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Epistemic-Justificatory Proof Theory and the Legitimacy of Judicial Decisions

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ABSTRACT

A judge's decision plays a central role in the rule of law by establishing legal truth and legitimizing the state's coercive power. This role has become increasingly complex in contemporary adjudication, where courts confront scientific, statistical, and algorithmic evidence amid normative uncertainty and heightened human rights demands. This article examines legal interpretation and proof in judicial decisions as a process of epistemic justification rather than procedural compliance. Using a qualitative normative approach supported by conceptual–philosophical and limited comparative analysis, the study explores how judges construct claims of legal truth through evidentiary reasoning. A review of the literature shows that existing studies on proof remain fragmented—doctrinal, probabilistic, or technological—and lack an integrated epistemological framework capable of explaining the inferential transition from evidence to legal fact. This fragmentation risks reducing judicial legitimacy to formal compliance or subjective judicial belief. The article's primary contribution is the proposal of Epistemic-Justificatory Proof Theory, which defines proof as an epistemic practice that ne-

cessitates inferential transparency, rational coherence, and intersubjective testability. By integrating legal theory with the philosophy of science, this framework offers an evaluative model for assessing the legitimacy of judicial decisions and provides a normative response to the challenges of proof in contemporary justice systems.

INTRODUCTION

A judge's decision is a central instrument in a state of law because it serves to establish legal truth while also legitimizing the state's use of coercive power. The relevance of this study is increasingly strengthened in the context of modern justice, which is faced with the increasing complexity of evidence, ranging from scientific and statistical to algorithmic evidence, amidst the uncertainty of the meaning of legal norms and the demands for human rights protection. In such situations, interpretation and proof can no longer be understood as mere technical stages but rather as a crucial space where law is shaped through judicial reasoning.

The subject of this research is the interpretation of law and evidence in judicial decisions, understood as the process of simultaneously seeking and justifying legal truth. This research aims to analyze how judges construct truth claims through evidentiary reasoning and to formulate a conceptual framework capable of explaining these standards of truth legitimacy. Specifically, this article aims to shift the understanding of proof from mere procedural compliance toward an epistemic practice that demands rational, coherent, and intersubjectively accountable justification.

Several previous studies have examined the interpretation and rules of evidence from various perspectives. Hartanto and Hidayat determined that the implementation of the reverse burden of proof in drug money laundering cases was normatively suitable but not yet effective in significantly curtailing the crime.[1] These findings align with Morrison's critique of the vulnerability of subjective forensic practices to bias and the urgency of shifting to transparent and validated data-driven methods,[2] as well as Curley et al.'s demonstration that bias in jury decisions is multifaceted, interactive, and potentially disruptive to the rationality and fairness of verdicts.[3] On the other hand, Cui et al. assert that advancements in natural language processing and big data have significantly improved the prediction of legal decisions, although the human-machine performance gap persists.[4] Meanwhile, Sachoulidou warns that the use of AI in law enforcement creates serious tension between efficiency and human rights protection, necessitating special procedural safeguards, particularly transparency and clarity of reasoning.[5] Roberts asserts that the his-

1 Hartanto, D., Hidayat, N. (2021). Application of reverse evidence for the crime of money laundering based on the origin of narcotics. Croatian International Relations Review, 27(88), pp. 14–33. <https://doi.org/10.2478/CIRR-2021-0009>.

2 Morrison, G. S. (2022). Advancing a paradigm shift in evaluation of forensic evidence: The rise of forensic data science. Forensic Science International: Synergy, 4, 100270. <https://doi.org/10.1016/j.fsisyn.2022.100270>.

3 Curley, L. J., Munro, J., Dror, I. E. (2022). Cognitive and human factors in legal layperson decision making: Sources of bias in juror decision making. Medicine, Science and the Law, 62(3), pp. 197–206. <https://doi.org/10.1177/00258024221080655>.

4 Cui, J., Shen, X., Wen, S. (2023). A survey on legal judgment prediction: Datasets, metrics, models and challenges. IEEE Access, 11, pp. 102050–102071. <https://doi.org/10.1109/ACCESS.2023.3317083>.

5 Sachoulidou, A. (2023). Going beyond the 'common suspects': To be presumed innocent in the era of algorithms, big data and artificial intelligence. Artificial Intelligence and Law, pp. 1–54. <https://doi.org/10.1007/s10506-023-09347-w>.

tory of comparative law enhances the comprehension of criminal procedure, yet necessitates methodological prudence to prevent misinterpretations and the genetic fallacy.[6] Chukwuma's research on terrorism trials in Nigeria shows that proof actively shapes legal truth within the framework of pre-crime rationality.[7] Alpes and Baranowska's research shows that evidence of pushback against asylum seekers is often reduced or left out of ECtHR judgments because of proof practices and the state's assumption of good faith. This makes it harder to see the factual truth and the political side of border violence.[8]

The literature consistently demonstrates that proof is neither neutral nor mechanistic. Numerous studies underscore the constraints of formal proof efficacy, the impact of cognitive bias on evidence evaluation, and the conflict between technological efficiency and the safeguarding of human rights. However, these studies still tend to discuss proof in a fragmented manner—whether from a doctrinal, probabilistic, or technological perspective—without developing an integrated epistemological framework that explains how the inferential transition from evidence to legal fact can be rationally justified and its truthfulness assessed.

Based on these conditions, there is a research gap in the form of the absence of an approach that systematically links legal proof theory with epistemological and philosophical foundations. This gap leads to the legitimacy of legal truth in judicial decisions often being assumed as a consequence of procedural compliance or the judge's subjective beliefs, rather than being critically evaluated based on the quality of reasoning and its epistemic justification.

The novelty of this article lies in the introduction of Epistemic-Justificatory Proof Theory, an approach that views proof as an epistemic practice requiring inferential transparency, rational coherence, and intersubjective testability. By integrating legal theory and the philosophy of science, this article offers a new evaluative framework for assessing the legitimacy of judicial decisions while also placing evidence within the value horizon of a democratic rule of law, including in the context of Indonesia, which is based on Pancasila.

This article is structured as follows. The first part discusses judicial interpretation and proof as a process of seeking truth. The second part outlines the epistemological basis of judicial reasoning in proof. The third part analyzes the judge's decision as a practice of language and rational justification and formulates Epistemic-Justificatory Proof Theory as the main theoretical contribution of this research.

