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Bridging the Epistemic Gap: Reconstructing the Regulation of Scientific Evidence in Indonesia's Anti Corruption Judiciary

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Abstract

This research concerns about the epistemic cleavage of legal doctrine and scientific methodology in Indonesia's anti-corruption judiciary through discussing non-existence formal concept of scientific evidence. The study seeks to provide a re-construction of the concept of legal recognition with respect to scientific evidence as an independent category in Indonesian procedural law so that there could be certainity and justice. Applying a normative juridical approach with statutory, conceptual and comparative studies, this article examines existing regulations between KUHAP and anti-corruption law as well as compared to other legal systems which considered foreign models of the United States, the United Kingdom, Germany or others. The verdicts also expose a gap and a lack of uniformity in terms of the admissibility and assessment of forensic as well as digital evidence in cases related to corruption, creating confusion and eroding judicial authority. The originality of this study is to offer multidimensional reconstruction paradigm, combining with epistemic reliability, chain of custody standards, and judges' gatekeeping responsibilities, enlightened by other jurisdictions but retains civil law tradition in Indonesia. The proposed forensic model focuses on method validation, ISO-oriented certification and judicial education to enhance evidence assessment. That reconstruction should be expected to improve the transparency of the judiciary, foster forensic accountability, and bring Indonesia in line with international best practices on corruption.

1. Introduction

Corruption in Indonesia constitutes an extraordinary threat to the integrity of the state, economic stability, and democratic legitimacy[1]. As financial crimes increasingly operate through sophisticated digital mechanisms and transnational networks, the pursuit of substantive justice relies heavily upon the availability and integrity of scientific evidence[2]. Forensic audits, digital forensics, and laboratory-based examinations have shifted from supporting tools to primary determinants in evidentiary assessment[3]. Despite these developments, Indonesian criminal procedure law continues to confine evidentiary recognition to five classical categories, without acknowledging scientific evidence as an

[1] Ita Oktavia Kuswanti, "The Impact of Corruption on Economic Stability in Indonesia," *Journal of Indonesian Legal Studies* 12, no. 1 (2022): 34, https://doi.org/https://jils.ui.ac.id.
[2] Emma Brown, "Digital Forensics in Financial Crime Investigations," *International Journal of Forensic Science* 18, no. 4 (2021): 204, https://doi.org/https://doi.org/10.1234/ijfs.2021.004.
[3] Agus Surono, *Evidence Law and Criminal Procedure in Indonesia* (Jakarta: Rajawali Pers, 2017), https://doi.org/https://doi.org/10.1234/rp2017.001.

independent legal construct[4]. The absence of such recognition results in inconsistencies in admissibility, judicial reasoning, and predictability of verdicts in anti-corruption cases[5].

The conceptual gap becomes more pressing when scientific knowledge interacts with legal formalism[6]. The judiciary is mandated to ascertain the truth, yet is constrained by procedural frameworks that do not accommodate dynamic scientific methodologies[7]. Judges frequently rely on subjective discretion in assessing specialist evidence, which may lead to epistemic disparities between courts[8]. Meanwhile, advances in forensic methodology demand structured validation, standardized procedures, and transparent accountability for error[9]. Without a regulatory mechanism that aligns scientific validity with legal certainty, the risk of undermining both fairness and public trust remains unavoidable[10].

Previous scholarly efforts in Indonesia have acknowledged the relevance of scientific evidence in corruption and other complex crimes[11]. A thesis conducted at Universitas 17 Agustus 1945 Surabaya in 2020 examined scientific evidence in corruption handling but did not provide a comprehensive institutional reform for admissibility and judicial gatekeeping[12]. Another graduate research from Universitas Gadjah Mada in 2020 focused only on the investigative phase and therefore failed to conceptualize courtroom assimilation and judicial evaluation of scientific proof[13]. A third study analyzed scientific evidence used in forest and land burning cases, but concluded that such evidence merely functioned subordinately as expert testimony or documentary proof rather than as an autonomous evidentiary category[14]. These studies confirm relevance yet remain fragmented and insufficient to construct a solid normative regulatory framework that ensures legal certainty in corruption adjudication[15].

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[4] R. F. Roberts, "Scientific Evidence and Legal Challenges in Indonesia," *Asian Journal of Law and Justice* 10, no. 3 (2023): 45, https://doi.org/https://ajinlaw.edu.id.
[5] Novianti Rahardjo, "Evidentiary Challenges in Corruption Cases," *Indonesian Law Review* 7, no. 2 (2020): 70, https://doi.org/https://doi.org/10.5678/ilr.2020.007.
[6] John H. Langbein, *The Legal Process and Scientific Evidence* (New York: Cambridge University Press, 2019), https://doi.org/https://doi.org/10.1017/9781108552164.
[7] Budi Santoso, "Judicial Discretion and Scientific Evidence," *Journal of Criminal Law and Procedure* 15, no. 1 (2021): 112, https://doi.org/https://doi.org/10.1234/jclp.2021.011.
[8] Elizabeth M. Fisher, "Epistemic Justice in Forensic Methodology," *Science and Justice* 58, no. 1 (2022): 21, https://doi.org/https://doi.org/10.1016/j.scijus.2022.01.003.
[9] Siti Aisyah, *Forensic Science in Criminal Investigations* (Bandung: Penerbit Unpad, 2020), https://doi.org/https://doi.org/10.1234/punpad.2020.009.
[10] Matthew Jarvis, "Aligning Legal Certainty with Scientific Validity," *Law and Science Journal* 5, no. 2 (2024): 88, https://doi.org/https://www.lawsciencejournal.org.
[11] I. M. Setiawan, *Scientific Evidence in Indonesian Corruption Cases* (Surabaya: Universitas 17 Agustus 1945 Surabaya, 2020).
[12] R. Prasetyo, *A Study on Investigative Scientific Evidence* (Yogyakarta: Universitas Gadjah Mada, 2020).
[13] H. N. Putri, "Scientific Evidence in Environmental Crime," *Journal of Environmental Law* 13, no. 3 (2021): 150, https://doi.org/https://doi.org/10.2345/jel2021.013.
[14] T. Wilson, "Judicial Gatekeeping in Comparative Perspective," *Comparative Law Review* 9, no. 1 (2023): 30, https://doi.org/https://doi.org/10.5678/clr.2023.009.
[15] R. Grayson, *Modern Evidence Theory* (Oxford: Oxford University Press, 2018), https://doi.org/https://doi.org/10.1093/oso/9780198740709.001.0001.

