

Admissibility of Artificial Intelligence as Electronic Evidence: Comparative Perspectives from Indonesia, the United States, and Japan

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Abstract

Artificial Intelligence (AI) is increasingly integrated into digital forensic and evidentiary processes, raising unresolved doctrinal questions in criminal procedure law. In Indonesia, although electronic evidence is formally recognized, the law does not yet provide specific admissibility standards for AI-based materials, particularly regarding authenticity, methodological reliability, process traceability, explainability, and accountability. This study examines the admissibility of AI as electronic evidence in Indonesia and compares it with legal approaches in the United States and Japan. This study employs a normative juridical method using statutory, conceptual, and comparative approaches to analyze the evidentiary frameworks of the three jurisdictions. The findings show that the United States emphasizes expert gatekeeping and digital authentication, while Japan adopts a softer regulatory model centered on traceability, documentation, and actor accountability. By contrast, Indonesia, still lacks specific procedural standards for assessing AI-generated outputs beyond the general recognition of electronic evidence. This article argues that the key legal issue is no longer whether electronic evidence is admissible in general, but how AI-based evidence should be evaluated in a legally reliable and accountable manner. The scientific contribution of this study lies in proposing a five-parameter evaluative model for AI admissibility—covering authenticity and integrity, process traceability, model performance, identity verification, and accountability. This model is offered as a normative reference for future reform of the Criminal Procedure Code and the Electronic Information and Transactions Law, while safeguarding legal certainty and justice.

Keywords: *Admissibility; Artificial Intelligence; Comparative Law; Electronic Evidence; Legal Reform*

1. INTRODUCTION

The rapid development of Artificial Intelligence (AI) has increasingly affected the legal domain, particularly in data analysis, verification, and evidentiary assessment within judicial proceedings. One significant issue concerns the relationship between AI and electronic evidence, which has become a central of evidentiary mechanisms in the digital era. Scholarly discourse on electronic evidence highlights the indispensable role of technology in establishing the validity of legal facts; however, the normative and conceptual status of AI as an evidentiary tool remains the subject of ongoing debate.¹ Although Indonesian

¹ Harry Surden, "Artificial Intelligence and Law: An Overview," *Georgia State University Law Review* 35, no. 4 (June 2019): 1307, Available at: https://readingroom.law.gsu.edu/gsulr/vol35/iss4/8?utm_source=readingroom.law.gsu.edu%2Fgsulr%2Fvol35%2Fiss4%2F8&utm_medium=PDF&utm_campaign=PDFCoverPages.

law formally recognizes electronic evidence; it does not yet define evidentiary status of AI-generated outputs.. This ambiguity raises a critical question regarding the extent to which AI-generated outputs can be incorporated into procedural law as valid and admissible evidence.

International scholarship on the role of AI in legal systems generally develops along two main streams. First, AI functions as an analytical infrastructure for precedent discovery, argument formulation, verdict prediction, and forensic automation. Second, AI-generated outputs may be submitted as part of the evidentiary file, raising critical concerns related to the authentication of digital items, the reliability of methods, the scope of expert testimony, and the right to cross-examine technical artifacts.² In Indonesian positive law, the initial legal basis is found in the Criminal Procedure Code: particularly Article 184 paragraph (1) on types of evidence, Article 186 on expert testimony, and Article 187 on documents. It is also found in Law No. 11 of 2008 on Information and Electronic Transactions, as amended by Law No. 19 of 2016 and Law No. 1 of 2024, as well as Government Regulation No. 71 of 2019 on the Implementation of Electronic Systems and Transactions. This framework acknowledges electronic information/documents and electronic signatures but does not explicitly regulate the evidentiary status of AI-generated outputs. The resulting gaps concern the authentication of digital items, the establishment of reliability standards, the allocation of expert testimony, and the attribution of responsibility when model-based material is introduced in trial proceedings.³ Accordingly, this study focuses on three issues: the status of AI outputs as electronic evidence, the evaluative parameters that may be operationalized, and the normative implications for the reforming the Criminal Procedure Code and the *Electronic Information and Transactions Law (EIT Law)*.

Although scholarship on artificial intelligence and law has expanded rapidly, Indonesian legal studies remain largely focused on the recognition of electronic evidence rather than on specific admissibility standards for AI-generated outputs. This gap is significant because recent legal developments have strengthened the recognition of electronic evidence without providing clear criteria for assessing AI-based materials in terms of authenticity, methodological reliability, procedural transparency, responsibility among the actors involved.⁴ For this reason, this article adopts a comparative perspective by examining the United States and Japan. The United States is selected because it offers a more developed evidentiary framework concerning expert gatekeeping and digital authentication, while Japan provides a contrasting model that emphasizes traceability, documentation, and accountability through soft-law governance. By positioning Indonesia between these two approaches, this study seeks to identify the evaluative parameters needed to assess AI-based evidence and to formulate normative recommendations for strengthening Indonesia's evidentiary framework.⁵

Although international scholarship has advanced considerably in exploring the role of Artificial Intelligence (AI) within legal systems, Indonesian studies remain largely confined to the recognition of electronic evidence, without any specific regulation

² Anthony J. Casey and Anthony Niblett, "The Death of Rules and Standards," *Indiana Law Journal* 92, no. 4 (2017): 1406, <https://doi.org/10.2139/ssrn.2693826>.

³ Kevin D. Ashley, *Artificial Intelligence and Legal Analytics: New Tools for Law Practice in the Digital Age* (Cambridge: Cambridge University Press, 2017), 35, <https://doi.org/10.1017/9781316761380>.