METHODOLOGY

This research uses a qualitative-normative (doctrinal) approach, supported by conceptual-philosophical and limited comparative analysis. The doctrinal approach is used to map the concepts of interpretation, standards of proof, and decision-making within the framework of the rule of law, while conceptual-philosophical analysis is used to reconstruct proof as an epistemic practice—that is, to assess how the inferential transition from evidence to legal facts is constructed, tested, and rationally justified. Limited comparison is used to examine the development of modern proof problems (e.g., scientific, statistical, and algorithmic evidence) as material to sharpen arguments in the Indonesian context. This combination of methods was chosen because the research objective was not to empirically measure the behavior of judicial actors but rather to explain the structure of

6 Roberts, P. (2025). Standards and methods of proof: An English perspective on Della Torre's comparative legal history. Quaestio Facti, no. 9, pp. 225–239. <https://doi.org/10.33115/udg_bib/qf.i9.23151>.

7 Chukwuma, K. H. (2025). Evidencing terrorism: Juridical truth-making in terrorism trials. European Journal of International Security, pp. 1–18. <https://doi.org/10.1017/eis.2024.60>.

8 Alpes, M. J., Baranowska, G. (2025). The politics of legal facts: The erasure of pushback evidence from the European Court of Human Rights. Law and Social Inquiry, 50(1), pp. 225–248. <https://doi.org/10.1017/lsi.2024.27>.

judges' reasoning and justification and formulate an evaluative framework for Epistemic-Justificatory Proof Theory. Therefore, the use of these methods directly supports the achievement of the research objective: to produce a model for assessing the legitimacy of legal truth that emphasizes coherence, transparency, and intersubjective testability.

1. JUDICIAL INTERPRETATION AND PROOF AS A PROCESS OF TRUTH-FINDING

1.1. Indeterminacy of legal meaning and the role of judges in shaping judicial decisions

Ronald Dworkin argued that legal interpretation is never neutral; when a rule is recognized as legitimate law, that recognition implicitly provides a moral basis for the state to use coercion in enforcing rights and obligations.[9] This view asserts that legal interpretation always operates within a specific value horizon, thus fundamentally challenging Hans Kelsen's position, which views law as a pure normative order free from non-legal elements.[10] This belief confirms that from the initial interpretation stage, claims of legal truth have been bound to normative considerations that cannot be fully neutralized.

This argument is also supported by H. L. A. Hart, who, through his analysis, addressed the uncertainty of the meaning of legal rules. Hart argues that in certain situations, judges cannot fully base their decisions on existing positive rules because primary rules contain the possibility of ambiguity or uncertainty about meaning. A classic example is the rule, "No vehicles are allowed in the park". In many situations, this ban clearly applies to cars, but a gray area (penumbra) emerges when faced with other types of "vehicles", such as motorized wheelchairs or toy cars.[11]

In that penumbral space, the judge legitimately used discretion and considered non-legal norms, including moral considerations, to build a justifiable basis for the decision. So in this case, the uncertainty of meaning is not an anomaly but rather an inherent characteristic of primary rules, making the use of discretion not only legitimate but also a structural consequence of the very practice of interpreting law.

1.2. Proof as a rational endeavor to establish truth

The uncertainty of legal meaning that arises at the interpretation stage does not stop at the level of the norm but continues directly to the evidence stage in court. In this context, a standard of proof is needed as a normative threshold to determine when evidence can be considered strong enough to render a positive decision, such as finding the defendant guilty in a criminal case.[12] In other words, the law of evidence does not merely function to determine right or wrong procedurally but serves as an epistemic mechanism to justify the transition from evidence to valid legal facts.

In this regard, judges can be understood to act like "researchers": every fact established as a "legal fact" must be testable, and its truth accountable. Tom R. Tyler asserts that the court's decision does not sufficiently rely on positive law or intuition but must be based on empirical evidence that can be rationally evaluated.[13]

9 Lefkowitz, D. (2024). A new philosophy for international legal skepticism? International Theory, 16(2), pp. 237–268. <https://doi.org/10.1017/S1752971924000010>.

10 Dziadzio, A. (2021). The academic portrait of the creator of the pure theory of law: Several facts from Thomas Olechowski's book entitled Hans Kelsen. Biographie eines Rechtswissenschaftlers. Tübingen: Mohr Siebeck, 2020 (1027 pp.). Krakowskie Studia z Historii Państwa i Prawa, 14(3), pp. 383–395. <https://doi.org/10.4467/20844131ks.21.028.14093>.

11 Riesthuis, T. (2023). The legitimacy of judicial decision-making: Towards empirical scrutiny of theories of adjudication. Utrecht Law Review, 19(2), pp. 75–76. <https://doi.org/10.36633/ulr.877>.

12 Ross, L. (2024). The philosophy of legal proof. Cambridge University Press.

13 Liu, W., Li, X., Li, G. (2025). The contributions of philosophy of science in science education research: A

The argument shows that the demands can only be met if the judge has an adequate epistemological perspective, namely, a deep understanding of the foundations of knowledge within the framework of the philosophy of science. This perspective is necessary to achieve clarity of meaning and ensure that the basic statements of theory and the scientific method can be understood and used meaningfully in the judicial process. Therefore, the next section discusses the role of judges and the relevance of the philosophy of science as a framework for assessing and justifying truth claims in court decisions.

2. PHILOSOPHY OF SCIENCE AND THE FORMATION OF TRUTH IN JUDICIAL DECISIONS

2.1. Judicial reasoning in the age of legislation: from statutory texts to epistemic foundations

Justice Scalia stated that "we live in an era of legislation, and most law is statutory law".[14] This statement confirms the dominance of written law in modern judicial practice. However, the application of legal norms does not work automatically; judges still need to construct meaning through legal reasoning. Inductive reasoning is often used here, which means making general conclusions based on specific case patterns.[15] This process is not only technical but also rests on three foundations of knowledge: ontology about the nature of legal norms, epistemology about how legal knowledge is acquired and justified, and axiology about the values that guide interpretation.[16] Thus, the judge's epistemic ability becomes a fundamental requirement for the formation of correct and accountable decisions.