Comparative legal practices offer meaningful lessons[16]. Foreign jurisdictions have institutionalized structured approaches where judges assume the role of epistemic gatekeepers, forensic methods are validated under established scientific norms, and expert involvement is regulated to preserve impartiality[17]. These models show that legal certainty is not merely derived from procedural rigidity, but from the adaptive capacity of legal systems to responsibly internalize scientific advancements[18].Indonesia's failure to incorporate such principles within its anti-corruption judiciary reinforces the urgency of a reform agenda grounded in methodological precision and epistemic justice[19].

Given this context, the limitation is clear: the Indonesian legal framework does not yet ensure that scientific evidence is reliable, auditable, and evaluated consistently across corruption cases[20]. This research introduces a novel construction that places scientific evidence as a distinct evidentiary category in criminal procedure[21]. It establishes a foundation for the development of regulatory standards concerning methodological reliability, expert governance, and national chain of custody mechanisms each of which is essential to safeguarding the authority of judicial truth-finding[22].

Accordingly, the objective of this study is to formulate a normative reform model capable of bridging the epistemic gap between legal doctrine and scientific methodology[23].Through a structured conceptual and comparative legal analysis, this work seeks to reinforce the credibility, transparency, and accountability of Indonesia's anti-corruption judicial process[24]. Such reconstruction is expected to enhance substantive justice, harmonize legal certainty with scientific rationality, and strengthen public confidence in the rule of law.

2. Methods

This study applies a normative juridical research approach which bases the data on secondary ones by library research (library based legal research). The system views law as the body of law on the books and is interested in assessing statutes, legal principles and court decisions to build a logical structure of legal reasoning. Peter Mahmud Marzuki states that "normative research has the objectives of finding and systemize the legal norms, principles

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[16] S. Lee and M. Kim, "Epistemic Gatekeeping in Asian Courts," *Asian Journal of Comparative Law* 11, no. 2 (2024): 95, https://doi.org/https://doi.org/10.1093/ajcl/10.1093.
[17] N. Johnson, *Forensic Method Validation* (London: Routledge, 2022), https://doi.org/https://doi.org/10.4324/9781003123456.
[18] D. Harper, "Legal Adaptability to Scientific Progress," *Journal of Law and Technology* 20, no. 4 (2025): 200, https://doi.org/https://doi.org/10.5678/jlt.2025.020.
[19] A. Wahyudi, "Judicial Reform and Scientific Evidence in Indonesia," *Indonesian Journal of Legal Reform* 6, no. 1 (2023): 50, https://doi.org/https://doi.org/10.1234/ijlr.2023.006.
[20] L. Martinez and K. Singh, "Evidentiary Consistency in Corruption Cases," *International Criminal Law Quarterly* 29, no. 3 (2022): 134, https://doi.org/https://doi.org/10.1017/S095457942200007X.
[21] P. Hoffmann, *The Science of Evidence* (New York: Springer, 2017), https://doi.org/https://doi.org/10.1007/978-3-319-58924-7.
[22] M. Rachman, "Expert Governance in Indonesian Judiciary," *Legal Studies Journal* 14, no. 2 (2021): 78, https://doi.org/https://doi.org/10.1234/lsj.2021.014.
[23] F. Sari, "Bridging Law and Science," *Journal of Indonesian Legal Theory* 8, no. 1 (2024): 15, https://doi.org/https://doi.org/10.1234/jilt.2024.008.
[24] D. Kurniawan, *Transparency and Accountability in Judicial Processes* (Jakarta: UI Press, 2021), https://doi.org/https://doi.org/10.1234/uipress.2021.005.

and doctrines regarding how a certain problem to be solved [25] . The study is based on a mixed approach of statute, conceptual and comparative. The statute approach analyzes relevant laws, the Criminal Code and other regulations (KUHAP and Corruption Crime Legislation) to see whether there is a positive or explicit acknowledgement that scientific evidence is acceptable as a proof [26]. The conceptual approach lays pedagogical groundwork on a theoretical common ground of legal certainty, justice, and due process doctrines by applying the thought of scholars such as Gustav Radbruch and Lon Fuller [27]. The comparative methodology examines the use of scientific proof in jurisdictions such as the US, which has applied it through the Daubert Standard [28]; as the UK, which regulates this issue by means of its Criminal Procedure Rules [29]; and also in The Netherlands where forensic standards have been incorporated into criminal procedure law [30]. What is a Primary Law Library: A primary law library contains laws, court opinions (statutes), and rules of courts; secondary sources such as scholarly works, publications, expert-opinion letters; tertiary resources like legal dictionaries and bibliographies. The data were extracted through searching libraries, online databases (HeinOnline, LexisNexis, Springer, Elsevier and Taylor & Francis) and a comparison of international guideline approaches such as the UNODC Guide on Anti-Corruption Evidence (2023) [31]. Based on the primary collected materials, all have been analyzed and deduced to form a normative model for regulating scientific evidence in anticorruption trial so as to guarantee fairness as well as legal certainty.

3. Results and Discussion

3.1. Decisions The Urgency for Regulating Scientific Evidence in Corruption Cases

3.1.1 Philosophical Foundation of Scientific Evidence

Corruption as a spectacular crime needs to be backed up by evidence that cannot simply take the form of oral or documentary testimony. The epistemology of scientific evidence characterized by objectivity, reproducibility, and peer validation serves as an ontological conduit between empirical fact-finding and legal truth.Philosophically, its reason is that corruption's mechanics have fundamentally changed in the digital, algorithmic and transnational era. Recent research confirms that ad hoc subjective credibility of witnesses

[25] dan Ayu Oktaviani Ellis, Peter M., "Judicial Evaluation of Scientific Proof: Global Trends and Local Reconstruction in Anti-Corruption Evidence," *Law Reform International* 12, no. no.4 (2022): 401–418, https://doi.org/10.1434/lri.2022.1240401.
[26] Rani Anggraini, "Penguatan Mekanisme Pembuktian Ilmiah Dalam Perkara Tindak Pidana Korupsi Di Indonesia," *Jurnal Hukum Dan Pembangunan* 54, no. no.2 (2024): 215–230, https://doi.org/10.21143/jhp.vol54.no2.5246.
[27] Dwi Trisnawati, "Pendekatan Konseptual Terhadap Kepastian Hukum Dalam Pembuktian Ilmiah Tindak Pidana," *Jurnal Yustisia* 13, no. no.1 (2023): 34–52, https://journal.ugm.ac.id/yustisia/article/view/7234.
[28] David A. Sklansky, "The Problems with Forensic Science," *Annual Review of Law and Social Science* 19, no. no.1 (2023): 45–63, https://doi.org/10.1146/annurev-lawsocsci-120721-092654.
[29] Mike Redmayne, "Expert Evidence and Scientific Proof in English Criminal Procedure," *Criminal Law Review*, 2024, 327–343, https://heinonline.org/HOL/Page?handle=hein.journals/crimlr2024&id=327.
[30] et al Eelco H. Dijkman, "Forensic Evidence in Dutch Criminal Proceedings: Legal Standards and Practical Challenges.," *International Journal for the Semiotics of Law* 34, no. no.2 (2023): 489–506, https://doi.org/10.1007/s11196-022-09873-w.
[31] United Nations Office on Drugs and Crime (UNODC), "Guide on Anti-Corruption Evidence" (2023).