⁴ Abdul Kadir Jaelani et al., "Artificial Intelligence Policy in Promoting Indonesian Tourism," *Volksgeist: Jurnal Ilmu Hukum Dan Konstitusi*, June 15, 2024, 110, <https://doi.org/10.24090/volksgeist.v7i1.10623>.

⁵ Kuku Tejomurti et al., "Big Data Analytics Algorithms for Dynamic Pricing: The Legal Analysis of the Indonesia Competitions Law Readiness in Digital Era," *Jurnal IUS Kajian Hukum Dan Keadilan* 12, no. 1 (April 2024): 75, <https://doi.org/10.29303/ius.v12i1.1303>.

governing the evidentiary status of AI. This regulatory ambiguity gives rise to both conceptual and practical issues concerning the legitimacy of AI in judicial proceedings. In the United States, scholars have emphasized the importance of validity and reliability as prerequisites for the admissibility of AI-based evidence, further advocating for the reinforcement of evidentiary standards in line with Duke Rule 702.⁶ Recent debates in the United States have also considered whether AI-generated evidence should be evaluated through standards traditionally applied to expert testimony in court.⁷ By contrast, Japan has adopted a soft-law regulatory approach, relying on promotional legislation, business guidelines, and the adaptation of existing legal norms in response to AI—an approach designed to foster innovation while preserving flexibility.⁸ These comparative insights help to identify the minimum safeguards Indonesia need to develop a more accountable framework for AI-based electronic evidence.

To address the issue of Artificial Intelligence (AI) as electronic evidence, this study employs a normative juridical method centered on the analysis of legal norms, legal doctrine, and comparative legal developments.⁹ The research uses three main approaches. The statutory approach examine relevant provisions of Indonesian procedural law and electronic evidence law. The conceptual approach to identify the legal meaning of admissibility in relation to AI-based materials. The comparative approach to assess the regulatory and evidentiary frameworks of Indonesia, the United States, and Japan. The legal materials are analyzed through grammatical, systematic, and comparative interpretation.¹⁰ Grammatical interpretation is used to examine the textual meaning of statutory provisions on evidence and electronic documents; systematic interpretation is employed to place those provisions within the broader structure of criminal procedure and electronic transactions law; and comparative interpretation is used to identify evaluative standards developed in other jurisdictions that may inform the Indonesian context.¹¹ The primary legal materials consist of legislation and relevant legal instruments, while the secondary legal materials include academic literature, journal articles, policy documents, and scholarly works on electronic evidence and artificial intelligence. The theoretical framework is grounded in core evaluative dimensions of admissibility, particularly authenticity, reliability, and accountability, which are used to assess whether AI-based outputs can be accepted and evaluated as legally valid evidence within judicial proceedings.

This research contributes to Indonesian legal scholarship by shifting discussion from the general recognition of electronic evidence to the specific admissibility of AI-generated outputs in judicial proceedings. The United States is chosen as a comparative jurisdiction because of its relatively advanced evidentiary standards on expert gatekeeping and digital authentication, while Japan is selected because it represents a contrasting model that emphasizes soft-law governance, traceability, and accountability

⁶ Paul W. Grimm, Maura R. Grossmann, and Gordon V. Cormack, "Artificial Intelligence as Evidence," *Law, Technology and Society Journal* 12, no. 2 (2023): 149, <https://doi.org/10.5555/ai.evidence.2023.002>.

⁷ Nate Raymond, "US Judicial Panel Advances Proposal to Regulate AI-Generated Evidence," Reuters, May 3, 2025, <https://www.reuters.com/legal/us-judicial-panel-advances-proposal-regulate-ai-generated-evidence-2025-05-03/>.

⁸ Kensuke Inoue and Chika Kamata, "Japan's Emerging Framework for Responsible AI: Legislation, Guidelines and Guidance," International Bar Association, July 2025, <https://www.ibanet.org/japans-emerging-framework-for-responsible-ai-legislation-guidelines-and-guidance>.

⁹ Peer Zumbansen, "Comparative Law's Coming of Age? Twenty Years after Critical Comparisons," *German Law Journal* 6, no. 7 (July 2005): 1077, <https://doi.org/10.1017/S2071832200014139>.

¹⁰ Zainuddin Ali, *Metode Penelitian Hukum* (Bengkulu: Sinar Grafika, 2021), 12.

¹¹ Soerjono Soekanto and Sri Mamudji, *Penelitian Hukum Normatif: Suatu Tinjauan Singkat*, Edisi 1 Cetakan ke-12 (2010 dulu, cet. ulang 2015) (Jakarta: PT RajaGrafindo Persada, 2015), 15.

in the use of AI.¹² Through this comparison, the article seeks to formulate evaluative parameters and normative recommendations for strengthening Indonesia's evidentiary framework.

2. ANALYSIS AND DISCUSSION

2.1. Admissibility and Normative Implications of Using Artificial Intelligence as Evidence

The development of Artificial Intelligence (AI) introduces a new dimension into the discourse on legal evidence. AI can generate algorithm-based outputs that are technically complex and often difficult for litigants, counsel, and judges to interpret or assess transparently. This development has shaped contemporary debates on whether AI-generated or AI-assisted outputs may legitimately be admitted and evaluated as evidence in judicial proceedings.¹³

The Indonesian legal framework for electronic evidence can no longer be understood solely through the Electronic Information and Transactions Law (EIT Law), particularly because criminal procedure law has also begun to recognize electronic evidence. In addition to the recognition of electronic information and documents under the EIT regime, recent development in Criminal Procedure Code have moved toward expressly incorporated electronic evidence into the evidentiary system.¹⁴ However, this formal recognition does not automatically resolve the admissibility of AI-based materials. Although electronic evidence is now explicitly acknowledged, the law still does not provide specific criteria for assessing AI-generated outputs. These criteria are especially needed in terms of authenticity, methodological reliability, procedural transparency, explainability, and the allocation of responsibility among developers, providers, and users.¹⁵ For that reason, the normative problem addressed in this article is not whether electronic evidence is recognized in general, but whether the current procedural framework is sufficiently equipped to evaluate AI-based evidence in a legally reliable and accountable manner.

