referred to as AI, and its impact on Indonesian law. AI, or artificial intelligence, is a series of technological systems programmed to think and act like humans to solve problems or perform tasks. Additionally, AI can be defined as a tool that supports human-like thinking and reasoning processes based on given instructions. Given this, it is

²⁰ "Lihat Pasal 6 Undang-Undang Nomor 11 Tahun 2008 tentang Informasi dan Transaksi Elektronik sebagaimana yang telah diubah dengan Undang-Undang Nomor 1 Tahun 2024 tentang Perubahan atas Undang-Undang Nomor 11 Tahun 2008 tentang Informasi dan Transaksi Elektronik". <https://peraturan.bpk.go.id/details/274494/uu-no-1-tahun-2024>.

²¹ Nurlaila Isima, "Kedudukan Alat Bukti Elektronik Dalam Pembuktian Perkara Pidana," *Gorontalo Law Review* 5, no. 1 (2022): 179–89. DOI: <https://doi.org/10.32662/golrev.v5i1.1999>.

²² The Conversation, "Dua Sisi EU AI Act: 10 Hal Yang Bisa Dipelajari Indonesia," *theconversation.com*, 2024, Diakses dari <https://theconversation.com/dua-sisi-eu-ai-act-10-hal-yang-bisa-dipelajari-indonesia-239824>.

crucial for all countries to establish specific regulations regarding AI. However, the ITE Law, as legislation governing electronic systems, does not explicitly address AI.²³

In the Electronic Information and Transaction Law, AI is classified as an electronic system and electronic agent based on the characteristics of Article 1 Paragraph 5 of the Electronic Information and Transaction Law, which states that it is "capable of collecting, processing, analyzing, displaying, and transmitting electronic information." Article 1(8) of the Electronic Information and Transactions Law also states that AI is an electronic agent because AI performs actions in accordance with pre-programmed instructions. Since AI operates based on programming input by humans, namely the electronic system operators themselves, as stipulated in Government Regulation No. 71 of 2019 on the Implementation of Electronic Systems and Transactions, hereinafter referred to as PP 71/2019, the electronic system operators are responsible for the operational aspects of AI.²⁴

In Government Regulation No. 71 of 2019 concerning the Implementation of Electronic Systems and Transactions, every Electronic System Operator is required to register the electronic system along with the hardware and software that will be operated before it is used by Electronic System Users. In addition, all operations related to the management of Electronic Systems must be recorded in an audit trail.²⁵ Upon a valid request from an investigator, the operator is obligated to provide all information and data generated by the Electronic System when required in criminal proceedings. However, there is no provision in Government Regulation No. 71 of 2019 on the Implementation of Electronic Systems and Transactions that explains the procedural safeguards for the authenticity of such Electronic Systems.

In addition to these two regulations, "Regulation of the Minister of Communication and Information Technology (Menkominfo) Number 3 of 2021 concerning Standards for Business Activities and Product Standards in the Implementation of Risk-Based Business Licensing in the Postal, Telecommunications, and Electronic Systems and Transactions Sectors also regulates business standardization based on KBLI code 62015. Under the same regulation, every company and electronic system provider is required to formulate internal policies regarding artificial intelligence ethics and data management. The Minister of Communication and Information Technology Circular Letter No. 9 of 2023 on Artificial Intelligence Ethics discusses the use and supervision of AI with a focus on principles such as humanity and fairness. However, this Circular Letter is not yet binding. Nevertheless, it establishes several key components, namely:²⁶ Ensuring that AI operations prioritize equality, fairness, and peace for the common good (Inclusivity), the use of AI must respect "human rights, social relationships of trust, and people's opinions and thoughts" (Humanity), user data security, including their

²³ M D Akbar, *Op.cit.*

²⁴ *Ibid.* hal 4.

²⁵ Peraturan Pemerintah Republik Indonesia Nomor 71 Tahun 2019 Tentang Penyelenggaraan Sistem Dan Transaksi Elektronik. Diakses dari <https://peraturan.bpk.go.id/Details/122030/pp-no-71-tahun-2019>.

²⁶ Surat Edaran Menteri Komunikasi Dan Informasi Republik Indonesia Nomor 9 Tahun 2023 Tentang Etika Kecerdasan Artifisial. Diakses dari https://jdih.komdigi.go.id/produk_hukum/view/id/883/t/surat+edaran+menteri+komunikasi+dan+informatika+n+omor+9+tahun+2023.

privacy, must be protected with priority given to user rights to prevent harm to any party (Security), and the implementation of AI must consider accessibility for all parties.

The challenges faced by law enforcement officials in relation to electronic evidence in forex trading manipulation cases are as follows. First, there is weak regulation protecting the authenticity of electronic evidence, particularly in the context of AI. Some of the regulations that do exist do not provide detailed explanations as to whether AI is considered an electronic system or merely an "electronic agent." Additionally, law enforcement agencies, particularly in the police sector, lack specific guidelines on how to protect AI systems from being damaged or manipulated.

Second, there is a lack of technological understanding among law enforcement agencies. As explained earlier, law enforcement officials' understanding of technology is still minimal in solving technology-related crimes, especially in the stage of protecting electronic evidence from manipulation before, during, and after the investigation. Therefore, in addition to strengthening regulations on the examination of electronic devices used as a means of crime, there is also a need for better understanding of technology by law enforcement officials.