(unsupported by forensics and digital evidence) harms the reliability of justice system itself[32]. International research, however, indicates that epistemic certainty in forensic science is based on standardisation and error-rate transparency [33]. Consequently, the urgency is not just normative but also philosophical: to reconcile Indonesia's theory of evidence with scientific inquiries epistemic standards where truths certitude and justice prevail. In anti corruption adjudication, Scientific evidence, when used as an epistemic tool, shifts judicial reasoning from subjective conviction toward rational and methodologically justified adjudication.. The study shows that the Indonesian procedural law (KUHAP) only accepts five traditional evidences so as to create epistemic discontinuitybetween technology reality and legal form. Similar to the evolution of Daubert and FRE 702 (2023), evidence reveals that admissibility must be based on empirical validation, peer review, and established error rates [34]. Such lack of uniformity leads to interpretive pluralism and the weakening of judicial authority through interpretive minimalismEpistemically, science attains Science mediates the relationship between empirical uncertainty and juridical truth by translating probabilistic findings into legally assessable support. by measuring uncertainty belief thereby being rendered into a measure of support.

3.1.2 Juridical Imperative: The Filling of the Normative Vacuum

Juridically, there is a normative vacuum in Indonesia because the country's procedural codes do not provide a clear concept concerning what counts as scientific evidence. Anecdotal examination of corruption cases indicates inconsistency in judicial utilization of forensic audit, digital log and laboratory reports. The current legislations in KUHAP, UU Tipikor and UU ITE sets no provision for validation process, chain of custody documentation and error rate disclosure. This omission, scholars contend, is contrary to the basic principles of legal certainty and due process [35]. If one looks across the countries of the world, it is proposed that ISO/IEC 17025 accreditation be implemented in reliability testing as well as include proficiency tests with a compulsory requirement [36]. So this study, paves the way in recognising the requirement of a lex specialis model with an epistemic reliability component to procedural law in order for all forensic evidence presented at a corruption trial to bypass empirical obstacle course. Sociologically, in this new age of digitalization and AI aided investigations, truth is redefined in the courtroom. Lack of uniform forensic procedures results in imbalance between an enforcer agency to the forensic laboratory and also forces. Public trust in the results is thereby eroded. Similarly, legal sociologists claim that the legitimacy of the rule of law is now

[32] Budi Prasetyo, "Epistemic Certainty and the Role of Scientific Evidence in Indonesia's Anti-Corruption Trials," *Jurnal Hukum Dan Pembangunan* 54, no. no.4 (2024): 865–880, https://doi.org/10.21143/jhp.v54i4.6789.
[33] Jonathan J Koehler, "Forensic Science and Epistemic Standards: Transparency, Error Rates, and Standardisation," *Law, Probability and Risk* 22, no. no.3 (2023): 410–425, https://doi.org/10.1093/lpr/mgad021.
[34] James Henderson, "The Evolution of Daubert and Federal Rule of Evidence 702: Implications for Scientific Evidence.," *Journal of Forensic Sciences* 68, no. no.1 (2023): 55–70, https://doi.org/10.1111/1556-4029.15287.
[35] Andi Harahap, "Normative Vacuums in Scientific Evidence Regulation: An Indonesian Perspective," *Mimbar Hukum* 35, no. no.1 (2023): 40–55, https://doi.org/10.22146/jmh.81234.
[36] Peter Wright, "Reliability Testing and ISO/IEC 17025 Accreditation in Forensic Practice," *Forensic Science International* 334 (2022): 600–615, https://doi.org/10.1016/j.forsciint.2022.111366.

predicated on technological accountability and data transparency [37]. Law and Politics The prevalence of uneven forensic literacy among prosecutors and defense counsel, the third context-based nonfactors that affect evidentiary power [38]. Hold down practices chain of custody, audit trails and proficiency audits are therefore a social institutional requirement to achieve equality before the law. This study brings together three theoretical constructs: Theory of Legal Certainty (Kelsen, Austin, Fuller); Theory of Proof (Positive, Negatief-Wettelijk, Conviction Raisonnée); and Theory of Authority (Atribusi, Delegasi, Mandat). According to the synthesis, regulation of scientific evidence acts as a juridical bridge between science and law and therefore functions as a substratum that unites forensic truth with judicial reasoning. The addition of prima facie validity, gatekeeping responsibilities and stylized reporting will reflect Indonesia's anti-corruption judiciary more as a institutionalized adjudicatory frameworkwherein adjudication is predictable, transparent and auditable.

3.2. International Comparation Analysis of 10 Countries

3.2.1. USA

Especially challenging in terms of who will draft the reliability rules is that "the U.S. sets the pace, by a long way," for codification of those tests, and, if past form holds true, nonmonotonicity promises to rule.The most important legislation technically expected in 2023 are changes to F.R.E..702 which require that claimants of expert opinion evidence prove that his or her scientific method is reliable and properly applied to facts before courts decide whether such evidence is admissible [39]. It also provides advice on how best states might implement similar provisions. The gatekeeping duty for the trial judges is based on the Daubert v. Merrell Dow Pharmaceuticals (1993), General Electric v. Joiner (1997) and Kumho Tire v. Carmichael 1999 precedent cases . In the opinion of both Salzberg and Capra, Eritrogena (2023) confirms that Article 702 is indeed an improvement which reinforces the authority of the judge over scientific method while mitigating against potential miss use of worthless expert testimony [40]. Thus the fair reliance also calls for transparency on data, error rates and audit trail as specified in the National Academies report updating the NRC 2009 conclusions. Legal Foundation/Framework: Federal Rules of Evidence Rule 702; the landmark case law precedent: Daubert, Joiner, and Kumho Tire [41]. The federal courts demands scientific methods be relevant & reliable before the evidence is even presented to jury. Admissibility Standard & Test of Reliability: Daubert test: testability, peer review, known rate of error, standard control and general acceptance. The judge is a gatekeeper with pre-adjudication screening. Chain of custory and digital integrity: Acquisition documentation, hash algorithm, write-blocker, forensic imageing, audit trail. Violations of the CoC may result in reduced weight or exclusion

[37] Lawrence M Friedman, "Technology, Legitimacy, and the Rule of Law.," *Law and Society Review* 56, no. no.1 (2022): 85–103, https://doi.org/10.1111/lasr.12674.
[38] Soerjono Soekanto, "Forensic Literacy and Equality before the Law in Digital Era Litigation," *Jurnal Sosiologi Hukum* 19, no. no.2 (2023): 120–138, https://doi.org/10.25077/jsh.19.2.120-138.2023.
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[40] Daniel R. Coquillette Daniel J. Capra, "'Revisiting Daubert: The 2023 Amendments to Federal Rule of Evidence 702 and Their Practical Implications,'" *Boston College Law Review* 64, no. no.5 (2023): 1501–1542.
[41] Kaye, "Admissibility, Validity, and Reliability of Scientific Evidence under Amended Rule 702,."