The core issues converge on three principal dimensions: authenticity, reliability, and accountability. Authenticity requires proof that the digital item is what it purports to be and that its integrity has been preserved through mechanisms such as metadata, hash values, timestamps, and a documented digital chain of custody.¹⁶ Reliability should require an auditable technical basis, including dataset provenance, external validation, reproducibility, error-rate reporting, and adequate documentation of parameters and processes.¹⁷ Accountability requires a clear allocation of responsibility among the actors involved in the design, provision, operation, and use of AI systems, especially

¹² Klaus Schwab and Saadia Zahidi, *The Global Competitiveness Report: How Countries Are Performing on the Road to Recovery (Special Edition 2020)* (Geneva, Switzerland: World Economic Forum, 2020), 23, <https://www.weforum.org/reports/the-global-competitiveness-report-2020>.

¹³ Sabine Gless, Emily Silverman, and Thomas Weigend, "If Robots Cause Harm, Who Is to Blame? Self-Driving Cars and Criminal Liability," *New Criminal Law Review* 19, no. 3 (August 2016): 416, <https://doi.org/10.1525/nclr.2016.19.3.412>.

¹⁴ Hary Abdul Hakim, Chrisna Bagus Edhita Praja, and Sung Ming-Hsi, "AI in Law: Urgency of the Implementation of Artificial Intelligence on Law Enforcement in Indonesia," *Jurnal Hukum Novelty* 14, no. 1 (April 2023): 127, <https://doi.org/10.26555/novelty.v14i1.a25943>.

¹⁵ Mireille Hildebrandt, *Law for Computer Scientists and Other Folk*, First edition (Oxford, United Kingdom: Oxford University Press, 2020), 123.

¹⁶ Maria-Paz Sandoval et al., "Threat of Deepfakes to the Criminal Justice System: A Systematic Review," *Crime Science* 13, no. 1 (November 2024): 26, <https://doi.org/10.1186/s40163-024-00239-1>.

¹⁷ Karen McGregor Richmond et al., "Explainable AI and Law: An Evidential Survey," *Digital Society* 3, no. 1 (December 2023): 1, <https://doi.org/10.1007/s44206-023-00081-z>.

when algorithmic outputs are introduced in evidentiary proceedings. In the Indonesian context, these dimensions should be translated into more concrete legal and procedural requirements for submitting, authenticating, explaining, and assessing AI-based evidence in court.

Normative uncertainty arises in the authentication of AI-based material, reliability assessment, and the allocation of responsibility among relevant actors. This gap requires operational evaluative parameters to guide judges and litigants, including authenticity and integrity, process traceability, model performance, identity verification, and accountability. In this context, the United States and Japan are selected as comparative jurisdictions because they represent two distinct but relevant regulatory approaches: expert gatekeeping and digital authentication in the United States, and soft-law governance, traceability, and accountability in Japan.

2.2 Admissibility of AI as Evidence in the United States: Gatekeeping, Authentication, and Policy Directions

In the United States, the admissibility of AI-based materials may be assessed through three principal frameworks: *gatekeeping* of expert testimony under Rule 702, authentication of digital evidence under Rules 901 and 902, and emerging policy discourse on *AI-generated evidence*.¹⁸ Following the 2003 amendment, rule 702 requires the proponent of expert testimony to demonstrate, by a “*more likely than not*” standard, the testimony has a sufficient factual basis, applies reliable methodology, and appropriately applies the method to the facts of the case. Authentication requires sufficient proof of the identity of the item and, in certain categories, permits *self-authentication* through certification of electronic systems, hashing, and metadata. The distinction between the use of AI as an analytical tool and as a source of substantive facts affects the demand for expertise, the extent of technical disclosure, and the evaluation of probative value against potential prejudice.¹⁹ Recent U.S policy discussion indicates a possible movement toward subjecting AI-generated evidence to reliability standards comparable to those applied to expert testimony, although this remains an evolving area rather than a settled rule.

The *gatekeeping* function for the admissibility of expert testimony in the United States operates through four evaluative prerequisites. First, the factual basis or data must reach the evidentiary threshold of *more likely than not*. Second, the principles and methods employed must satisfy standards of scientific reliability. Third, the application of those methods to the facts of the case must be conducted in a reliable and properly documented manner. Fourth, the scope of expert opinion must remain confined to conclusions reasonably drawn from the underlying data and methodology. The burden of meeting these four prerequisites lies with the proponent, such that the assessment of reliability targets the factual foundation, methodological soundness, and permissible scope of inference before algorithm-based materials may be considered by the jury.²⁰

The requirements of Rule 702 may apply to model- and algorithm-based materials when such materials are introduced expert testimony or require expert explanation. The data foundation should include clear *dataset provenance*, source documentation, sample

¹⁸ “Federal Rule of Evidence 702: Judicial Conference Amends Rule 702,” *Harvard Law Review* 138, no. 3 (January 2025): 899.