Third, forensic laboratories at every level of the police force lack sophisticated equipment, and technical obstacles such as resources, facilities, and infrastructure for law enforcement are still limited.²⁷ As a result, data and information in AI systems cannot be analyzed in detail. Differences in perceptions regarding digital evidence among law enforcement officials also have a significant impact on the course of a case. This is because digital evidence is not always in physical form.²⁸

In this digital age, electronic evidence has become an important tool in uncovering criminal acts and helping law enforcement officials find digital traces left by perpetrators, such as CCTV, mobile phones, recordings, photos, and others. In forex trading, the investment tool used is a trading robot that functions to automatically execute transactions when the forex market chart reaches certain conditions that have been programmed by its creator by inputting a system design called an expert advisor.

The expert advisor system is a system consisting of a collection of technical analysis algorithms from indicators used to study price conditions in the forex market. Thus, expert advisors can make decisions between buying or selling assets or pairs to be traded. Participants can reduce the possibility of losses due to psychological or emotional factors by using this system.²⁹ This Expert Advisor will appear on participants' screens in the form of a website or an application that will automatically execute trading transactions using parameters and logic provided by MQL4, enabling the automation of trading strategies based on predetermined

²⁷ Fitriati Fitriati, Iyah Faniyah, and Nisep Rahmad, "Hambatan Teknis Penyidikan Tindak Pidana Manipulasi Informasi Elektronik Pada Polda Sumatera Barat," *Masalah-Masalah Hukum* 51, no. 4 (2022): 390–400. DOI: <https://doi.org/10.14710/mmh.51.4.2022.390-400>.

²⁸ *Ibid* Hal. 9

²⁹ A. C Febryanti, I Darmawan, and R. Andreswari, "Pemodelan Sistem Pendukung Keputusan Pemilihan Bidang Peminatan Menggunakan Metode Simple Additive Weighting Studi Kasus: Program Studi Sistem Informasi Universitas Telkom," *EProceedings of Engineering* 4, no. 2 (2017). Retrieved by <https://openlibrarypublications.telkomuniversity.ac.id/index.php/engineering/article/view/1304/0>.

rules, namely a market that provides programming related to the electronic world. However, the programming has been manipulated by the perpetrators so that they always make a profit.

Once the system is ready, the perpetrators carry out their series of crimes. In this case, the perpetrators act as Introducing Brokers (IB) and Marketing personnel, offering services to prospective customers on behalf of Futures Brokers and misusing the legality of government logos (OJK, BAPPEBTI, KEMENKEU) and SRO (BBJ, BKDI, KBI, ICH). The perpetrators then instilled trust in potential customers by offering fixed income or passive income and showing them promising forex investment packages, prompting them to transfer money to the perpetrators' accounts. The perpetrators would ask for the potential victims' identities to register online to log in to the website and register the robot. After registration, the victims would receive profits according to the investment package they chose, and if they wanted to earn more, they had to recruit other people as determined by the company by holding seminars, educational sessions, and training.³⁰

This scheme will repeat itself over several months, forming a pyramid scheme or Ponzi scheme. According to "Law Number 7 of 2014 concerning Trade, a pyramid scheme refers to activities that generate profits but not from the sale of goods by taking advantage of opportunities to join business partners to obtain rewards or income, mainly from the participation fees of other people who will join or after joining the business partner."³¹ In this case, the partner is the victim. Then, the expert advisor manipulates the time so that the transactions always generate profits.³² After the perpetrator feels that they have gained a profit, they will stop the investment activities on the grounds of "maintenance," when in fact they are only manipulating the victims and shutting down the investment system.

Based on these regulations and the use of AI for forex trading, it has become particularly difficult for law enforcement officials to maintain the validity of electronic evidence because, in essence, technology is highly susceptible to manipulation, changes, or damage to the system used as evidence. Additionally, the rapid advancement of technology is another factor complicating efforts to maintain the authenticity of AI. Therefore, special efforts are needed to update existing regulations to align them with the latest technological developments.³³

The problem arises because law enforcement officials face challenges in maintaining the integrity of electronic evidence, including limited technical knowledge and a lack of supporting technological equipment. In the "Regulation of the Chief of the Indonesian National Police No. 10 of 2009 on Procedures and Requirements for Requesting Technical Criminalistic Examinations at the Crime Scene and Forensic Examinations of Evidence at the Forensic

³⁰ BAPPEBTI. *Op.cit.*

³¹ Undang-Undang Republik Indonesia Nomor 7 Tahun 2014 Tentang Perdagangan. Diakses dari <https://peraturan.bpk.go.id/Details/38584/uu-no-7-tahun-2014>.

³² Quora, "Apakah PT Simbiotik Multitalenta Indonesia (SMI) Ini Penipu? Benarkah PT.SMI Tidak Menjual Robot Trading Untuk Forex?," id.quora.com, n.d., Diakses dari [https://id.quora.com/Apakah-PT-Simbiotik-Multitalenta-Indonesia-SMI-ini-penipu-Benarkah-PT-SMI-tidak-menjual-robot-trading-untuk-forex?q=PT SIM](https://id.quora.com/Apakah-PT-Simbiotik-Multitalenta-Indonesia-SMI-ini-penipu-Benarkah-PT-SMI-tidak-menjual-robot-trading-untuk-forex?q=PT%20SIM).