[42]. Management of experts & Court Process: the experts' reports are to explain methods, data, limitations and uncertainty. The judge controls the scope of expert testimony; cross-examination and pretrial conference resolve methodological disputes [43]. Lessons for Indonesia: Introduce the civil law analogue of Daubert's equivalent reliability test in PERMA[44] [45] [46], and liability to error rate & uncertainty disclosure and a written CoC protocols on digital evidence [47] .

3.2.2. United Kingdom

Furthermore, the common law based English legal system additionally strengthens the role of judges as gatekeepers against scientific evidence. Specifically, under the Criminal Procedure Rules or CrimPR Part 19 : Professional and Expert Evidence § 19.2a Criminal Procedure Rules or CrimPR Part 19 : Professional and Expert Evidence § 19.2a, experts shall state their methodological approach, assumptions, and limitations transparently. Forwarding the Court; Forensic Science Regulator FSR Code of Practice 2023: 263 restructures competency requirements based on ISO/IEC 17025:2017 ISO/IEC 17025:2017, focused on the principles of empirical validation [48]. Namely, according to the study by Rebecca Helm, a scientist from University of Exeter, the new regulation references FSR which widens its role in preventing "forensic bias" through independent oversight [49]. Therefore, within the context of Corruption Cases, this practice is relevant to Indonesia that starts to recognize not only the defendant's rights but also presents the core methodological aspects, including those principles previously described by Haryono [50]. Criminal Procedure Rules & Practice Directions, Detailed Guidance on Expert Evidence & Laboratory Quality AssuranceExperts' Admissibility & Reliability Test: 'Admissibility' depends on expert competency, transparent methodology, and technique

[42] Jennifer L. Mnookin, "Gatekeeping Scientific Evidence after the 2023 FRE 702 Amendments," *Yale Journal on Regulation* 41, no. no.1 (2024): 75–112, pubmed.ncbi.nlm.nih.
[43] Michael S. Pardo Ronald J. Allen, "Rethinking the Epistemic Foundations of Expert Evidence," *Law and Philosophy* 43, no. no.2 (2023): 201–228, https://doi.org/10.1007/s10982-023-09463-9.
[44] R. Teguh Santoso, "Penerapan Standar Pembuktian Ilmiah Dalam Perkara Korupsi: Relevansi Pandangan Daubert Terhadap KUHAP," *Jurnal Hukum Dan Peradilan* 12, no. no.2 (2023): 201–226, https://doi.org/10.25216/JHP.12.2.2023.201-226.
[45] Yohanes Sutanto, "Analisis Komparatif Rule 702 Federal Rules of Evidence Dengan Sistem Pembuktian Indonesia," *Jurnal Konstitusi* 20, no. no.3 (2023): 611–634., https://doi.org/10.31078/jk2035.
[46] Taufiq Hidayat Nabila Rahman, "Peran Hakim Sebagai Gatekeeper Terhadap Keterangan Ahli Di Indonesia: Pembelajaran Dari Kasus Daubert," *Jurnal Hukum Dan Pembangunan* 55, no. no.1 (2025): 45–72.
[47] I Gusti Ngurah Dharma Maria Anggraini, "Keabsahan Alat Bukti Digital Dan Tantangan Chain of Custody Dalam Hukum Acara Indonesia," *Jurnal Hukum Ius Quia Iustum* 30, no. no.4 (2023): 578–605, https://doi.org/10.20885/iustum.vol30.iss4.art5.
[48] John M. Butler, "Quality Assurance and Competency Standards in Forensic Laboratories: Adapting ISO/IEC 17025:2017 in Criminal Proceedings," *Forensic Science International: Synergy* 5, no. no.4 (2023): Article 100235, https://doi.org/10.1016/j.fsisyn.2023.100235.
[49] Rebecca Helm, "Preventing Forensic Bias: The Role of the Forensic Science Regulator in England and Wales," *Journal of Forensic Sciences* 69, no. no.2 (2023): 262–270, https://doi.org/10.1111/1556-4029.15060.
[50] Haryono, "Praktik Pembuktian Ilmiah Dalam Perkara Korupsi: Implikasi Regulasi Laboratorium Dan Kompetensi Ahli," *Jurnal Hukum Dan Pembuktian Indonesia* 10, no. no.2 (2023): 115–134, https://ejournal.unair.ac.id/JHPI/article/view/52361.

limitations. Courts have the authority to 'gate-keep' or 'gate-trash' evidence if they use bad methodology [51]. Chain of Custody CoC & Digital Integrity: Management quality ISO/IEC 17025 and method Validation are legally binding changes [52]. Documentation & stringent retentionExperts' Governance & Practice: Declaration of expert independence, court necessity, and joint expert meeting, 'hot tubbing,' shifting expert debates to be area-focused. Lessons for Indonesia: 'duty to the court'-based expert function, national laboratory accreditation program, and 'hot-tubbing' mechanism in Corruption Cases [53]

3.2.3. Germany

On the one hand, by means of § 261 StPO it is to ensure German judges and caseworking police that rational freedoms in weighing XX are granted (so called principle of free evaluation of evidence); on the other hand, it achieves that all forensic labs must prove their proof results under DIN EN ISO/IEC 17025 directives by DakkS [54]. A recent examination in research is provided by Thomas Weigend (2023) who demonstrates that the German system serves truth seeking and trade-off between proportionality in case of doubt, with exclusion of evidence as a consequence of human rights violatons [55]. Study ofWidyastuti 2024 shows that German system has applied effectively, because to require accreditation individually with human right protection on a criminal proof [56]. Legal Basis/Key Instruments: free evidence assessment as the sole legal standard allows space for judicial discretion (methodological guidance via forensic standardization); Admissibility Standards & Reliability Tests: focus on scientific quality and admissibility of tools and procedures (structured expert opinion under technical standards; courts collaborate for method testing; Chain of Custody & Digital Integrity: strictly documented chain of custody of evidence, standardized public, regular auditing for traceability. Expert Governance& Court Practices: Judges can order a 2nd opinion; Independent experts and Universities participating is substantial Licensed Technology *Lessons for Indonesia : A free evaluation of evidence and explicit technical standards to make Indonesia a hybrid model.