2.2. Philosophy of science as a framework for establishing truth in proof

The philosophy of science explains the epistemological framework of law enforcement. Karl Popper showed that scientific knowledge is not supported by final proof, but rather by its resistance to falsification. A theory is considered robust to the extent that it withstands testing and is open to refutation.[17] This analogy is relevant to legal proof: a judge's conclusions about facts are never absolute but are the result of eliminating alternatives through applicable standards of proof.

Thomas Kuhn later emphasized that the prevailing paradigm influences a community's assessment of truth. Paradigms shape our understanding of fact, legitimate methods, and acceptable forms of argumentation. When anomalies accumulate, paradigms may disintegrate, resulting in conceptual transformations.[18] In law, a change in the standard of proof or method of interpretation can be understood as a shift in the interpretive paradigm due to case pressure and the dynamics of social values.

Imre Lakatos then refined the tension between Popper and Kuhn through the concept of

literature review. Science and Education, 34(3), pp. 1203–1222. <https://doi.org/10.1007/s11191-023-00485-w>.

14 Molnár, S. J. (2024). US constitution and the notion of family: The risks of the Supreme Court's judicial activism through family and privacy cases. Pázmány Law Review, 11(1), pp. 81–99. <https://doi.org/10.55019/plr.2024.1.81-99>.

15 Garbuio, M. Lin, N. (2021). Innovative idea generation in problem finding: Abductive reasoning, cognitive impediments, and the promise of artificial intelligence. Journal of Product Innovation Management, 38(6), pp. 701–725. <https://doi.org/10.1111/jpim.12602>.

16 Smith, M., McCulloch, T., Daly, M. (2025). Being, knowing and doing: Aligning ontology, epistemology, and axiology to develop an account of social work as practice. Social Work Education, 44(3), pp. 522–537. <https://doi.org/10.1080/02615479.2024.2330598>.

17 Archer, R. (2024). Retiring Popper: Critical realism, falsificationism, and the crisis of replication. Theory and Psychology, 34(5), pp. 561–584. <https://doi.org/10.1177/09593543241250079>.

18 Sciortino, L. (2021). The emergence of objectivity: Fleck, Foucault, Kuhn and Hacking. Studies in History and Philosophy of Science, 88, pp. 128–137. <https://doi.org/10.1016/j.shpsa.2021.06.005>.

research programs. A program is progressive if it can create new, coherent solutions to problems, but it is degenerative if it only fixes problems with patchwork solutions.[19] This analogy is relevant for understanding the development of legal doctrine: an interpretive theory capable of providing answers to new problems will drive changes in jurisprudence and become the dominant interpretive program.

Paul Feyerabend cautioned against the perils of the dominance of a singular methodology. According to him, the dominance of Western science has the potential to silence other forms of knowledge, leading to epistemicide.[20] In a legal context, this view reminds us that truth in the judiciary is not built solely on the text of the law or positivist logic. Evaluating facts and interpreting norms requires space for social experience, morality, and cultural context to make decisions more just and contextual.

Michael Polanyi reinforced this notion by asserting the existence of tacit knowledge: aspects of knowledge that cannot be fully formalized, such as professional intuition and institutional habits.[21] Therefore, the judge's reasoning is not merely a literal application of the text but also a process of synthesizing professional experience and intuition that is not entirely written into the norms.

Furthermore, Jürgen Habermas emphasized that the legitimacy of normative claims requires communicative rationality, not merely internal consistency. A decision is normatively valid if it can be justified through uncoerced discourse with the strongest arguments.[22] So, the judge's decision should be open to rational evaluation by more than one person, not just claims from the text.

Wilfrid Sellars deconstructed the presumption that empirical experience exists in a neutral state. It indicates that experience is always understood through certain concepts and rules, so "the given" is an epistemological myth.[23] In law, the term means that facts do not simply exist but are constructed through legal categorization and the values that accompany it.

Quine deepened that criticism through epistemological holism. For him, knowledge claims are part of a network of beliefs, and empirical testing does not apply to a single proposition but rather to the coherence of the knowledge system as a whole.[24] In the practice of proof, the strength of an argument does not rely solely on a single piece of evidence but on the inferential coherence of all integrated evidence.

To affirm the connection between the epistemological foundations of the philosophy of science and the judge's reasoning process in proving and interpreting the law, various epistemological theories can be read as a complementary conceptual flow from the realm of theory to judicial practice. Dworkin, Hart, and Habermas place judicial reasoning within a normative-communicative horizon, emphasizing that the legitimacy of a decision requires moral accountability, recognition of the uncertainty of meaning, and openness to intersubjective rational testing. Conversely, Popper, Kuhn, Lakatos, and Quine highlighted the methodological dimensions of truth formation, demonstrating that assessments of facts and norms are never final but are always subject to tests of coherence, potential falsification, and the dynamics of paradigms and belief networks. Feyerabend

19 Özdemir, N. Türkben, Y. (2022). The problem of objectivity in science in Imre Lakatos. Türkiye İlahiyat Araştırmaları Dergisi, 6(1), pp. 247–264. <https://doi.org/10.32711/tiad.1070222>.

20 Muller, S. M. (2024). Feyerabend and decolonisation. Epistemology and Philosophy of Science, 61(3). <https://doi.org/10.5840/eps202461349>.

21 Preston, J. (2022). Gestalt epistemology: From Gestalt psychology to phenomenology in the work of Michael Polanyi. Philosophia Scientiae, 26(3), pp. 233–254. <https://doi.org/10.4000/philosophiascientiae.3668>.

22 Duvenhage, P. N. J. (2024). Reflections on Habermas's discourse ethics. Verbum et Ecclesia, 45(1), pp. 1–9. <https://doi.org/10.4102/ve.v45i1>.

23 O'Shea, J. R. (2021). What is the myth of the given? Synthese, 199(3–4), pp. 10543–10567. <https://doi.org/10.1007/s11229-021-03258-6>.

24 Parrini, P. (2021). Quine on analyticity and holism: A critical appraisal in dialogue with Sandro Nannini. Philosophical Inquiries, 9(1), pp. 95–112. <https://doi.org/10.4454/philinq.v9i1.359>.

and Polanyi criticized the inclination towards methodological formalism by advocating for epistemic pluralism and the significance of tacit knowledge in the judicial inference process. Conversely, Sellars, through his critique of "the given", emphasized that legal facts are never presented neutrally but are always constructed through conceptual categories and legal language.