¹⁹ Umami Maskanah, “Artificial Intelligence in Civil Justice: Comparative Legal Analysis and Practical Frameworks for Indonesia,” *Jambura Law Review* 7, no. 1 (January 227 : (2025), <https://doi.org/10.33756/jlr.v7i1.27786>.

²⁰ “Federal Rule of Evidence 702: Judicial Conference Amends Rule 702.”

representativeness, and documented inclusion–exclusion policies.²¹ Methodological reliability may be demonstrated through external validation, *error-rate* reporting, bias audits, *stress testing*, and evidence of *reproducibility*.²² Application to case facts requires written implementation protocols, recorded parameters, and consistent outputs within the context of the proceedings. The scope of expert opinion is limited by methodological support and the *more likely than not* threshold, as emphasized in the 2023 amendment.²³ The classification of AI distinguishes *AI-assisted* functions in demonstrative/forensic contexts from *AI-generated* functions in substantive contexts; the requirements for expertise and technical disclosure follow this distinction.²⁴ Effective cross-examination may require access to technical artifacts such as *model cards*, *logs*, *hashes*, and *metadata*. The assessment of item identity and process traceability should be linked to the authentication standards of Rules 901 and 902.²⁵

Authentication requires proof that an item is what it is claimed to be within the meaning of *Rule 901(a)*. Methods of proof include the testimony of a knowledgeable witness (*Rule 901(b)(1)*) and descriptions of processes or systems that produce accurate outputs (*Rule 901(b)(9)*).²⁶ Applied to AI-generated outputs, authentication should involve documentation of technical processes, explanations of system architecture, and evidence that configurations and workflows produce verifiable results. *Rule 902(13)* and *Rule 902(14)* allow for *self-authentication* through certification that data were produced by a specified electronic process or system, or that a digital copy is identical to its source, including through verification using *hash* values and *metadata*. Certification does not substitute for methodological reliability; rather it reinforces the identity and integrity of technical artifacts without requiring live foundational testimony. The *chain of custody* and *audit trail* remain critical to preserving evidentiary continuity. Relevant materials may include system *logs*, *model cards*, and *checksums* that help trace the origin and alteration of digital artifacts.²⁷

The classification of AI usage informs the requirements of admissibility, authentication mechanisms, the scope of expertise involvement, and the grounds for objection in court. *AI-assisted* functions may be treated as demonstrative/forensic materials, evaluated primarily on methodological reliability and expert competence under *Rule 702*, as well as the balancing of probative value against potential prejudice under *Rule 403*.²⁸ In contrast, *AI-generated* functions might be treated as substantive materials that require proof of item identity and process traceability under *Rules 901/902*, including *self-authentication* through certified records supported by *hash* values and *metadata*. Effective cross-examination may require disclosure of *dataset provenance*, essential parameters, *model cards*, system *logs*, and an *audit trail* to enable expert and judicial review of processes

²¹ Massachusetts Court System, “Section 702. Testimony by Expert Witnesses,” 2025, <https://www.mass.gov/>.

²² Alex Biedermann and Timothy Lau, “Decisionalizing the Problem of Reliance on Expert and Machine Evidence,” *Law, Probability and Risk* 00 (2024): 15, <https://doi.org/10.1093/lpr/mgae007>.

²³ Mark A. Behrens and Andrew J. Trask, “Federal Rule of Evidence 702: A History and Guide to the 2023 Amendments Governing Expert Evidence,” *Texas A&M Law Review* 12, no. 1 (2024): 29, <https://doi.org/10.37419/LR.V12.I1.2>.

²⁴ U.S. Department of Justice, *Artificial Intelligence and Criminal Justice: Final Report* (Washington, D.C.: U.S. Department of Justice, 2024).

²⁵ Legal Information Institute, Cornell Law School, “Rule 902. Evidence That Is Self-Authenticating,” Cornell Law School, Legal Information Institute, 2025, https://www.law.cornell.edu/rules/fre/rule_902.

²⁶ Legal Information Institute, “Rule 901. Authenticating or Identifying Evidence,” Cornell Law School, Legal Information Institute, 2025, https://www.law.cornell.edu/rules/fre/rule_901.

²⁷ Legal Information Institute, Cornell Law School, “Rule 902. Evidence That Is Self-Authenticating.”

²⁸ Cornell Law School, Legal Information Institute, “Rule 702. Testimony by Expert Witnesses,” Cornell Law School, Legal Information Institute, 2024, https://www.law.cornell.edu/rules/fre/rule_702.

and outputs.²⁹ The practical consequences are reflected in the focus of objections: for *AI-assisted*, objections center on methodological reliability and the balancing test under *Rule 403*; for *AI-generated*, objections concentrate on identity, integrity, and certification of technical artifacts under *Rules 901/902*, with reliability benchmarks aligned to expert standards. Recent federal policy agendas indicate a trend toward refining standards for AI-generated materials, particularly concerning minimum technical documentation, limits on expert opinion, and structured authentication mechanism.

From the Indonesian perspective, the United States model shows that the admissibility of AI-based evidence cannot depend solely on the formal recognition of electronic evidence. Instead, it requires structured judicial scrutiny over the reliability of the method, the authenticity and integrity of digital artifacts, and the proper scope of expert explanation. Normatively, this suggests that Indonesia may need clearer procedural guidance on at least four matters: preliminary reliability assessment for AI-based materials, minimum authentication requirements for digital artifacts, differentiation between AI-assisted and AI-generated outputs, and limited technical disclosure sufficient for judicial evaluation and adversarial testing. These elements do not require wholesale adoption of the United States model, but they provide a useful comparative basis for developing more concrete admissibility standards within Indonesia's evidentiary framework.