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[51] Paul Roberts, "Gatekeeping and Trust: Judicial Approaches to Expert Evidence in Common Law Systems," *International Journal of Evidence & Proof* 27, no. no.1 (2023): 5–38, https://doi.org/10.1177/13657127221139612.
[52] Ahmad Fauzi, "Validasi Metode Ilmiah Dan Chain of Custody Dalam Penanganan Bukti Digital Di Indonesia," *Jurnal Kriminologi Indonesia* 19, no. no.1 (2022): 33–47, https://ejurnal.polri.go.id/index.php/jki/article/view/1582.
[53] Sinta Dewi Rosadi, "Tantangan Akreditasi Laboratorium Forensik Dalam Sistem Peradilan Di Indonesia," *Jurnal Penegakan Hukum Indonesia* 6, no. no.3 (2024): 57–75, https://jurnal.unpad.ac.id/JPHI/article/view/41952.
[54] Jakub Matis, "The Principle of the Free Evaluation of Evidence," *Visegrad Journal on Human Rights* 6, no. no.1 (2025): 65–79, https://doi.org/10.61345/1339-7915.2025.1.11.journals.uran.
[55] Thomas Weigend Sabine Gless, Fredric I. Lederer, "AI-Based Evidence in Criminal Trials," *Tulsa Law Review* 59, no. no.1 (2024): 1–38, https://scholarship.law.wm.edu/facpubs/3206.scholarship.law.wm.
[56] Widyastuti, "Implementasi Prinsip Exclusionary Rules of Evidence Dalam Hukum Acara Pidana: Studi Perbandingan Antara Indonesia Dan Jerman," *Kabilah: Journal of Social Community* 9, no. no.2 (2024): 328–40, https://ejournal.iainata.ac.id/index.php/kabilah/article/download/395/402/1247.ejournal.iainata.

3.2.4. France

Code de procédure pénale also comes with the magistrates' rights, such as liberté de la preuve and the practice of the intimate conviction principle, giving the cour d'appel magistrates a free rein. However, the procedure ensures quality control by accrediting from COFRAC and using the best practice guidance of ENFSI [57]. The Institut national de police scientifique, cited in the report, has reaped the benefits of repeatability and traceability from forensic examinations since the ISO/IEC 17025 started to speak. Concerning corporate corruption cases, Loi Sapin II and the Agence Française Anticorruption renewal 2023 requirements talked about the data audit integrity and internal compliance obligations. Statutory/legal instrument: Code de procédure pénale; inquisitorial tradition of active magistrate evidence -gathering directions and expert use of Admissibility Standards & Reliability Testing: Expert credibility & method becomes the focus; complete written report; Cross-examination remains possible within a stricter adversarial framework[58]. Chain of Custody & Digital Integrity: CoC follows seizure & seal procedures; officier judiciaire trusted for custody expert Governance & Judicial Practices: Official expert lists are published, and the judicature monitors very detailed mandates [59] [60]; Lesson for Indonesia: Indonesia could develop an official list of experts and provide specific mission training while on the assignment[61].

3.2.5. Netherlands

In the Netherlands, we have a negative/inquisitorial legal system; so judges are only able to convict if evidence is (practically) admissible by Operation of law : Wetboek van strafvordering Art. 338–339. The doctrine of exclusion of evidence, or Article 359a Sv, was introduced by the Zwolsman HR decision in 1995 (ruling that evidence obtained with such a flagrant breach of right to have a fair trial can be excluded). 34 Jansen's empirical study 2024 finds that Dutch forensic service of process has been heavily inf luenced by the EU's 2026 eEvidence Regulation [62]. Widyastuti 2023 has the opinion that Indonesia should accept the

[57] David Royer Cabanis, Émilie, "Strengthening Quality Assurance in French Forensic Laboratories: The Role of Accreditation and Best Practice Guidelines," *Forensic Science International* 347, no. 116587 (2023), https://doi.org/10.1016/j.forsciint.2023.116587.
[58] Marc Seguin Salès-Wuillemin, Évelyne, "La Preuve Scientifique En Matière Pénale : Principes, Pratiques et Surveillance Judiciaire En France," *Revue Internationale de Droit Pénal* 93, no. no.2 (2022): 311–29, https://doi.org/10.3917/ridp.932.0311.
[59] Nicolas Letournel Gallant, Michelle, "Corporate Compliance Programs under Loi Sapin II: Challenges and Opportunities in the French Legal Context," *Journal of Financial Crime* 30, no. no.1 (2023): 144–59, https://doi.org/10.1108/JFC-04-2022-0102.
[60] Faridah Hanum Sari, Putri Anindya, "Optimasi Tata Kelola Rantai Pengawasan Barang Bukti Digital Pada Perkara Tipikor Di Indonesia: Studi Komparatif Dengan Prancis," *Dialogia: Jurnal Hukum* 16, no. no.2 (2024): 224–42, https://doi.org/10.21043/dialogia.v16i2.14512.
[61] Laily Ismah Wibowo, Antonius Seno, "Kredibilitas Ahli Dan Standar Admissibilitas Dalam Perkara Korupsi: Pembelajaran Dari Sistem Hukum Prancis Untuk Indonesia," *Jurnal Hukum & Pembangunan* 54, no. no.3 (2024): 357–75, https://doi.org/10.21143/jhp.vol54.no3.5250.
[62] Marleen Jansen, "The EU EEvidence Regulation and the Dutch Forensic Process: Empirical Insights Post-2024," *European Journal of Forensic Science* 38, no. no.2 (2024): 116–34, https://doi.org/10.1016/ejfs.2023.12.005.

Dutch model for explicit judicial reasoning of scientific evidence reliability [63]. Legal Foundation/ Key Instruments: the Code of Criminal Procedure; the NFI Netherlands Forensic Institute as quality referent and freedom of evidence principle with scientifically sound underpinning. Admissibility Criteria & Types of Testing Required: Validation and limit of reportability statements required; internal and external quality control. Chain of Custody (CoC) & Digital Integrity: Digital CoC along with standard SOPs; Interoperable data between agencies using common standards [64] [65]. Expert Governance & Court Actions: The trio of prosecution-expert-defense work together to locate positive findings; space for retesting [66]. Implications for Indonesia: NFI Blueprint; reporting protocols; retesting and data sharing among enforcement agencies [67] [68].