³³ Magdalena Łągiewska, "Ethical Limits of Using Artificial Intelligence in Justice," *Knowledge Base of the University Gdansk*, 2024, Retrieved by <https://repozytorium.bg.ug.edu.pl/info/report/UOG87bdc797a40f49ccb416044a62bed0d0/>.

Laboratory of the Indonesian National Police” Chapter III, Paragraph 3, regulates the field of forensic physics for the examination of electronic devices. In order to comply with the examination procedures, the following technical steps must be taken:³⁴ All evidence, including the system, must be sent to the Forensic Laboratory. For complex electronic devices, the shipment must be accompanied by technical specifications and a log book, must be handled with care to maintain its authenticity, and must be accompanied by a comparison item with a statement of authenticity from the official manufacturer if it is suspected to be fake or does not meet specifications. must be inspected directly at the crime scene (CSI) while maintaining its integrity (status quo) if it does not match the size and condition at the forensic laboratory.

Although the regulations stipulate that electronic devices and systems must be inspected beforehand, there are no provisions in the regulations regarding the manipulation of electronic evidence before, during, or after the inspection. Therefore, cybercrime investigations require strong technical knowledge and access to advanced technological equipment.

Based on these issues, in order to achieve progress in the implementation and enforcement of cyber law in Indonesia, A comprehensive strategy and collaboration among law enforcement agencies are required. This strategy includes reformulating regulations to align them with current challenges, enhancing the capabilities of law enforcement agencies—both in terms of understanding and the resources and infrastructure used in solving cybercrime cases—and increasing public awareness about cybersecurity. Through collaboration, Indonesia can develop a safe and secure cyber environment.³⁵

3.2. Reformulation of Provisions on the Authenticity of Electronic Evidence

With the advancement of information technology, electronic evidence has become one of the expanded forms of evidence regulated in Article 5 of the Electronic Information and Transaction Law to anticipate developments in line with the emergence of new crimes due to the influence of modern technological developments.³⁶ In Indonesia, regulations regarding the protection of the authenticity of electronic evidence are still very weak. This is especially true for criminal acts involving AI programs, which are still relatively new in Indonesia.

In an effort to strengthen legal certainty regarding electronic evidence, reformulating Article 5 of the Electronic Information and Transaction Law is crucial, especially in accommodating developments in artificial intelligence (AI) technology. Currently, the applicable regulations do not explicitly regulate the legal status of AI and its printouts as valid evidence in court proceedings. Therefore, the reformulation of Article 5 of the Electronic Information and Transactions Law is necessary by adding provisions that clarify that data,

³⁴ Peraturan Kepala Polisi Republik Indonesia Nomor 10 Tahun 2009 Tentang Tata Cara Persyaratan Permintaan Pemeriksaan Teknis Kriminalistik Tempat Kejadian Perkara Dan Laboratoris Kriminalistik Barang Bukti Kepada Laboratorium Forensik Kepolisian Negara Republik Indonesia. Diakses dari <https://peraturan.infoasn.id/peraturan-kepala-kepolisian-negara-nomor-10-tahun-2009/>.

³⁵ M. W Mufti et al., *Op.cit.*, hal 3.

³⁶ I Pribadi, “Legalitas Alat Bukti Elektronik Dalam Sistem Peradilan Pidana,” *Lex Renaissance* 3, no. 1 (2018). DOI: <https://doi.org/10.20885/JLR.vol3.iss1.art4>.

analysis, or documents generated by AI, including their printed outputs, may be recognized as valid electronic evidence provided they meet the principles of authenticity, integrity, and legal accountability.³⁷ This reformulation aims to align regulations with modern legal requirements, where AI is increasingly used in various sectors, including in investigations and case evidence. With clearer legal recognition, the use of AI in the judicial system can be optimized without creating legal loopholes or debates regarding the validity of the evidence produced.

Modern crimes committed today use AI programs to carry out their crimes, so special handling and an excellent seizure management system are needed to ensure that evidence is not lost or damaged.³⁸ In the "Regulation of the Chief of the Indonesian National Police No. 10 of 2009 concerning the Procedures and Requirements for Requesting Criminalistic Technical Examinations at the Crime Scene and Criminalistic Laboratory Examinations of Evidence to the Forensic Laboratory of the Indonesian National Police" it is stipulated that "electronic evidence must first be examined by the police laboratory before it can be used as evidence in court; however, the regulation also provides for the prior examination of electronic devices or systems. The regulation does not address the issue of whether electronic evidence has been tampered with before, during, or after the examination."³⁹