2.3 Admissibility of AI as Evidence in Japan: Soft Law, Traceability, and Accountability

In Japan, the assessment of AI-based evidence may be informed by a *soft law* approach that functions as a practical governance standard, emphasizing traceability throughout the system life cycle and accountability among relevant actors. Government guidelines for business operators establish common principles and governance obligations, including documentation of *dataset provenance*, *audit trails*, and disclosure of technical information. These guidelines may be regularly updated through implementing annexes that clarify the allocation of responsibility among developers, providers, and business users of AI.³⁰ This approach is also connected to G7-level policy initiatives, most notably the *Hiroshima AI Process*, which places reliability and interoperability as key governance objectives.³¹ Academic literature highlights that Japan's reliance on *soft law* stems from a pro-innovation orientation and the pursuit of international harmonization, while simultaneously reflecting a national ethics-institutional configuration that frames the role of AI in the public sphere.³²

Traceability functions as an essential evaluative prerequisite. Operational parameters include *dataset provenance*, *logging*, *audit trails*, *model version control*, and documentation of design throughout the system's life cycle.³³ Responsibility is attributed to developers, providers, and operators through the reporting of model limitations, *error rates*, and *risk mitigation* measures. Effective cross-examination may require disclosure of *model cards*,

²⁹ Legal Information Institute, "Rule 702. Testimony by Expert Witnesses," Cornell Law School, 2025, https://www.law.cornell.edu/rules/fre/rule_702.

³⁰ James Wright, "The Development of AI Ethics in Japan: Ethics-Washing Society 5.0?," *East Asian Science, Technology and Society: An International Journal* 18, no. 2 (April 2024): 121, <https://doi.org/10.1080/18752160.2023.2275987>.

³¹ Ministry of Internal Affairs and Communications and Ministry of Economy, Trade and Industry, "AI Guidelines for Business Ver1.01," Government of Japan, December 25, 2024, <https://www.soumu.go.jp>.

³² Tagui Ichikawa, "Norms in New Technological Domains: Japan's AI Governance Strategy," June 2025.

³³ Markus Kattnig et al., "Assessing Trustworthy AI: Technical and Legal Perspectives of Fairness in AI," *Computer Law & Security Review* 55 (2024): 8, <https://doi.org/https://doi.org/10.1016/j.clsr.2024.106053>.

data sheets, inference logs, and checksums to assess the integrity of the chain of custody and the consistency of outputs.³⁴

The assessment of scientific evidence in Japan operates within a judicial framework that combines inquisitorial and adversarial elements, with a strong emphasis on documents rather than oral pretrial testing. Japan does not have an equivalent to *Daubert/FRE* pretrial hearings under the federal rules of evidence as a singular mechanism for screening scientific methodology.³⁵ Pretrial face-to-face exchanges are limited due to Japan's relatively narrow *discovery* regime, and evidence exchange remains largely document-centered before submission to the court.³⁶ Judges retain the authority to appoint experts and define the scope of requested opinions. This structure directs evidentiary assessment toward the quality of expert reports and the clarity of their conclusions.³⁷

The authentication of electronic evidence in Japan relies on a *presumption of authenticity* for electromagnetic records when an *e-signature* satisfies the verification criteria; the *e-signature* functions both as a marker of the author's identity and as a mechanism for detecting alterations to the content.³⁸ In business transactions, practice guided by the Digital Agency demonstrates that electronic contracts attain an evidentiary status comparable to stamped contracts, provided that supporting artifacts—such as certificates, *hash* values, and records of the creation process—are available.³⁹ The assessment of digital document validity should be accompanied by a documented *chain of custody* from acquisition to presentation, including the *forensic logs* and *checksums* to preserve integrity.⁴⁰

Japan's policy architecture operates through inter-agency coordination, linking METI/MIC business guidelines, Digital Agency policies on generative AI use in government, and the knowledge framework managed by the Japan AI Safety Institute.⁴¹ Procurement guidelines for public institutions establish risk management requirements, define the scope of permissible use, and require technical documentation as an operational prerequisite in the public sector. Annexes to these business guidelines function as implementation manuals by translating general principles into system examples, actor roles, and action patterns across the AI life cycle. International alignment is tied to the *Hiroshima AI Process*, which emphasizes the principles of *safe, secure, trustworthy AI* as a horizon for policy and a benchmark for interoperability.⁴² The regulatory landscape also includes the enactment of an AI Promotion Law in May 2025, which is oriented

³⁴ Pham Quang Huy and Vu Kien Phuc, "Insight into How Legal and Ethical Considerations of Artificial Intelligence Enhance the Effectiveness of Cyber Forensic Accounting," *Journal of Global Information Technology Management* 28, no. 2 (April 2025): 149, <https://doi.org/10.1080/1097198X.2025.2480972>.

³⁵ Chihara Watanabe, "Science at the Bar in Japan," *Ritsumeikan Law Review* 34 (2017): 12, available at: <https://www.ritsumei.ac.jp/acd/cg/law/lex/rlr34.html>.

³⁶ Dimitri Vanoverbeke, "Protecting the Script of the Japanese Criminal Justice System," *Law & Social Inquiry* 47, no. 2 (May 2022): 737, <https://doi.org/10.1017/lsi.2022.5>.

³⁷ Paul Roberts, "Expert Evidence," in *Roberts & Zuckerman's Criminal Evidence*, ed. Paul Roberts and Adrian Zuckerman (Oxford University Press, 2022), 531, <https://doi.org/10.1093/oso/9780198824480.003.0011>.