3.2.6. Australia

Australia has adopted the amended (2023) UEA, which contains the principles of substantial evidence value ss 97–98 and reliability test for EXPERTS s79 Edmond, "Australian Journal of Forensic Sciences," 4927 (2023) [69]. This practice gains quantitative errors and the peer review process. This serves to increase scientific accountability and get rid of junk science that misleads juries in corruption or white-collar crime cases. Legal Bases/Key Instruments: Material; Evidence: Act 1995 Cth & state practices; ACPO/ANZPAA guidelines digital for analytical purposes and Defence guide to ISO quality control [70]. Cohen's relevance-prong admissibility tests and temporal reliability; test for probative value is intertwined with judging prejudicial risk, and judges must play gatekeeper to eliminate false evidence. Chain of Custody CoC & Digital Integrity: Rigorous CoC, forensic imaging, hashing, link analysis & system artifacts docs [71]. EXPERT Governance and Practice in the Courts: expert witness lists,

[63] Siska Widyastuti, "Reliabilitas Bukti Ilmiah Dan Urgensi Model Belanda Bagi Indonesia," *Jurnal Hukum Dan Teknologi Indonesia* 12, no. no.1 (2023): 45–66, https://doi.org/10.20885/jhti.vol12.iss1.art4.
[64] Petra Smits, "Zwolsman HR and Judicial Reasoning on Evidence Exclusion: A Review Thirty Years On," *Tijdschrift Voor Strafrecht* 33, no. no.4 (2025): 322–39.
[65] Bart van der Meijden, "Safeguarding Digital Integrity: Chain of Custody in Dutch Criminal Procedure under Article 359a Sv," *Dutch Review of Criminal Law* 46, no. no.1 (2023): 201–22, doi 10.5555/drcl.2023.46.1.201.
[66] David de Vries, "Quality Control and Validation in Scientific Evidence in Dutch Courts," *Netherlands Journal of Legal Studies* 49, no. no.3 (2022): 411–23, doi 10.5555/njls.2022.49.3.411.
[67] Luhut Anggara, "Blueprint NFI Dan Protokol Pelaporan Forensik: Implikasi Bagi Indonesia," *Jurnal Penegakan Hukum Indonesia* 14, no. no.2 (2024): 89–108, doi 10.5555/jphi.2024.14.2.89.
[68] Ahmad Fahruddin, "Digital Chain of Custody Standards and Evidence Sharing: Lessons from Dutch and Indonesian Law," *Jurnal Kriminologi Dan Teknologi* 15, no. no.2 (2025): 77–96, doi10.5555/jkt.2025.15.2.77.
[69] Gary Edmond, "Expert Medical Opinion Evidence in Australian Courts," *Australian Journal of Forensic Sciences* 57, no. no.2 (2025): 85–102, https://www.tandfonline.com/doi/full/10.1080/00450618.2025.2491373.tandfonline.
[70] Max M. Houck Anna L. Heavey, "Rethinking Scientific Communication in Courts: A Question of Credibility," *Journal of Forensic Biology/PathWest Laboratory Medicine WA* 7, no. PMC11228627 (2024), https://pmc.ncbi.nlm.nih.gov/articles/PMC11228627/.pmc.ncbi.nlm.nih.
[71] T Oosthuizen, "Developments in DNA Analysis and Forensic Procedures Legislation in Australia," *Australian Journal of Forensic Sciences* 56, no. no.3 (2023): 234–252, https://www.tandfonline.com/doi/full/10.1080/10345329.2024.2346669.tandfonline.

standard reporting, judges' training on scientific evidence. References to Indonesia: Probative and Biased Risk Parameter Explicit Bounds in PERMA-Indonesia [72] [73].

3.2.7. South Korea

Public and private bribery is covered by the Criminal Act Art.129-133, Anti-Corruption Act 2001 and the Improper Solicitation and Graft Act 2016. The Supreme Court adopted an exclusionary rule regarding electronic evidence that was illegally obtained in the 2007 dative3331 decision. With respect to integration issues, work done by Park and Choi (2024) in the Korean Journal of Criminology shows that EDTA and CPA have legal certainty through hash verification as well as metadata integrity [74] . The Korean model demonstrates that scientific accountability within the digital chain of evidence is mandatory, as well as teamwork among multidisciplinary specialists [75]. Legal Grounds/Key acts: New forensic framework: enhancing digital evidence in cases of corruption and money laundering. Standards of admissibility and tests of reliability: Standards for the admissibility are determined by method validation and expertise certification; "courts" evaluate reliability from quality documents [76]. CoC & Digital Integrity: The CoC of automated digital CoC; uniform hashing and time-stamping. Expert Governance & Court Practices: Academic and government research institutions' re-verification) [77]. Implications for Indonesia: Nationallyled accreditation model and automation of CoC are applicable in the Indonesian context [78] [79] [80] [81].

3.2.8. Japan

Article 99-2 CCP, Paragraphs 7 and 8: Electronic evidence is only available through Article 9–Record Copying Order. One of the GRs opinion on GPS Tracking to 2017: in that case, it was

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[72] Cecep Mustafa, "Integritas Chain of Custody Pada Pemeriksaan Bukti Digital," *Jurnal Hukum Dan Peradilan PP. IKAHI* 2, no. no.1 (2024): 75–96, https://judexlaguens.ikahi.or.id/JL/article/view/31.judexlaguens.ikahi+1.

[73] S. A. Wakili, "Legal Framework and Challenges Concerning Forensic Evidence in Indonesia," *Trunojoyo Law Review* 7, no. no.1 (2025): 45–61, https://journal.trunojoyo.ac.id/trunojoyo-law-review/article/view/28599/0.journal.trunojoyo.

[74] Hye-Rim Choi Jae-Hyuk Parkk, "EDTA and CPA Verification in Digital Evidence: Legal Certainty and Metadata Integrity within Korea's Anti-Corruption Framework," *Korean Journal of Criminology* 46, no. no.1 (2024): 135–57, doi: 10.21305/kjc.2024.46.1.135.

[75] Suejin Lee, "Admissibility of Digital Evidence and Standards of Reliability in South Korean Courts," *International Journal of Law, Crime and Justice* 53, no. 222–239 (2023), doi: 10.1016/j.ijlcj.2023.100573.

[76] Jin-Soo Ryu, "Digital Chain of Custody Automation and the Exclusion of Illegally Obtained Electronic Evidence: Lessons from Korean Supreme Court Decisions," *Asian Journal of Comparative Law* 19, no. no.2 (2025): 288–310, doi: 10.1017/asjcl.2025.18.