The synthesis of these thoughts confirms that proof and interpretation are not mechanistic processes but rather layered epistemic practices that are tentative, discursive, and value-laden. Thus, the legitimacy of a decision is not sufficiently determined by internal logical consistency or textual adherence to the law but also by inferential coherence, transparency of reasoning, and the judge's ability to rationally explain why one conclusion is more reasonable than others within the prevailing values and paradigms. This epistemological perspective enriches legal analysis by shifting the focus of evaluation from merely the operative part of a judgment to the quality of judicial reasoning as the basis for the legitimacy of legal truth.

3. LANGUAGE OF PROOF AND JUDICIAL TRUTH IN JUDICIAL DECISIONS

3.1. Judicial decisions as linguistic practices and legal reasoning

A court decision is a written ruling issued by a court to resolve disputes and determine the rights and obligations of the parties in a case.[25] Peter M. Tiersma's statement that "our law is a law of words, and words are the lawyer's primary tool" affirms that law inherently operates through language. Legal norms do not function as neutral, abstract structures but are present, understood, and enforced through linguistic practices.[26]

Therefore, language cannot be reduced to a mere technical medium but is an ontological prerequisite for the existence and effectiveness of law. Developments in the study of legal linguistics indicate that language use directly influences how law is interpreted, applied, and legitimized in judicial practice. Thereby, in this case, the quality of legal reasoning in court decisions significantly depends on the accuracy and consistency of the judge's interpretation of legal language.

This view aligns with Arthur Kozak's theory of juriscentrism, which understands law as a cultural phenomenon that lives within the mental structures and institutional practices of the legal community, rather than as a normative system that exists independently before being interpreted. According to Kozak, law is formed through the internal rationality of jurists, which operates through professional discretion, methods of interpretation, and conceptual frameworks learned institutionally. Legal reality is, therefore, intra-institutional: it exists within the technical language, reasoning patterns, and interpretive practices of legal professionals. Consequently, legal language represents social reality and actively constructs factual experiences into legal categories that are often inaccessible to lay understanding.

In this context, the judge's decision can be perceived as the outcome of a process of interpreting legal significance through systematic legal reasoning. This process demands a theoretical framework of proof that is not only procedurally valid but also rationally accountable. In the law of evidence, at least four classic theories are recognized. *Positief Wettelijk* limits proof to the evidence determined by law without the normative relevance of the judge's conviction.[27] *Negatief Wettelijk*, which is adopt-

25 Su, Y., Liu, K., Cheung, A. K. F. (2023). Epistemic modality in translated and non-translated English court judgments of Hong Kong: A corpus-based study. Journal of Specialised Translation, no. 40, pp. 56–80. <https://doi.org/10.26034/cm.jostrans.2023.525>.

26 Glogar, O. (2023). The concept of legal language: What makes legal language 'legal'? International Journal for the Semiotics of Law, 36(3), pp. 1081–1107. <https://doi.org/10.1007/s11196-023-10010-5>.

27 Pangestu, K., Suyanto, H., Agustanti, R. D., (2021). Application of circumstantial evidence in criminal laws

ed in Indonesia, requires a combination of valid evidence and the judge's belief as the basis for sentencing.[28] *C* Conviction Intime places the judge's inner conviction as the basis for the decision but still requires its formation through a rational evaluation of the evidence.[29] Meanwhile, Conviction Raisonnée demands that such a conviction be accompanied by a rational justification that can be tested and intersubjectively accounted for, particularly through the standard of beyond a reasonable doubt.[30]

3.2. Proof, rationality, and the construction of judicial decisions

However, contemporary philosophy of science shows that adherence to proof procedures and recognition of judges' subjective beliefs are no longer sufficient to support claims of legal truth. The core issue of proof lies in its epistemic dimension, namely "how the inferential steps from evidence to legal facts are constructed, tested, and accounted for". In this context, structural tension arises between formal procedurality—such as rules of evidence and court procedures—and the demands of epistemic rationality, which require coherent, testable, and open-to-criticism reasoning as a prerequisite for the legitimacy of judicial decisions in a democratic rule of law state.

From the perspective of legal epistemology, as previously outlined, the thinking of Dworkin, Hart, Popper, Kuhn, Lakatos, Feyerabend, Polanyi, Habermas, Sellars, and Quine clarifies this tension. Dworkin asserts that legal interpretation always contains a moral dimension. Hart demonstrated that semantic ambiguity in legal rules renders judicial discretion unavoidable. Popper emphasized testability and the possibility of falsification as conditions for the rationality of knowledge. Kuhn and Lakatos explained that knowledge develops through paradigm shifts and the dynamics of research programs. Feyerabend criticized the monopoly of a single method and defended epistemic pluralism. Polanyi highlighted the role of tacit knowledge, which cannot be fully reduced to explicit rules. Habermas links legitimacy to communicative rationality and domination-free deliberation. Sellars and Quine subsequently repudiated the presumption of a "given" foundation of knowledge devoid of a coherent conceptual framework.

The epistemological consequence of this overall view is that the standard of proof cannot stop at the formula of "judicial belief" but must be raised to an epistemic condition worthy of being called accountable rational knowledge.[31] Proof, therefore, must be conducted professionally and reliably, avoiding inferential errors and treating evidence proportionally to the severity of the consequences that will be imposed.[32]

This epistemic challenge is evident in the proof paradox, which is a situation where the statistical probability is very high but is still not felt to be sufficient as a basis for a judge's decision.[33] The Blue Bus case, Prisoners, Gatecrasher, Riot, Smith v. Rapid Transit Inc., and cold-hit DNA show that probability alone is insufficient to identify individuals, especially when there is

in Indonesia. Jurnal Hukum Novelty, 12(1), pp. 54–66. <https://doi.org/10.26555/novelty.v12i01.a16996>.

28 Giri Santosa, D. G., Ibnu Kamali, K. M. (2022). Acquisition and presentation of digital evidence in criminal trial in Indonesia. Jurnal Hukum dan Peradilan, 11(2), pp. 195–218. <https://doi.org/10.25216/jhp.11.2.2022.195-218>.