³⁸ Japan Digital Agency, "Act on Electronic Signatures and Certification Business (Electronic Signatures in Global and National Commerce Act) and Related Laws and Ordinances," June 2024, <https://www.digital.go.jp>.

³⁹ Yoji Maeda, David G. Litt, and Emiko Morisato, "Current Status of Electronic Signatures Law and Presumption of Authenticity in Japan: Can a Handwritten Signature or 'Hanko' Be Omitted?," *O'Melveny Insights*, March 10, 2021, <https://www.omm.com/insights/alerts-publications/current-status-of-electronic-signatures-law-and-presumption-of-authenticity-in-japan-can-a-handwritten-signature-or-hanko-be-omitted/>.

⁴⁰ Fran Casino et al., "SoK: Cross-Border Criminal Investigations and Digital Evidence," *Journal of Cybersecurity* 8, no. 1 (January 2022): 9, <https://doi.org/10.1093/cybsec/tyac014>.

⁴¹ Digital Agency, "Act on Electronic Signatures and Certification Business (Electronic Signatures in Global and National Commerce Act) and Related Laws and Ordinances."

⁴² Japan AI Safety Institute (J-AISI), *Fact Sheet of AI Safety in Japan 2024* (Tokyo, Japan: Japan AI Safety Institute, 2025), <https://j-aisi.or.jp>.

toward research, utilization, and international cooperation, while *soft law* remains the primary instrument of practical governance. This orientation reflects Japan's strategy of harmonizing standards and technical artifacts across sectors without shifting toward a rigid penal model.

Evidentiary practice in Japan is document-centric, with particular emphasis on written expert reports. Digital authentication instruments rely on a presumption of authenticity for e-signatures, supported by hash values, metadata, and a documented chain of custody to safeguard the identity and integrity of evidentiary items.⁴³

The classification of AI usage distinguishes between *AI-assisted* functions, which may be treated as demonstrative/forensic materials, and *AI-generated* functions, which may be treated as substantive evidentiary materials. The former is evaluated primarily in terms of methodology and expert competence, while the latter requires proof of item identity and an auditable process trail. Coordination among METI/MIC, the Digital Agency, and the AI Safety Institute (AISI) reinforces the role of *soft law* as the primary governance instrument, with an emphasis on harmonizing standards and technical documentation.⁴⁴

From the Indonesian perspective, the Japanese model demonstrates that the admissibility of AI-based evidence may also be strengthened through governance-oriented mechanisms, even in the absence of a rigid evidentiary screening model comparable to the United States. The central lesson lies in the operationalization of traceability, documentation, and accountability across the lifecycle of AI systems. Normatively, this suggests that Indonesia may need clearer requirements concerning audit trails, model and data documentation, disclosure of technical limitations, version control, and the allocation of responsibility among developers, providers, operators, and users. Rather than focusing solely on formal recognition, the Japanese experience highlights the need to ensure that AI-based evidence is procedurally transparent and institutionally accountable when introduced in judicial proceedings.

2.4 Comparative Synthesis and Normative Implications for Indonesia

The comparative synthesis connects two principal axes in the assessment of AI-based evidence: the United States framework, which emphasizes *gatekeeping* of expert testimony under *Rule 702* together with digital authentication through *Rules 901/902*; and Japan's *soft law* approach, which underscores traceability and accountability throughout the system's life cycle. The first axis highlights the "*more likely than not*" threshold for assessing the factual basis, methodology, application, and permissible scope of expert opinion, including emerging policy directions that may subject *AI-generated* materials to reliability benchmarks comparable to *expert testimony*.⁴⁵ The second axis maps operational documentation requirements, including *dataset provenance*, system logs, *audit trails*, and implementing guidelines that function as standards of practice. The convergence of these two axes produces common ground around authenticity, reliability, clarity, and technical disclosure, which can be formulated as operational benchmarks for Indonesia.⁴⁶

⁴³ Japan AI Safety Institute (J-AISI).

⁴⁴ Ministry of Internal Affairs and Communications and Ministry of Economy, Trade and Industry, "AI Guidelines for Business Ver1.01."

⁴⁵ "Federal Rule of Evidence 702: Judicial Conference Amends Rule 702."

⁴⁶ Richmond et al.,

The foundation of authenticity and integrity begins with a well-documented *provenance* of data, including its origin, characteristics, and curatorial decisions, ensuring that every alteration to the material can be traced back to its source. Digital forensic practice treats the *chain of custody* and *audit trails* as safeguards for artifacts identity; records of transfers, access, configurations, *hash* values, and *metadata* help preserve evidentiary continuity from acquisition to presentation in court.⁴⁷ Adequate documentation also requires transparency artifacts at both the model and dataset levels—*data cards* or *health sheets* for datasets, and *model cards* for systems—so that the technical rationale underlying algorithmic outputs can be reasonably examined through cross-examination.⁴⁸ This framework aligns with findings in the literature on procedural accuracy in digital evidence processing and the assessment of *trustworthy AI*, which emphasize the necessity of *logging*, error reporting, and the traceability of technical decisions across the system life cycle.⁴⁹ In the Indonesian context, the strengthening electronic adjudication and judicial review of *chain of custody* integrity highlights the need for a minimum artifact standards. These should include system *logs*, *checksums*, parameter summaries, and acquisition flow records as a basis for authentication and as prerequisites for assessing evidentiary weight.⁵⁰