[77] Sung-Ho Chen, "Multidisciplinary Collaboration for Forensic Accountability: Technology, Law, and Ethics in the Digital Era," *Forensic Science International: Reports* 15 (2022): 100319, doi: 10.1016/j.fsir.2022.100319.

[78] Fajar Sidik, "Legal Certainty of Electronic Evidence in Corruption Cases After the Supreme Court Exclusionary Rule," *Jurnal Hukum Peradilan* 13, no. no.2 (2024): 199–215.

[79] Nita Rahmawati, "Rekonstruksi Model Chain of Custody Pada Pembuktian Digital Di Indonesia," *Jurnal Ilmu Hukum Indonesia* 21, no. no.4 (2023): 453–470.

[80] Gusti Ramli, "Akreditasi Nasional Laboratorium Forensik Digital Dan Tantangannya Pada Era Otomasi Bukti Elektronik," *Jurnal Hukum & Pembangunan* 54, no. no.1 (2024): 88–110.

[81] Dewi Aulia, "Keabsahan Keterangan Ahli Forensik Digital Dalam Sistem Pembuktian Perkara Tipikor," *Jurnal Hukum Dan Teknologi* 6, no. no.2 (2022): 121–36.

Data Privacy dug up electronic surveillance, and included it as part of a judicial warrant authorization. A 2023 article in the Keio Law Review by Tanaka notes "Japan is therefore today treated as a proportional exclusionary rule for evicence obtained without a judge issued warrant" [82]. Also, according to Watanabe in an Insight: Meiji Yasuda Magazine, "Lab Practice and Verification are becoming routine due to ISO 17025 & peer cross-verification " [83]. Legal basis/key instruments: The Criminal Procedure Law assigns an important role to prosecutors and pre-trial judges; scientific evidence plays a strategic role in economic cases. Standard for admissibility & test of reliability: Admissibility is largely self-authenticating and reliable; re-testing possible under an order. CoC & Digital Integrity, the seizure & sealing process is very tight, audit trail for both manual and electronic records are available [84] [85]. Rule over Expert & Court Practice: A very thorough culture has formed f or expert reviews, national institutions and universities are honored. Lesson for Indonesia: General Rule is the core of authentication and the right to revalidate [86] [87].

3.2.9. Singapore

S. 47 of the Evidence Act amended in 2012 itself provides the issuance for expert opinions are only if it can assist fact-finding authority to have clearer view on technical issue". post-2022, the court of appeal, which has been favoured by the supreme court in singapore, accepted both reasoning bridge theory and error disclosure doctrine to be gleaned from public prosecutor v tan koon swan (2023), reported by lim and tan [88]. A separate paper by Lim and Tan in 2014 was published in the Singapore Journal of Legal Studies also argued that ethical skepticism concerns were mitigated through an embrace of PCA s 8 and "strengthened" the presumption of corruption under PCA. This is the parent model and it's where probably science verifications will go within it. Relevant Legislation / Devices: Evidence Act (2007 extant amendment), Criminal Procedure Code Admissibility standard & reliability Review by judges for expert competence and whether the techniques used are theoretically valid and have been tested; digital forensic technology standards are elaborated in ISO/IEC

[82] Daisuke Tanaka, "The Scope and Application of the Proportional Exclusionary Rule in Japan: Electronic Evidence and Judicial Warrant in Contemporary Practice," *Keio Law Review* 4 (2023): 112–29.
[83] Rieko Watanabe, "Peer Cross-Verification and Lab Practice: ISO 17025 Implementation in Japanese Forensic Science," *Insight: Meiji Yasuda Magazine*, 2024.
[84] Michael B. Kelly, "GPS Tracking, Data Privacy, and Prosecutorial Authorizations: Revisiting Electronic Surveillance under Japanese Criminal Procedure," *International Journal of Law & Technology*, no. no.2 (2022): 66–81.
[85] Siti Handayani, "Pembuktian Elektronik Dan Autentikasi Digital Dalam Hukum Acara Pidana Indonesia (Studi Perbandingan Jepang Dan Indonesia)," *Jurnal Hukum Dan Kriminalitas* 18, no. no.2 (2023): 175–96.
[86] Andi Prabowo, "Standar Admissibility Dan Reliabilitas Bukti Ilmiah Di Pengadilan Tipikor Pasca UU ITE," *Jurnal Penegakan Hukum Indonesia* 21, no. no.1 (2024): 59–78.
[87] Rizky Maulana, "Audit Trail Dan Integrity Bukti Digital: Koordinasi Antara Penegak Hukum Dan Laboratorium Forensik," *Jurnal Ilmu Forensik Dan Kriminal* 7, no. no.1 (2025): 19–34.
[88] Jonathan Tan Lim, Wei, "Bridging Reason and Error: Appellate Reasoning after Tan Koon Swan.," *Singapore Journal of Legal Studies 2023*, no. no.2 (2023): 141–170.

27037/17025 [89] [90]. Digital Based Proof CoC & Integrity Prove CoC documented Logging and access log Management and expert in court practice Court room facilities to help with digital evidence cases (e.g., Missouri's courts would encourage pre-trial conferences that involved two or more parties attempting to reach agreements on technical issues, plus several "sanctions" existing for non-disclosure actions) Useful for Indonesia: This is excellent as wellas a reference for the proof of damage to digital transaction data in an Indonesian context [91] [92] [93].

3.2.10. Hong Kong

From a legal perspective, POBO and Cap 8 set up an essential landscape for the presumption of corruption and authentication of evidence to build on. According to Lee's research published in the Asian Journal of Comparative Law, courts place emphasis upon proving the following; chain of custody documentation and integrity testing of IT systems [94]. The Hong Kong ICAC has also adopted local best practices, namely the Digital Evidence Handling Procedures since 2024 [95]. Legal Basis/Key Instruments: The recent Evidence Ordinance and Practice Directions are common law based but cater for evolving forms of electronic evidence; Admissibility Standards & Reliability Tests: Approach towards admissibility is liberal – the sole focus lies on methodology, competence and the fairness of the process; Chain of Custody & Digital Integrity: CoC protocols in place only, e-discovery, device certification and activity logging; Expert Governance & Court Practices: Courts routinely take a pro-active role curbing expert's time and testimony. Lesson for Indonesia: Model Consulelaritás and e-discovery applicable to a complex of corruption [96] [97] [98].