29 Tuzet, G. (2021). Evidence assessment and standards of proof: A messy issue. Quaestio Facti, no. 2, pp. 87–113. <https://doi.org/10.33115/udg_bib/qf.i2.22480>.

30 Ambos, K. (2023). 'Intime conviction' in Germany: Conceptual foundations, historical development and current meaning. Quaestio Facti. Revista Internacional Sobre Razonamiento Probatorio, 4(1), pp. 167–189. <https://doi.org/10.33115/udg_bib/qf.i1.22839>.

31 Summers, S. J. (2023). The epistemic ambitions of the criminal trial: Truth, proof, and rights. Quaestio Facti. Revista Internacional Sobre Razonamiento Probatorio, 4(1), pp. 249–272. <https://doi.org/10.33115/udg_bib/qf.i1.22809>.

32 Guerrero, A. (2021). The interested expert problem and the epistemology of juries. Episteme, 18(3), pp. 428–452. <https://doi.org/10.1017/epi.2021.36>.

33 Spottswood, M. (2021). Philosophical foundations of the law of evidence: Chapter 7 – Paradoxes of proof. Oxford University Press.

still uncertainty about the accuracy of the statistical model used (meta-uncertainty).[34] The conjunction paradox and the judgment paradox illustrate that the probability of each component of a case may appear sufficient in isolation; however, when aggregated, it fails to satisfy the burden of proof, resulting in a discord between the evaluation of individual components and the overall conclusion during judicial deliberations.[35] The paradox of expertise also highlights the limitations of non-technical judges in assessing the reliability and admissibility of expert testimony.[36] On the other hand, Ross shows that under certain epistemic gap conditions—when factual harm is real but individual perpetrators cannot be identified—the use of statistics can be morally and legally justified to achieve corrective and distributive justice.[37]

From the perspective of legal epistemology, the proof paradox teaches that proof cannot be reduced to just two things: the fulfillment of formal evidence or the highest statistical probability. Both are important, but they do not automatically produce adequate intersubjective justification. Fratantonio shows that a purely epistemic approach—which focuses only on knowledge, the risk of error, or the structure of justification—fails to explain why testimony is often accepted while purely statistical evidence is rejected, even though the statistics may be more accurate.[38] This preference is based on moral and institutional ideas about how the legal system should treat people with respect, not just as numbers in a probability distribution. Therefore, the proof paradox is not only an epistemic problem but also a moral-institutional problem that touches upon the fundamental design and values of the justice system.

If this overall perspective is drawn into the law of evidence, then ideal proof must be understood as an "epistemic practice" subject to the demands of rationality, transparency, and testability. In determining what should be believed, epistemic reasons have an independent and normative status that cannot be overridden by practical reasons except indirectly, namely, through practical reasons for believing correctly according to epistemic standards.[39] Consequently, proof can no longer be perceived as a procedural instrument for formally validating evidence; instead, it should be regarded as an intellectual endeavor for substantiating factual assertions through a publicly accountable framework of reasoning.

Within this framework, the reasoning and inferences contained in the judge's decision-making considerations must be logically, explicitly, and systematically structured so that they can be reconstructed step by step by other parties. Proof reasoning is required to be publicly accessible, open to intersubjective verification, and—if necessary—ready to be corrected or refuted through stronger arguments or counter-evidence.

This principle is reflected, among other things, in the case of Compulife Software Inc. v. Newman (2020), where the court affirmed that the fact that the data came from a publicly accessible source does not automatically make the method of obtaining it lawful. Manual access within human capabilities is qualitatively different from the use of automated programs capable of collecting data in quantities practically impossible for humans, thus raising its own normative issues. A similar approach is also evident in the case of DHI Group, Inc. v. Kent (2019), when the court refused to grant

34 Steele, K., Colyvan, M. (2023). Meta-uncertainty and the proof paradoxes. Philosophical Studies, 180(7). <https://doi.org/10.1007/s11098-023-01951-5>.

35 Pardo, M. S. (2019). The paradoxes of legal proof: A critical guide. Boston University Law Review, 99(1).

36 Martini, C. (2015). The paradox of proof and scientific expertise. Humana.Mente Journal of Philosophical Studies, 8(28), pp. 1–16.

37 Ross, L. (2021). Justice in epistemic gaps: The 'proof paradox' revisited. Nous-Supplement: Philosophical Issues, 31(1). <https://doi.org/10.1111/phis.12193>.

38 Fratantonio, G. (2021). Evidence, risk, and proof paradoxes: Pessimism about the epistemic project. International Journal of Evidence and Proof, 25(4). <https://doi.org/10.1177/13657127211035831>.

39 Kauppinen, A. (2023). The epistemic vs. the practical. In Oxford Studies in Metaethics (Vol. 18, pp. 137–162). <https://doi.org/10.1093/oso/9780198884699.003.0007>.

summary judgment in a trade secret dispute arising from the unauthorized taking of a database, as well as in United States v. Nosal (2016), which asserts that trade secrets can be a compilation of data from public, closed, or a combination of both sources.[40] In this case, the compilation's overall confidentiality, not the origin of each data element, determines it. Thus, the credibility of the decision no longer rests solely on procedural compliance but on the quality of the rational justification supporting the factual conclusions reached.

This framework demands the adoption of a new paradigm in proof theory, which can be called Epistemic-Justificatory Proof Theory. This paradigm is based on the idea that the validity of a decision is not determined solely by the fulfillment of formal evidentiary requirements, but rather by the quality of the reasoning used to justify the factual conclusions. Proof reasoning must meet the standards of epistemic justification, meaning it must be constructed rationally, coherently, and intersubjectively acceptable to those using the same standards of reasoning.

In this perspective, the legitimacy of proof undergoes a fundamental shift: from formal certainty toward epistemic testability, from reliance on institutional authority toward argumentative strength open to scrutiny, and from procedural legality toward rational legitimacy that respects the values of truth and epistemic justice. So, a valid decision is not only one that follows the law, but also one that can be justified epistemologically and intellectually in front of the public of legal reasoning.

The urgency of the epistemic-justificatory paradigm is becoming increasingly prominent as the complexity of evidence in modern legal practice grows, including scientific, statistical, algorithmic, and data analysis evidence. Open science practices demonstrate potential benefits for various actors in the legal system, including increased accuracy in assessing the strength of scientific evidence and improved trust in expert testimony.[41] A 2019 Pew Research Center survey showed that 54% of respondents trust scientific findings more when the data is transparently open.