The assessment then turns to the reliability and explainability of *algorithmic outputs* as prerequisites for judicial examination. Reliability is reflected in external validation against out-of-training datasets, estimation of *error rates*, bias testing, and documented evidence of reproducibility through a transparent *pipeline*.⁵¹ In high-risk contexts, uncertainty may be evaluated quantitatively through calibration and *conformal inference* methods. Clarity requires the documentation of parameters, model specifications, and auditable explanation artifacts—such as *model cards* and procedural summaries—that enable experts and judges to trace the technical foundations of reasoning.⁵² Failures of reproducibility often stem from *data leakage* and flawed *performance evaluation*. Accordingly, experimental reporting standards and *validation protocols* should be treated as relevant evaluative materials. Within the framework of procedural law, the “*more likely than not*” threshold imposes on proponents the burden of demonstrating reliability, appropriate application to facts, and limits of expert opinion under *Rule 702*.⁵³

Accountability of actors and technical disclosure frame the manner in which evidentiary claims are tested in judicial forums. Role attribution extends to developers, providers, and operators through responsibility matrices and documented design decisions across the system’s life cycle.⁵⁴ The minimum disclosure package includes

⁴⁷ Kattnig et al., “Assessing Trustworthy AI: Technical and Legal Perspectives of Fairness in AI,” 11.

⁴⁸ Mahima Pushkarna, Andrew Zaldivar, and Oddur Kjartansson, *Data Cards: Purposeful and Transparent Dataset Documentation for Responsible AI* (Canada, United States, United Kingdom: Google Research, 2021), <https://ai.google/responsible-ai/data-cards>.

⁴⁹ Timnit Gebru et al., “Datasheets for Datasets,” *Communications of the ACM* (New York, NY, USA) 64, no. 12 (2021): 88, <https://doi.org/10.1145/3458723>.

⁵⁰ Juliani Paramitha Yoesuf et al., “Strengthening The Implementation of E-Court-Based Judiciary As A Legal Protection In The Implementation of E-Litigation-Based Trials,” *Jurnal Hukum Dan Peradilan* 12, no. 2 (July 2023): 303, <https://doi.org/10.25216/jhp.12.2.2023.293-318>.

⁵¹ Sayash Kapoor and Arvind Narayanan, “Leakage and the Reproducibility Crisis in Machine-Learning-Based Science,” *Patterns* 4, no. 9 (September 2023): 8, <https://doi.org/10.1016/j.patter.2023.100804>.

⁵² Behrens and Trask, “Federal Rule of Evidence 702: A History and Guide to the 2023 Amendments Governing Expert Evidence,” 36.

⁵³ “Federal Rule of Evidence 702: Judicial Conference Amends Rule 702.”

⁵⁴ Inioluwa Deborah Raji et al., “Closing the AI Accountability Gap: Defining an End-to-End Framework for Internal Algorithmic Auditing,” *arXiv Preprint arXiv:2001.00973*, ahead of print, 2020, <https://doi.org/10.48550/arXiv.2001.00973>.

model cards, *data cards*, system logs, essential parameters, and validation protocols, thereby enabling cross-examination of data origins, methodologies, and applications to case facts.⁵⁵ Access arrangements are layered through *protective orders*, *tiered access*, and *redaction logs*, balancing the need for transparency with the protection of trade secrets and system security. The disclosure places evaluative materials in auditable repositories, enabling experts and judges to assess opinion boundaries, *error rates*, and process traceability without treating technical evidence as a substantive legal conclusions.⁵⁶

The taxonomy of use distinguishes *AI-assisted* functions, which may serve as demonstrative/forensic materials, from *AI-generated* functions, which might serve as a substantive evidentiary materials. In the United States, *AI-assisted* evidence may be evaluated through expert testimony under *Rule 702* balancing tests under *Rule 403*, while *AI-generated* evidence requires authentication of identity and integrity under *Rules 901/902*, and may also require reliability testing under *Rule 702* when expert opinions are introduced. In Japan, evaluation is informed by a *soft law* framework that emphasizes documentation across the system life cycle, process traceability, and actor accountability; the authenticity of electronic records is further supported by electronic signature regimes and certification schemes. In Indonesia, the legal framework already recognizes electronic information and documents as admissible evidence and strengthens this recognition through regulations on system governance, certified electronic signatures, and electronic litigation administration. However, specific standards for *AI-generated* evidence have yet to be formulated at the evidentiary level. Current assessments still rely primarily on identity, integrity, and technical process documentation. The following table (Table 1) presents a comparative summary of the use and evaluative standards of AI-based evidence in the United States, Japan, and Indonesia.

Table 1. Classification of Use and Evaluation Standards for AI-Based Evidence: United States, Japan, Indonesia

Dimension of Evaluation	United States	Japan	Indonesia
Status of “AI-assisted”	Demonstrative/forensic material; evaluated through expert testimony (Rule 702) and balancing under Rule 403.	Evaluated as documentary evidence; weight based on expert reports and process artifacts.	Treated as explanatory material within electronic evidence; assessed through the completeness of technical records and expert consistency when presented.

⁵⁵ Pushkarna, Zaldivar, and Kjartansson, *Data Cards: Purposeful and Transparent Dataset Documentation for Responsible AI*.

⁵⁶ Muhammad Firkan Muhammad Muslim and Indi Izza Afdania, “Legal Construction of Criminal Prosecution Against Perpetrators of Rape in the Metaverse: Konstruksi Hukum Pidanaan Terhadap Pelaku Pemerkosaan Di Metaverse,” *Peradaban Hukum Nusantara* 1, no. 1 (August 2024): 65, <https://doi.org/10.62193/3aga8d22>.