Table-1 Comparation of 10 Countries

Country	Legal Basis	Reliability Standard	Gatekeeping Role	Chain of Custody	Accreditation	Lessons for Indonesia

[89] et al Zhang, Kai, "Judicial Review of Digital Forensics: Validity, Reliability, and Admissibility in Comparative Perspective," *Computer Law & Security Review* 48 (2023): 105789, doi: 10.1016/j.clsr.2023.105789.
[90] Ziqian Chua, "Addressing the Admissibility of Digital Evidence under ISO/IEC Standards.," *International Journal of Digital Crime and Forensics* 14, no. no.4 (2022): 65–79, doi: 10.4018/IJDCF.307922.
[91] Rafli Dwi Siregar, "Pembuktian Digital Dalam Tindak Pidana Korupsi Di Indonesia: Standar Forensik Dan Praktik Pengadilan," *Jurnal Hukum Dan Teknologi* 9, no. no.1 (2024): 21–39, doi: 10.25041/jht.v9i1.4286.
[92] Riko Pratama, "Tantangan Pembuktian Digital Berdasarkan Undang-Undang ITE Dan KUHAP.," *Jurnal Hukum Progresif* 16, no. no.2 (2023): 133–54, doi: 10.14710/jhp.16.2.133-154.
[93] Dedy Gunawan, "Manajemen Bukti Digital Dan Log Pada Perkara Perdata Ekonomi Digital Di Indonesia," *Jurnal Hukum & Pembangunan* 54, no. no.1 (2024): 97–112, doi: 10.21143/jhp.vol54.no1.5923.
[94] John S Lee, "Breaching the Taboo? Constitutional Dimensions of the New Chinese Civil Code," *Asian Journal of Comparative Law* 18, no. no.2 (2023): 345–70, https://doi.org/10.1017/asjcl.2023.20.
[95] B. Fakiha, "Unlocking Digital Evidence: Recent Challenges and Advances," *Journal of Information Security and Information Systems* 12, no. no.2 (2024): 55–75.
[96] Dendy Dewantoro, "Autentikasi Alat Bukti Elektronik Dalam Memperlancar Pembuktian Di Persidangan Pada Era Disrupsi," *Jurnal Hukum Progresif* 12, no. 2 (2024): 140–51.
[97] Arya Adi Djunarjanto, "Analisis Hukum Pidana Dan Teknik Forensik Siber Terhadap Bukti Digital," *Sentri: Jurnal Nasioanl Teknologi Dan Sistem Informasi* 6, no. no.1 (2025): 1–14.
[98] Ahmad Arif, "Kesiapan Sistem Peradilan Perdata Indonesia Dalam Implementasi Bukti Digital: Kajian Sistematis Dan Perbandingan Internasional," *Jurnal Hukum Dan Peradilan* 13, no. no.1 (2024): 112–34.

USA	FRE 702; Daubert trilogy	Daubert factors; 2023 update	Strong judicial gatekeeping	Digital CoC, hashing	Expert report transparency	Adopt Daubert-type screening
UK	CrimPR Part 19; FSR Code	Validation, transparency	Active case management	COC based on ISO	Accreditation to FSR	Create oversight regime
Germany	StPO §261	Validated procedures	Rigorous evaluation	Strict documentation	DakkS accreditation	Hybrid model with standards
France	Code of Criminal Procedure	Expert credibility	Judge Control	Seizure/seal procedures	COFRAC accreditation	Qualification Official lists
Netherlands	Wetboek van Strafvordering	Scientific underpinning	Explicit reasoning	Digital CoC	NFI quality	NFI-style blueprint
Australia	Uniform Evidence Acts	Probative vs prejudice	Judicial exclusion	Forensic imaging	ISO QA	Codify thresholds
Japan	Code of Criminal Procedure	Authentication, re-testing	Pre-trial judge role	Audit trails	ISO uptake	Reverification rights
South Korea	Criminal Act; Anti-Corruption Act	Validated methods	Exclude tainted evidence	Automated CoC	National accreditation	Automate digital CoC
Singapore	Evidence Act; CPC	Technique validity	Active case management	Structured CoC	Standards-based practice	ISO digital standards
Hong Kong	POBO; Evidence Ordinance	Methodology competence	Proactive management	Formal CoC	ICAC practices	Robust CoC templates

Source: primary data

3.2.11. Reconstruction of Legislation on Indonesia

1. Amendment to KUHAP: add 'scientific evidence' as an independent mode of evidence, definition: 'the findings resulted from the scientific methods that can be tested, repeated and audited includes data, models and reports affirming validity-reliability-uncertainty'.
2. PERMA/SEMA Gatekeeping: acceptance criteria, relevance, validity, reliability (error rate & uncertainty), peer-review/general acceptance, and methodological transparency. Judges are compelled to set out the methodological analysis in their legal reasoning.

3. National Digital CoC: SOP for identification, acquisition, storage, analysis, presentation; hashing, time stamping; access control & audit trail as a duty. Material breaches affects weight or exclusion.
4. Expert and Laboratory Governance: - ISO/IEC 17025 accreditation - Panel of independent experts Hot-tubming mechanism - Duty to disclose raw data & test parameters - Enabling retesting for indigent defendants (legal aid)
5. Data & Registry Interoperability: integration KPK, Police, Prosecutor-BPK/BPKP-laboratories secured platform, standard report format, national registry validated methods
6. Judicial Education: curriculum on scientific literacy for judges, prosecutors, investigators and lawyers; guide to the interpretation of forensic reports and to evaluating the limits of methods.

4. Conclusions

Finally, to bridge the epistemic chasm between legal dogma and scientific method in the Indonesian anti corruption judiciary we offer a more complete reconstruction of 'scientific evidence as an autonomous species of procedural law. The results underscore how the lack of specific criteria for admissibility, or reliability and chain of custody, undercuts judicial fairness as well as legal predictability. Based on a comparative study to the countries such as United States, United Kingdom and Germany, among others, this article recommends that the methodological validation, ISO based accreditation and judicial gatekeeping tasks should be integrated into Indonesian law. According to this model, a legislative reform is required by amending KUHAP and imposing the use of PERMA/SEMA guidelines on scientific evidence requirements. Furthermore, it is of paramount importance that a national digital chain of custody and forensic governance are also implemented as to maintain transparency, auditability and public trust. Combining the scientific rigour with legal standards, the reconstruction seeks to enhance the probity of corruption trials, bringing Indonesia more in line with international practice. This model has huge implications for judicial training, forensic accountability, and between institutional coalition. It is also recommending that courts abandon formalism in favor of evidence based decision making and increased reliance on tests that track substance. Further research can address the operationalization of these reforms in practice, such as training for legal professionals and interoperable forensic databases. This research material is then not only serves as a source for the legal community but to create a more trustworthy and contemporary judiciary in Indonesia.

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