Next, it is necessary to reformulate provisions that tighten supervision and registration of AI-based electronic systems within the framework of the Government Regulation on the Implementation of Electronic Systems and Transactions (PP PTSE). First, this reformulation aims to ensure data integrity so that it does not undergo changes that could affect its validity as electronic evidence in court. The urgency of this reformulation stems from the inherent characteristics of AI itself. AI can influence the authenticity of electronic evidence, as it can automatically alter data—either through machine learning algorithms or through intervention by parties with access to the system. Additionally, AI systems can be programmed to modify or filter specific information, which may compromise the objectivity of electronic evidence.⁴⁰ There are also several AI models that work as "black boxes," where the decision-making process is difficult to audit or verify, and the risk of hacking and illegal modification of data stored in AI-based electronic systems can compromise the validity of evidence. Given these issues, it is very important to note that maintaining the authenticity of evidence is crucial in a system of proof.⁴¹ Therefore, there is a need for specific reformulation to strengthen

³⁷ Santos Wachjoe P, "PENGUNAAN INFORMASI ELEKTRONIK DAN DOKUMEN ELEKTRONIK SEBAGAI ALAT BUKTI PERSIDANGAN THE USAGE OF ELECTRONIC INFORMATION AND DOCUMENT AS COURT EVIDENCE," *Jurnal Hukum Dan Peradilan* 5, no. 1 (2016): 1–18. Retrieved by <http://jurnalhukumdandanperadilan.org/jhp/article/download/43/53>.

³⁸ Henny Saida Flora et al., *HUKUM PIDANA DI ERA DIGITAL* (Batam: CV Rey Media Grafika, 2024), Diakses dari [https://books.google.co.id/books?hl=id&lr=&id=zFcXEQAAQBAJ&oi=fnd&pg=PA1&dq=Flora,+H.+S.,+SH,+M.,+Kn,+M.,+Kes,+M.+H.,+Kasmanto+Rinaldi,+S.+H.,+SI,+M.,+%26+SH,+M.+\(2024\).+Hukum+Pidana+Di+Era+Digital.+CV+Rey+Media+Grafika.24&ots=oLWrlQfnYK&sig=SQTSJZaJKcByY](https://books.google.co.id/books?hl=id&lr=&id=zFcXEQAAQBAJ&oi=fnd&pg=PA1&dq=Flora,+H.+S.,+SH,+M.,+Kn,+M.,+Kes,+M.+H.,+Kasmanto+Rinaldi,+S.+H.,+SI,+M.,+%26+SH,+M.+(2024).+Hukum+Pidana+Di+Era+Digital.+CV+Rey+Media+Grafika.24&ots=oLWrlQfnYK&sig=SQTSJZaJKcByY).

³⁹ Y. N Eato, "Keabsahan Alat Bukti Dan Barang Bukti Pada Perkara Pidana," *Lex Crimen* 6, no. 2 (2017). Retrieved by <https://ejournal.unsrat.ac.id/v3/index.php/lexcrimen/article/view/15346/14894>.

⁴⁰ Tirtayasa, "AI Dan Politik: Pengaruh Algoritma Terhadap Kebijakan Publik," *kepripos.id*, 202., Diakses dari https://kepripos.id/ai-dan-politik-pengaruh-algoritma-terhadap-kebijakan-publik/?utm_source=chatgpt.com.

⁴¹ D. D. J. Lakada, "Perkembangan Pengaturan Alat Bukti Elektronik Dalam Hukum Acara Pidana (Kajian Hukum

regulations in the PTSE PP to ensure that electronic evidence, especially that involving AI, cannot be manipulated.

Then, to maintain the authenticity of such evidence, the reformulation of AI in the PTSE Law must include an AI-based electronic registration and certification system, which means that all AI systems must be registered in a system provided by the government before they can be used as evidence in court to verify their authenticity. The registration system must be able to include information such as AI algorithms or working methods, data used for model training, and data logging and audit mechanisms. Furthermore, the most important thing is that the AI system must have security certification that can ensure that the AI is accountable and can be used as evidence in the Indonesian judicial system. Second, the reformulation must also add an authority to conduct periodic supervision and audits of AI systems that are suspected of being used in a crime.⁴² Audits are essential to ensure that an AI system does not have a mechanism that can change data after it has been generated, and that it is also capable of storing system activity logs that cannot be modified by system administrators, and has hashing and digital signature mechanisms to further ensure the integrity of stored data.

The reformulation of PP PTSE must also include the obligation for electronic system providers to be able to provide complete data, which means that if at any time the data is requested by law enforcement officials, the service provider must submit the data without falsification and its authenticity must be maintained. Furthermore, the AI mechanism used must be Read only or immutable storage so that the data produced cannot be changed after the initial process. Furthermore, the AI implementation system must use blockchain technology to maintain data validity. This must be regulated in the reformulation of PP PTSE so that the AI system used for public purposes must apply blockchain distributed ledger technology (DLT) to ensure that stored data cannot be modified or deleted. This technology will greatly assist law enforcement agencies in verifying the authenticity of data extracted from the AI system, which can then be used as evidence in court proceedings.

The reformulation of provisions in the PP PTSE will have a positive impact on the judicial system, as it will help prevent the manipulation of electronic evidence by tightening logging and data security mechanisms, increasing the accountability of electronic system providers through registration and periodic audits, and ensuring that electronic evidence is accountable through the application of blockchain and hashing technologies. It will also make it easier for law enforcement officials to obtain original data without the risk of alteration during investigations and trials.

Before the emergence of forex trading, crypto investments were also often the subject of pros and cons in determining whether they could be used as legal evidence due to several recent cases, such as Doni Salmanan's crypto investment fraud, which resulted in losses of Rp.