In this context, purely statistical evidence (PSE) is understood as evidence that provides support solely through probability figures, without the support of other individual evidence such as witnesses, visual recordings, motive, or confessions. The classic example is the Prisoners and Blue Bus case. Ross emphasized that DNA profiling is essentially statistical evidence as well, because at trial, experts typically present the odds of a random match, for example, "one in a billion". However, the law does not automatically prohibit statistical evidence; the main issue is not admissibility, but whether the evidence is sufficient to meet the burden and standard of proof according to the objectives of the justice system. Therefore, statistical evidence can be considered usable under certain conditions, such as DNA evidence with a tiny error rate, but not always, as in the case of Prisoners.[42]

The advent of algorithms and the utilization of artificial intelligence have significantly transformed the domain of evidence. Algorithms are understood as "decision-making machines" that can assist various processes, but their acceptance heavily depends on the user's level of understanding and risk perception, particularly regarding bias and privacy.[43] At the same time, the theory of evidence-based inference using probabilistic reasoning shows that Dempster's rule is a direct extension of Bayes' rule and still operates on basic probabilities, not just degrees of subjective belief. Criticism of Dempster's rule often arises from the misuse of posterior prob-

40 Sobel, B. L. W. (2021). A new common law of web scraping. Lewis & Clark Law Review, 25(1), pp. 147–207.

41 McAuliff, B. D. et al. (2023). Psychology and law, meet open science. In The Oxford Handbook of Psychology and Law (pp. 71–96). <https://doi.org/10.1093/oxfordhb/9780197649138.013.5>.

42 Ross, L. (2021). Rehabilitating statistical evidence. Philosophy and Phenomenological Research, 102(1), pp. 3–23. <https://doi.org/10.1111/phpr.12622>.

43 Horowitz, M. C., Kahn, L. (2021). What influences attitudes about artificial intelligence adoption: Evidence from U.S. local officials. PLoS ONE, 16(10), pp. 1–20. <https://doi.org/10.1371/journal.pone.0257732>.

abilities or double-counting priors, rather than from inherent weaknesses in its probabilistic rationality.[44] This reinforces the view that evidence-based reasoning can still be probabilistically justified, even under conditions of uncertainty and imperfect data.

The intricacy of contemporary proof necessitates a thorough assessment of reliability, validity, and possible inferential inaccuracies. Without an adequate epistemological framework, the process of proof risks falling into epistemic overreach, which is the tendency to uncritically accept factual conclusions solely because they are supported by specific technical methods or scientific authority, without an adequate understanding of the methodological assumptions, empirical limitations, and normative context of their use. In such conditions, judicial rationality has the potential to be reduced to technocratic compliance, rather than the practice of intellectually and ethically responsible reasoning.

In the epistemic-justificatory paradigm, the legitimacy of decisions no longer primarily rests on the institutional authority of the decision-makers but rather on the quality of the epistemic reasoning that establishes inferential relationships between evidence, facts, and norms. An epistemically valid decision is required to exhibit epistemic transparency, which means an explicit explanation of the inference steps, the basis for choosing the reasoning model, the evaluation of error risks, and the rational reasons for accepting one inference and rejecting others. This epistemic transparency not only strengthens public accountability but also enables institutional learning within the judicial system, preventing judicial errors from being structurally reproduced.

Furthermore, Epistemic-Justificatory Proof Theory challenges the conventional separation between formal proof and the normative dimension. Because proof always takes place within a specific epistemic horizon, it is never completely value-free. Evidence, facts, and norms are constructed through a framework of knowledge that contains both methodological assumptions and ethical choices about how the risk of error is allocated and who bears the consequences. Therefore, epistemically valid proof must be open to rational evaluation that considers epistemic justice, the proportionality of the risk of error, and the fairness of the distribution of the burden of proof, particularly for parties in structurally vulnerable positions.

This framework gains a distinctive normative relevance within the context of Pancasila as the philosophical foundation of Indonesia's rule of law.[45] The principle of fair and humane treatment affirms that individuals should not be reduced to mere objects of proof or statistical variables,[46] but must be treated as dignified subjects entitled to understandable and accountable judicial reasons.[47] Meanwhile, the principle of social justice demands that the distribution of the risk of evidentiary error be done proportionally,[48] so that epistemic uncertainty is not unfairly placed on those who are socially and institutionally in a weaker position. Thus, epistemic justification in proof not only serves as a methodological requirement but also as a concrete embodiment of the basic values of Pancasila in modern judicial practice.

44 Xu, D. L., Yang, J. B., Wang, Y. M. (2025). Make evidence theory probabilistic again. Journal of Control and Decision, pp. 1–16. <https://doi.org/10.1080/23307706.2025.2495805>.

45 Susilo, E. (2025). Natural justice, procedural justice, and the judge's role in the Pancasila-based rule of law. Yurispruden: Jurnal Fakultas Hukum Universitas Islam Malang, 8(2), pp. 177–196. <https://doi.org/10.33474/yur.v8i2.23835>.

46 Aldyan, A. (2023). The Indonesian state law system is based on the philosophy of Pancasila and constitution. Res Judicata, 6(1). <https://doi.org/10.29406/rj.v6i1.4939>.

47 Yasir, M., Gunarto, G., Bawono, B. T. (2024). Legal reconstruction of suspect investigation based on Pancasila justice values. Scholars International Journal of Law, Crime and Justice, 7(01). <https://doi.org/10.36348/sijlcj.2024.v07i01.002>.

48 Sumadi, T., Casmana, A. R., Maiwan, M. (2024). The implementation of Pancasila values to early children through traditional ceremonies in Banceuy community. European Journal of Theoretical and Applied Sciences, 2(1). <https://doi.org/10.59324/ejtas.2024.2(1).36>.

Consequently, the reform of the theory and practice of proof cannot be limited to procedural aspects alone but must target the epistemic structures that underpin judicial and administrative practices. The reforms include developing reflective standards of proof, improving the epistemic literacy of legal decision-makers, and standardizing reasoning techniques and judgment writing that emphasize public justification. On a theoretical level, this paradigm opens up space for interdisciplinary dialog between law, epistemology, philosophy of science, cognitive psychology, and argumentative linguistics. On a practical level, it provides an evaluative framework for assessing whether a decision truly meets the demands of rational legitimacy in a pluralistic and value-based democratic society.