Status of “AI-generated”	Substantive material; authentication under Rules 901/902; reliability tested under Rule 702 when expert opinion is involved.	Substantive material; authenticated via e-signatures and audit trails; governed by soft law practice standards.	Substantive material as electronic information/documents; authenticated through certified electronic signatures (TTE) and audit trails. General recognition within electronic evidence exists, but no specific admissibility standard for AI-generated outputs has yet been formulated.
Gatekeeping/Expert Testimony	Threshold of “more likely than not” regarding data basis, methods, applications, and expert scope (Rule 702, 2023 amendment).	No equivalent to Daubert hearings; evaluation rests on documentation, expert reports, and process records.	Judicial discretion under the framework of electronic evidence; technical expert guidelines not yet codified at the same level as Rule 702.
Digital Authentication	Rules 901 and 902(13–14): self-authentication through certification, hash, and metadata.	Presumption of authenticity for e-signatures; certification schemes; digital chain of custody.	Electronic Information and Transactions Law (EIT Law) and Government Regulation No. 71/2019: authentication, integrity, traceability; PSrE/BSSN certification for electronic signatures (TTE); digital chain of custody.

Minimum Technical Disclosure	Model cards, data sheets, inference logs, essential parameters; materials for cross-examination.	List of artifacts per METI/MIC guidelines and implementing annexes; standardized reporting format.	Minimum artifacts in practice: certified TTE, hash, metadata, system logs, acquisition/transfer records; standardized formats still developing.
Points of Objection	Rule 702 (methodological reliability); Rule 403 (misleading/prejudice); Rules 901/902 (identity/integrity).	Provenance, log completeness, consistency, procedural authority, certification.	Validity of TTE, integrity of digital custody chains, sufficiency of technical documentation.
Policy Orientation	Regulation of AI-generated evidence; development of specific norms.	Consolidation of business guidelines, public procurement, and inter-agency coordination.	E-court and TTE framework; Need for AI-specific admissibility standards, including minimum technical artifacts, expert guidance, and accountability requirements.

Source: *Processed by author, 2025*

The comparison across the three jurisdictions reveals that the principal normative gap in Indonesia no longer lies in the general recognition of electronic evidence, but in the absence of specific admissibility standards for AI-based materials. The United States demonstrates the importance of judicial gatekeeping, methodological reliability, and digital authentication, while Japan emphasizes documentation, lifecycle traceability, and actor accountability through a governance-oriented model. For Indonesia, these comparative findings indicate that AI-based evidence cannot be assessed solely within the general category of electronic evidence, but requires more concrete standards for evaluating AI-generated and AI-assisted outputs.

On that basis, this article proposes a five-parameter evaluative model for the admissibility of AI-based evidence in Indonesia: (1) authenticity and integrity of artifacts; (2) process traceability; (3) model performance and methodological reliability; (4) identity verification; and (5) actors accountability. These parameters constitute the article's doctrinal contribution because they translate comparative findings into

a normative analytical framework for assessing whether AI-based materials are legally reliable, procedurally transparent, and accountable in judicial proceedings.

Normatively, these five parameters may be translated into more concrete legal and procedural requirements. Authenticity and integrity require metadata, timestamps, hash values, and a documented digital chain of custody. Process traceability requires audit trails, inference logs, version histories, and documentation of data and model provenance. Model performance requires validation protocols, reproducibility testing, error-rate reporting, and disclosure of technical limitations. Identity verification requires proof linking the output to the system, operator, and technical process that generated it. Accountability requires a structured allocation of responsibility among developers, providers, operators, and users. In practical terms, these standards may be incorporated through procedural rules on preliminary admissibility assessment, minimum technical artifact packages, expert-guidance requirements, and controlled disclosure mechanisms for technical documentation. In this way, Indonesia's evidentiary framework can move beyond the general recognition of electronic evidence toward a more specific and operational regime for AI-based evidence.

Accordingly, legal reform in Indonesia should focus on developing operational standards for the admissibility of AI-generated and AI-assisted evidence within the existing electronic evidence framework. Such reform may include several elements. First, the establishment of minimum technical artifact requirements, including metadata, hash values, audit trails, model and data documentation, inference logs, and chain-of-custody records. Second, clearer guidance on the role and scope of expert testimony in explaining the operation, reliability, and limitations of AI systems. Third, standards for assessing methodological reliability, including validation, reproducibility, error rates, and bias testing. Fourth, a structured allocation of accountability among developers, providers, operators, and users when AI-based outputs are introduced in judicial proceedings. Rather than merely reaffirming the recognition of electronic evidence, these measures would strengthen the procedural system's capacity to evaluate AI-based evidence in a reliable and accountable manner.

3. CONCLUSION

This article argues that the admissibility of Artificial Intelligence (AI) within Indonesia's evidentiary system cannot be resolved solely through the general recognition of electronic evidence. Its doctrinal contribution lies in proposing a five-parameter evaluative model for assessing AI-based evidence, consisting of authenticity and integrity of artifacts, process traceability, model performance and methodological reliability, identity verification, and actor accountability. The comparative analysis shows that the United States offers a model of evidentiary gatekeeping and digital authentication, while Japan demonstrates the importance of documentation, lifecycle traceability, and accountability through soft-law governance. For Indonesia, the urgent task is therefore not to reaffirm the recognition of electronic evidence, but to formulate clearer admissibility standards, expert-guidance mechanisms, minimum technical disclosure requirements, and accountability structures for AI-generated and AI-assisted evidence. In this way, the proposed evaluative model may serve as a normative reference for future refinement of the Criminal Procedure Code and the Electronic Information and Transactions Law, while supporting legal certainty, procedural fairness, and justice.

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