Tentang Cyber Crime)," *Lex Crimen* 12, no. 5 (2024). Retrieved by <https://ejournal.unsrat.ac.id/v3/index.php/lexcrimen/article/view/59171/48105>.

⁴² S Masrichah, "Ancaman Dan Peluang Artificial Intelligence (AI)," *Khatulistiwa: Jurnal Pendidikan Dan Sosial Humaniora* 3, no. 3 (2023): 83–101. DOI: <https://doi.org/10.55606/khatulistiwa.v3i3.1860>.

24,000,000,000 (twenty-four billion rupiah).⁴³ Not only that case, but several other cases, particularly corruption, often hide the proceeds of corruption within crypto investments. In seizing crypto assets, law enforcement agencies face significant challenges. Due to these weaknesses, the Prosecutor's Office has established specific guidelines for handling crypto assets, outlined in the "Supreme Prosecutor's Office Guidelines No. 7 of 2023 on the Handling of Crypto Assets as Evidence in Criminal Cases." These guidelines define the term "cryptocurrency" itself and outline several stages in the seizure of cryptocurrency assets, including "Controlled Cryptowallet," "Blocking," "Asset Transfer," "Conversion," "Seizure Authorization," and "Enhanced Security and Oversight."

These guidelines can serve as a specific reference in determining how to seize robots used in forex trading cases so that they can be used as valid evidence, especially when the robots have been manipulated before, during, or after a thorough investigation. Supervision can be carried out in collaboration with law enforcement agencies and technology-related bodies such as the Ministry of Communication and Digital Technology (Komdigi) and the Commodity Futures Trading Supervisory Agency (BAPPEBTI). In addition to collaborating with relevant parties, law enforcement agencies must provide support in managing the digital inventory of items during inventory management and distribution. In processing this data, there must be a special mechanism to prevent digital data from being damaged or easily manipulated, which would require investigators to understand electronic equipment used in the AI system at the crime scene (TKP), Forensic Imaging, Recovery, Lost Data Searching, and other forensic procedures.⁴⁴

From these reformulations, law enforcement officials can reformulate several regulations as follows:

Table 1.1 Reformulation of Provisions

Formulation	Formulation
Law Number 1 of 2024 concerning the Second Amendment to Law Number 11 of 2008 concerning Electronic Information and Transactions" Article 5 Paragraph (1) : <i>Electronic information and/or electronic documents and/or their printouts constitute valid evidence.</i>	Article 5, Paragraph (1) <i>"Electronic information and/or electronic documents and/or their printed output, whether generated by humans or artificial intelligence, are valid evidence."</i>
Government Regulation No. 71 of 2019 on the Implementation of Electronic Systems and Transactions	Addition of Paragraph (1) <i>"For the purposes of criminal proceedings, Electronic System Operators are required to provide Electronic</i>

⁴³ Doni Muhammad Taufik Alias Doni Salmanan, Nomor 576/Pid.Sus/2022/PN Blb, Mahkamah Agung, 16 Desember 2022. Diakses dari <https://paralegal.id/putusan/putusan-pengadilan-negeri-bale-bandung-nomor-576-pid-sus-2022-pn-blb/>.

⁴⁴ Fitriati, Faniyah, and Rahmad, *Op.Cit.*, hal 6.

Article 33: *“For the purposes of criminal proceedings, Electronic System Operators are required to provide Electronic Information and/or Electronic Data contained in Electronic Systems or Electronic Information and/or Electronic Data generated by Electronic Systems upon a valid request from investigators for specific criminal acts in accordance with the authority stipulated in the law.”*

Information and/or Electronic Data contained in Electronic Systems or Electronic Information and/or Electronic Data generated by Electronic Systems upon a valid request from investigators for specific criminal acts in accordance with the authority stipulated in the law.”

(2) *The purpose of the request referred to in paragraph (1) is to serve as electronic evidence to assist in the presentation of evidence in criminal proceedings.*

(3) *Regulations regarding the handling of Electronic Information and/or Electronic Data as Electronic Evidence are further stipulated in the respective guidelines of each law enforcement agency.*

In the “Regulation of the Chief of the Indonesian National Police No. 10 of 2009 on the Procedures and Requirements for Requesting Criminalistic Technical Examinations at the Crime Scene and Forensic Examinations of Evidence at the Indonesian National Police Forensic Laboratory,” it is necessary to there are several more specific steps in seizing AI-based robots, and the regulatory framework can adopt “the Attorney General's Guidelines No. 7 of 2023 on the Handling of Crypto Assets as Evidence in Criminal Cases” by supplementing the list of equipment to be used to protect the authenticity of electronic evidence that has been obtained. Law enforcement officials can adopt the EU AI *Act* as a guideline in conducting strict supervision and stages of data authenticity protection on *trading* robots that will later be used as electronic evidence. In addition, there should be devices that support the process of protecting electronic evidence in every law enforcement agency such as the Police, BAPPEBTI, the Ministry of Communication and Information Technology, and so on.

That the process of proof based on previously established reformulation is possible or can be pursued by police investigators and other law enforcement officials to make robots the result of an electronic system, in this case artificial intelligence, as electronic evidence, and that the authenticity of such evidence will be protected from any kind of manipulation that may occur.