Thus, Epistemic-Justificatory Proof Theory offers a direction for conceptual transformation in how law understands and practices proof. The shift from proof as a procedural ritual toward proof as an epistemic practice allows legal systems to produce decisions that are more transparent, rational, and intellectually accountable. Within this framework, judicial reasoning is no longer understood as a closed technical activity but rather as a public practice that connects knowledge, power, and justice into a single normative unity that is open to scrutiny and accountability—in line with the demands of the rule of law, human rights protection, and the values of substantive justice in contemporary legal societies.

CONCLUSION

The judge's decision can no longer be understood as a "legitimate" procedural outcome simply because it meets the rules of evidence, but rather as an epistemic act that establishes legal truth and simultaneously bears the burden of legitimizing the use of state coercion. The research findings indicate that the complexity of contemporary evidence—scientific, statistical, and algorithmic—exacerbates the risk of bias, inferential errors, and the reduction of judicial deliberation to a formality or subjective belief. The main finding of this article is the need to assess the evidence based on the quality of its inferential transitions: how evidence is sorted, weighed, connected, and used as the basis for legal facts through coherent, explicit, and intersubjectively testable reasoning. The scientific novelty of this research lies in proposing Epistemic-Justificatory Proof Theory, an evaluative framework that shifts the focus of legitimacy from procedural compliance toward transparency of reasoning, rational coherence, and public testability of decision-making considerations. The added value of this approach is that it provides a conceptual standard for auditing the quality of evidentiary reasoning, including when courts are dealing with purely statistical evidence, expert testimony, or AI-based systems. Actionable recommendations include standardizing judgment writing techniques that display the steps of inference, improving epistemic literacy for judges to assess the reliability and validity of scientific/algorithmic evidence, and strengthening procedural safeguards that demand clear reasoning when technology is used in law enforcement processes. Looking ahead, further research could develop operational indicators for "inferential transparency", test their application to concrete rulings, and formulate standard proof designs that are more adaptable to data-driven evidence without sacrificing the protection of human rights and the dignity of legal subjects.

REFERENCES:

Aldyan, A. (2023). The Indonesian state law system is based on the philosophy of Pancasila and constitution. Res Judicata, 6(1). <https://doi.org/10.29406/rj.v6i1.4939>;

Alpes, M. J., Baranowska, G. (2025). The politics of legal facts: The erasure of pushback evidence from the European Court of Human Rights. Law and Social Inquiry, 50(1). <https://doi.org/10.1017/lsi.2024.27>;

Ambos, K. (2023). 'Intime conviction' in Germany: Conceptual foundations, historical development and current meaning. Quaestio Facti. Revista Internacional Sobre Razonamiento Probatorio, 4(1). <https://doi.org/10.33115/udg_bib/qf.i1.22839>;

Archer, R. (2024). Retiring Popper: Critical realism, falsificationism, and the crisis of replication. Theory and Psychology, 34(5). <https://doi.org/10.1177/09593543241250079>;

Chukwuma, K. H. (2025). Evidencing terrorism: Juridical truth-making in terrorism trials. European Journal of International Security. <https://doi.org/10.1017/eis.2024.60>;

Cui, J., Shen, X., Wen, S. (2023). A survey on legal judgment prediction: Datasets, metrics, models and challenges. IEEE Access, 11. <https://doi.org/10.1109/ACCESS.2023.3317083>;

Curley, L. J., Munro, J., Dror, I. E. (2022). Cognitive and human factors in legal layperson decision making: Sources of bias in juror decision making. Medicine, Science and the Law, 62(3). <https://doi.org/10.1177/00258024221080655>;

Duvenhage, P. N. J. (2024). Reflections on Habermas's discourse ethics. Verbum et Ecclesia, 45(1). <https://doi.org/10.4102/ve.v45i1>;

Dziadzio, A. (2021). The academic portrait of the creator of the pure theory of law: Several facts from Thomas Olechowski's book entitled Hans Kelsen. Biographie eines Rechtswissenschaftlers. Tübingen: Mohr Siebeck, 2020 (1027 pp.). Krakowskie Studia z Historii Państwa i Prawa, 14(3). <https://doi.org/10.4467/20844131ks.21.028.14093>;

Fratantonio, G. (2021). Evidence, risk, and proof paradoxes: Pessimism about the epistemic project. International Journal of Evidence and Proof, 25(4). <https://doi.org/10.1177/13657127211035831>;

Garbuio, M. Lin, N. (2021). Innovative idea generation in problem finding: Abductive reasoning, cognitive impediments, and the promise of artificial intelligence. Journal of Product Innovation Management, 38(6). <https://doi.org/10.1111/jpim.12602>;

Glogar, O. (2023). The concept of legal language: What makes legal language 'legal'? International Journal for the Semiotics of Law, 36(3). <https://doi.org/10.1007/s11196-023-10010-5>;

Guerrero, A. (2021). The interested expert problem and the epistemology of juries. Episteme, 18(3). <https://doi.org/10.1017/epi.2021.36>;

Hartanto, D., Hidayat, N. (2021). Application of reverse evidence for the crime of money laundering based on the origin of narcotics. Croatian International Relations Review, 27(88). <https://doi.org/10.2478/CIRR-2021-0009>;

Horowitz, M. C., Kahn, L. (2021). What influences attitudes about artificial intelligence adoption: Evidence from U.S. local officials. PLoS ONE, 16(10). <https://doi.org/10.1371/journal.pone.0257732>;

Kauppinen, A. (2023). The epistemic vs. the practical. In Oxford Studies in Metaethics (Vol. 18, pp. 137–162). <https://doi.org/10.1093/oso/9780198884699.003.0007>;

Lefkowitz, D. (2024). A new philosophy for international legal skepticism? International Theory, 16(2). <https://doi.org/10.1017/S1752971924000010>;

Liu, W., Li, X., Li, G. (2025). The contributions of philosophy of science in science education research: A literature review. Science and Education, 34(3). <https://doi.org/10.1007/s11191-023-00485-w>;

Martini, C. (2015). The paradox of proof and scientific expertise. Humana.Mente Journal of Philosophical Studies, 8(28).

McAuliff, B. D. et al. (2023). Psychology and law, meet open science. In The Oxford Handbook of Psychology and Law (pp. 71–96). <https://doi.org/10.1093/oxfordhb/9780197649138.013.5>.

Molnár, S. J. (2024). US constitution and the notion of family: The risks of the Supreme Court's judicial activism through family and privacy cases. Pázmány Law Review, 11(1). <https://doi.org/10.55019/plr.2024.1.81-99>;

Morrison, G. S. (2022). Advancing a paradigm shift in evaluation of forensic evidence: The rise of forensic data science. Forensic Science International: Synergy, 4, 100270. <https://doi.org/10.1016/j.fsisyn.2022.100270>;

Muller, S. M. (2024). Feyerabend and decolonisation. Epistemology and Philosophy of Science, 61(3). <https://doi.org/10.5840/eps202461349>;

O'Shea, J. R. (2021). What is the myth of the given? Synthese, 199(3–4). <https://doi.org/10.1007/s11229-021-03258-6>;

Özdemir, N. Türkben, Y. (2022). The problem of objectivity in science in Imre Lakatos. Türkiye İlahiyat Araştırmaları Dergisi, 6(1). <https://doi.org/10.32711/tiad.1070222>;

Pangestu, K., Suyanto, H., Agustanti, R. D., (2021). Application of circumstantial evidence in criminal laws in Indonesia. Jurnal Hukum Novelty, 12(1). <https://doi.org/10.26555/novelty.v12i01.a16996>;

Pardo, M. S. (2019). The paradoxes of legal proof: A critical guide. Boston University Law Review, 99(1);

Parrini, P. (2021). Quine on analyticity and holism: A critical appraisal in dialogue with Sandro Nannini. Philosophical Inquiries, 9(1). <https://doi.org/10.4454/philinq.v9i1.359>;

Preston, J. (2022). Gestalt epistemology: From Gestalt psychology to phenomenology in the work of Michael Polanyi. Philosophia Scientiae, 26(3). <https://doi.org/10.4000/philosophiascientiae.3668>;

Riesthuis, T. (2023). The legitimacy of judicial decision-making: Towards empirical scrutiny of theories of adjudication. Utrecht Law Review, 19(2). <https://doi.org/10.36633/ulr.877>;

Roberts, P. (2025). Standards and methods of proof: An English perspective on Della Torre's comparative legal history. Quaestio Facti, no. 9. <https://doi.org/10.33115/udg_bib/qf.i9.23151>;

Ross, L. (2021). Justice in epistemic gaps: The 'proof paradox' revisited. Nous-Supplement: Philosophical Issues, 31(1). <https://doi.org/10.1111/phis.12193>;

Ross, L. (2021). Rehabilitating statistical evidence. Philosophy and Phenomenological Research, 102(1). <https://doi.org/10.1111/phpr.12622>;

Ross, L. (2024). The philosophy of legal proof. Cambridge University Press;

Sachoulidou, A. (2023). Going beyond the 'common suspects': To be presumed innocent in the era of algorithms, big data and artificial intelligence. Artificial Intelligence and Law. <https://doi.org/10.1007/s10506-023-09347-w>;

Giri Santosa, D. G. G., Ibnu Kamali, K. M. (2022). Acquisition and presentation of digital evidence in criminal trial in Indonesia. Jurnal Hukum dan Peradilan, 11(2). <https://doi.org/10.25216/jhp.11.2.2022.195-218>;

Sciortino, L. (2021). The emergence of objectivity: Fleck, Foucault, Kuhn and Hacking. Studies in History and Philosophy of Science, 88. <https://doi.org/10.1016/j.shpsa.2021.06.005>;

Smith, M., McCulloch, T., Daly, M. (2025). Being, knowing and doing: Aligning on-

tology, epistemology, and axiology to develop an account of social work as practice. Social Work Education, 44(3). <https://doi.org/10.1080/02615479.2024.2330598>;

Sobel, B. L. W. (2021). A new common law of web scraping. Lewis & Clark Law Review, 25(1);

Spottswood, M. (2021). Philosophical foundations of the law of evidence: Chapter 7 – Paradoxes of proof. Oxford University Press;

Steele, K., Colyvan, M. (2023). Meta-uncertainty and the proof paradoxes. Philosophical Studies, 180(7). <https://doi.org/10.1007/s11098-023-01951-5>;

Su, Y., Liu, K., Cheung, A. K. F. (2023). Epistemic modality in translated and non-translated English court judgments of Hong Kong: A corpus-based study. Journal of Specialised Translation, no. 40. <https://doi.org/10.26034/cm.jostrans.2023.525>;

Sumadi, T., Casmana, A. R., Maiwan, M. (2024). The implementation of Pancasila values to early children through traditional ceremonies in Banceuy community. European Journal of Theoretical and Applied Sciences, 2(1). <https://doi.org/10.59324/ejtas.2024.2(1).36>;

Summers, S. J. (2023). The epistemic ambitions of the criminal trial: Truth, proof, and rights. Quaestio Facti. Revista Internacional Sobre Razonamiento Probatorio, 4(1). <https://doi.org/10.33115/udg_bib/qf.i1.22809>;

Susilo, E. (2025). Natural justice, procedural justice, and the judge's role in the Pancasila-based rule of law. Yurispruden: Jurnal Fakultas Hukum Universitas Islam Malang, 8(2). <https://doi.org/10.33474/yur.v8i2.23835>;

Tuzet, G. (2021). Evidence assessment and standards of proof: A messy issue. Quaestio Facti, no. 2. <https://doi.org/10.33115/udg_bib/qf.i2.22480>;

Xu, D. L., Yang, J. B., Wang, Y. M. (2025). Make evidence theory probabilistic again. Journal of Control and Decision. <https://doi.org/10.1080/23307706.2025.2495805>;

Yasir, M., Gunarto, G., Bawono, B. T. (2024). Legal reconstruction of suspect investigation based on Pancasila justice values. Scholars International Journal of Law, Crime and Justice, 7(01). <https://doi.org/10.36348/sijlcj.2024.v07i01.002>.