4. CONCLUSION

Technological developments pose a unique challenge for law enforcement officials in terms of maintaining the authenticity of electronic evidence, particularly in the field of AI. Existing regulations and guidelines still have weaknesses, especially in ensuring the authenticity, integrity, and validity of electronic evidence, including that generated by artificial intelligence (AI). Additionally, law enforcement officials' limited understanding of technology and the lack of adequate facilities and infrastructure in various forensic laboratories pose further challenges in handling cases related to technology. To address this, it is necessary to

reformulate certain laws and regulations, such as the ITE Law and the PTSE Regulation, which serve as the legal basis for law enforcement agencies in proving electronic evidence, which is challenging. Additionally, law enforcement agencies can adopt foreign regulations, such as the EU AI Act, in conducting examinations and ensuring the authenticity of electronic evidence, including AI-generated evidence.

REFERENCE

- Adhi, I Putu Krisna. "Rekaman Elektronik Personal Chat Pada Social Media Sebagai Alat Bukti." *Media Iuris* 1, no. 3 (2018). DOI: <https://doi.org/10.20473/mi.v1i3.9829>
- Akbar, Aidil, and Fadillah Sabri. "Kekuatan Pembuktian Dalam Persidangan Perkara Pidana Secara Elektronik." *Soumatera Law Review* 4, no. 1 (2021): 120–34. Retrieved by <https://scientiacatalysis.org/index.php/soumlaw/article/view/367>
- Akbar, M D. "Pemanfaatan Dan Permasalahan Artificial Intelligence Dalam Kehidupan Manusia Serta Pengaturannya Secara Hukum." *Media Hukum Indonesia* 2, no. 2 (2024). DOI: <https://doi.org/10.5281/zenodo.12169651>
- Asimah, D. "Menjawab Kendala Pembuktian Dalam Penerapan Alat Bukti Elektronik To Overcome The Constraints Of Proof In The Application Of Electronic Evidence." *Puslitbang Hukum Dan Peradilan Ditjen Badan* 3, no. 2 (2020). DOI: <https://doi.org/10.25216/peratun.322020.97-110>.
- Ardiansyah, Yusuf Amir, Dandi Umlati, Ewi Yasdin, Muhammad Faisal, and Amirul Adli Habib Hasibuan. "Analysis the Implementation Ministry of Transportation Decree Number KM 65 of 2009 in Shipping Crimes". *JUSTISI* 11 (2) 2025 :333-45. <https://doi.org/10.33506/js.v11i2.3901>.
- BAPPEBTI. "PENGATURAN DAN PENINDAKAN DI BIDANG PERDAGANGAN BERJANGKA KOMODITI," 2022. Diakses dari https://bappebti.go.id/bahan_literasi/detail/7271.
- Buinei, Gerson Sem, Wahab Aznul Hidayat, and A. Faqih Mursid. "Restorative Justice Approach in Dealing With Crimes at Police Level (A Study at Polresta and Polres Sorong)". *Journal of Law Justice* 2 (1) 2024 :1-12. <https://doi.org/10.33506/jlj.v2i1.3250>
- Doni Muhammad Taufik Alias Doni Salmanan, Nomor 576/Pid.Sus/2022/PN Blb, Mahkamah Agung, 16 Desember 2022. Diakses dari <https://paralegal.id/putusan/putusan-pengadilan-negeri-bale-bandung-nomor-576-pid-sus-2022-pn-blb/>.
- Eato, Y. N. "Keabsahan Alat Bukti Dan Barang Bukti Pada Perkara Pidana." *Lex Crimen* 6, no. 2 (2017). Retrieved by <https://ejournal.unsrat.ac.id/v3/index.php/lexcrimen/article/view/15346/14894>.
- Farosi, Mohamamd, and Widhi Cahyo Nugroho. "Investasi Ilegal Berkedok Robot Trading Menurut Hukum Pidana Di Indonesia." *Bureaucracy Journal: Indonesia Journal of Law and Social-Political Governance* 2, no. 1 (2022): 590–603. Doi: <https://doi.org/10.53363/bureau.v2i1.152>.
- Febryanti, A. C, I Darmawan, and R. Andreswari. "Pemodelan Sistem Pendukung Keputusan Pemilihan Bidang Peminatan Menggunakan Metode Simple Additive Weighting Studi Kasus: Program Studi Sistem Informasi Universitas Telkom." *EProceedings of Engineering* 4, no. 2 (2017). Retrieved by <https://openlibrarypublications.telkomuniversity.ac.id/index.php/engineering/article/view/1304/0>.

- Fitriati, Fitriati, Iyah Faniyah, and Nisep Rahmad. "Hambatan Teknis Penyidikan Tindak Pidana Manipulasi Informasi Elektronik Pada Polda Sumatera Barat." *Masalah-Masalah Hukum* 51, no. 4 (2022): 390–400. DOI: <https://doi.org/10.14710/mmh.51.4.2022.390-400>
- Flora, Henny Saida, Kasmanto Rinaldi, Jusri Mudjrimin, Sitta Saraya, Yusrina Handayani, Ratna Jaya, Rudy Dwi Laksono, Johannes Johny Koynja, Louisa Yesami K, and Parningotan Malau. *HUKUM PIDANA DI ERA DIGITAL*. Batam: CV Rey Media Grafika, 2024. Retrieved by [https://books.google.co.id/books?hl=id&lr=&id=zFcXEQAQBAJ&oi=fnd&pg=PA1&dq=Flora,+H.+S.,+SH,+M.,+Kn,+M.,+Kes,+M.+H.,+Kasmanto+Rinaldi,+S.+H.,+SI,+M.,+%26+SH,+M.+\(2024\).+Hukum+Pidana+Di+Era+Digital.+CV+Rey+Media+Grafika.24&ots=oLWrLQfnYK&sig=SQTSJZaJKcByY](https://books.google.co.id/books?hl=id&lr=&id=zFcXEQAQBAJ&oi=fnd&pg=PA1&dq=Flora,+H.+S.,+SH,+M.,+Kn,+M.,+Kes,+M.+H.,+Kasmanto+Rinaldi,+S.+H.,+SI,+M.,+%26+SH,+M.+(2024).+Hukum+Pidana+Di+Era+Digital.+CV+Rey+Media+Grafika.24&ots=oLWrLQfnYK&sig=SQTSJZaJKcByY).
- Isima, Nurlaila. "Kedudukan Alat Bukti Elektronik Dalam Pembuktian Perkara Pidana." *Gorontalo Law Review* 5, no. 1 (2022): 179–89. DOI: <https://doi.org/10.32662/golrev.v5i1.1999>
- Kumparan Bisnis. "Ombudsman Minta Bappebti Tuntaskan Kasus Investasi Bodong, Kerugian Rp 63 M." [kumparan.com](https://kumparan.com/kumparanbisnis/ombudsman-minta-bappebti-tuntaskan-kasus-investasi-bodong-kerugian-rp-63-m-1zI2f4VXfEB), 2023. Diakses dari: <https://kumparan.com/kumparanbisnis/ombudsman-minta-bappebti-tuntaskan-kasus-investasi-bodong-kerugian-rp-63-m-1zI2f4VXfEB>.
- Łągiewska, Magdalena. "Ethical Limits of Using Artificial Intelligence in Justice." *Knowledge Base of the University Gdansk*, 2024. Diakses dari: <https://repozytorium.bg.ug.edu.pl/info/report/UOG87bdc797a40f49ccb416044a62bed0d0/>.
- Lakada, D. D. J. "Perkembangan Pengaturan Alat Bukti Elektronik Dalam Hukum Acara Pidana (Kajian Hukum Tentang Cyber Crime)." *Lex Crimen* 12, no. 5 (2024). Retrieved by <https://ejournal.unsrat.ac.id/v3/index.php/lexcrimen/article/view/59171/48105>.
- Masrichah, S. "Ancaman Dan Peluang Artificial Intelligence (AI)." *Khatulistiwa: Jurnal Pendidikan Dan Sosial Humaniora* 3, no. 3 (2023): 83–101. DOI: <https://doi.org/10.55606/khatulistiwa.v3i3.1860>.
- Mufti, M. W, M. H Ikhsan, R Sani, and M Fauzan. "Urgensi Pembentukan Peraturan Perundang-Undangan Teknologi Berbasis Artificial Intelligence." *Socius: Jurnal Penelitian Ilmu-Ilmu Sosial* 1, no. 11 (2024). DOI: <https://doi.org/10.5281/zenodo.11422903>.
- Nugroho, Adi. "HUKUM FOREX DI INDONESIA, ADAKAH YANG MENGATURNYA ?" www.foreximf.com, 2021. Diakses melalui: <https://www.foreximf.com/blog/forex/hukum-forex>.
- P, Santos Wachjoe. "PENGUNAAN INFORMASI ELEKTRONIK DAN DOKUMEN ELEKTRONIK SEBAGAI ALAT BUKTI PERSIDANGAN THE USAGE OF ELECTRONIC INFORMATION AND DOCUMENT AS COURT EVIDENCE." *Jurnal Hukum Dan Peradilan* 5, no. 1 (2016): 1–18. Retrieved by <http://jurnalhukumdanperadilan.org/jhp/article/download/43/53>.
- Peraturan Kepala Polisi Republik Indonesia Nomor 10 Tahun 2009 tentang Tata Cara Persyaratan Permintaan Pemeriksaan Teknis Kriminalistik Tempat Kejadian Perkara dan Laboratoris Kriminalistik Barang Bukti Kepada Laboratorium Forensik Kepolisian Negara Repu. Diakses dari <https://peraturan.infoasn.id/peraturan-kepala-kepolisian-negara-nomor-10-tahun-2009/>.
- Peraturan Pemerintah Republik Indonesia Nomor 71 Tahun 2019 tentang Penyelenggaraan

- Sistem dan Transaksi Elektronik. Diakses dari <https://peraturan.bpk.go.id/Details/122030/pp-no-71-tahun-2019>.
- Pribadi, I. "Legalitas Alat Bukti Elektronik Dalam Sistem Peradilan Pidana." *Lex Renaissance* 3, no. 1 (2018). DOI: <https://doi.org/10.20885/JLR.vol3.iss1.art4>.
- Quora. "Apakah PT Simbiotik Multitalenta Indonesia (SMI) Ini Penipu? Benarkah PT.SMI Tidak Menjual Robot Trading Untuk Forex?" [id.quora.com](https://id.quora.com/Apakah-PT-Simbiotik-Multitalenta-Indonesia-SMI-ini-penipu-Benarkah-PT-SMI-tidak-menjual-robot-trading-untuk-forex?q=PT%20SIM), n.d. Diakses dari [https://id.quora.com/Apakah-PT-Simbiotik-Multitalenta-Indonesia-SMI-ini-penipu-Benarkah-PT-SMI-tidak-menjual-robot-trading-untuk-forex?q=PT SIM](https://id.quora.com/Apakah-PT-Simbiotik-Multitalenta-Indonesia-SMI-ini-penipu-Benarkah-PT-SMI-tidak-menjual-robot-trading-untuk-forex?q=PT%20SIM).
- Rahmad, N., K. N. Arifah, D. Setiyawan, M. Ramli, and B. S Daud. "Efektivitas Bukti Elektronik Dalam UU ITE Sebagai Perluasan Sistem Pembuktian Dalam KUHP." In *Prosiding University Research Colloquium*, 96–111, 2023. Retrieved by <https://repository.urecol.org/index.php/proceeding/article/view/2279>.
- Rahul Pieter S. Yapen, Wahab Aznul Hidayat, and Muharuddin Muharuddin. "The Role of Correctional Institutions in the Development of Prisoners to Prevent Recidivism of Crimes in Sorong City". *Journal of Law Justice* 2 (3) 2024 :162-76. <https://doi.org/10.33506/jlj.v2i3.3354>.
- Ramiyanto, Ramiyanto. "Bukti Elektronik Sebagai Alat Bukti Yang Sah Dalam Hukum Acara Pidana." *Jurnal Hukum Dan Peradilan* 6, no. 3 (2017): 463–84. DOI: 10.25216/JHP.6.3.2017.463-484.
- Santoso, Imelia. "Peraturan BAPPEBTI Yang Penting Dalam Trading Forex." blog.hsb.co.id, 2025. Diakses dari <https://blog.hsb.co.id/forex/regulasi-trading-forex-bappebti/>.
- Sari, Ni Putu Riyani Kartika, and Ni Luh Putu Geney Sri Kusuma. "Eksistensi Teori Pembuktian Positif Wettelijk Bewijstheorie Dalam Pembuktian Perkara Perdata." *Jurnal Akses* 12, no. 2 (2020): 132–40. DOI: <https://doi.org/10.70358/jurnalakses.v12i2.695>.
- Supandi, H. "Modernisasi Peradilan Tata Usaha Negara Di Era Revolusi Industri 4.0 Untuk Mendorong Kemajuan Peradaban Hukum Indonesia." *Professor Inauguration Speech Universitas Diponegoro*, 2019. Retrieved by <https://scispace.com/papers/modernisasi-peradilan-tata-usaha-negara-di-era-revolusi-21h5orvbsa>.
- Supardi. "Mengukur Kekuatan Alat Bukti Elektronik Dalam Pembuktian Perkara Tindak Pidana Korupsi." *Syntax Literate: Jurnal Ilmiah Indonesia* 6, no. 5 (2021). Retrieved by <http://jurnal.syntaxliterate.co.id/index.php/syntaxliterate/article/view/2724>.
- Surat Edaran Menteri Komunikasi dan Informasi Republik Indonesia Nomor 9 Tahun 2023 tentang Etika Kecerdasan Artifisial. Diakses dari https://jdih.komdigi.go.id/produk_hukum/view/id/883/t/surat+edaran+menteri+komunikasi+dan+informatika+nomor+9+tahun+2023.
- The Conversation. "Dua Sisi EU AI Act: 10 Hal Yang Bisa Dipelajari Indonesia." theconversation.com, 2024. Diakses dari <https://theconversation.com/dua-sisi-eu-ai-act-10-hal-yang-bisa-dipelajari-indonesia-239824>.
- Tirtayasa. "AI Dan Politik: Pengaruh Algoritma Terhadap Kebijakan Publik." kepripos.id, 2024. Diakses dari https://kepripos.id/ai-dan-politik-pengaruh-algoritma-terhadap-kebijakan-publik/?utm_source=chatgpt.com.
- Undang-Undang Republik Indonesia Nomor 10 Tahun 2011 tentang perubahan atas Undang-Undang Nomor 32 Tahun 1997 tentang Perdagangan Berjangka Komoditi. Diakses dari <https://peraturan.bpk.go.id/Details/39186/uu-no-10-tahun-2011>.
- Undang-Undang Republik Indonesia Nomor 7 Tahun 2014 tentang Perdagangan. Diakses dari

<https://peraturan.bpk.go.id/Details/38584/uu-no-7-tahun-2014>.
Undang-Undang Nomor 1 Tahun 2024 tentang Perubahan atas Undang-Undang Nomor 11
Tahun 2008 tentang Informasi dan Transaksi Elektronik.
<https://peraturan.bpk.go.id/details/274494/uu-no-1-tahun-2024>.