THE FORMAL RECOGNITION TRAP: ADMISSIBILITY WITHOUT PRODUCTION STANDARDS AND THE DENATURING OF ELECTRONIC EVIDENCE IN CIVIL LITIGATION

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Abstract

While civil procedural codes across diverse legal traditions recognize electronic evidence as admissible proof, this statutory acknowledgment fails to yield autonomous probative effectiveness. Applying Ecuador's Código Orgánico General de Procesos (COGEP) as a diagnostic baseline, this paper examines the structural conditions under which digital evidence undergoes formal admission only to face subsequent procedural neutralization within civil litigation. Methodologically, the study adopts a Multiple Mini Case Study design grounded in critical realism to analyze two contemporary Ecuadorian civil proceedings: a contractual banking dispute (2023) and a financial accounting dispute (2024). These cases are evaluated via *a priori* coding schema structured across four dimensions: admissibility conditions, production deficiencies, judicial evaluation patterns, and procedural consequences. To ensure analytical rigor, the strategy integrates doctrinal analysis, within-case process tracing, cross-case pattern matching, and corpus-assisted triangulation with a 35-paper systematic literature mapping, alongside comparative benchmarking against India, Poland, the United Arab Emirates, and ISO/IEC 27037 standards. Despite variations in evidence types, courts, and litigating parties, both proceedings exhibit identical deficiency profiles. These shortcomings include a total absence of chain-of-custody documentation, a lack of cryptographic integrity verification mechanisms, post-hoc expert-dependent authentication, and the systematic subordination of digital data to expert testimony. This invariant pattern indicates systemic friction rather than idiosyncratic judicial failure. Ultimately, COGEP's procedural vacuum between initial admission and final judicial weighting denatures electronic evidence. This structural omission reduces autonomous proof to raw material for expert opinion, reverses the de facto burden of proof, and fosters a profound inequality of arms. Consequently, technology-neutral codification of chain of custody, integrity verification, digital-specific authentication, and standardized judicial assessment criteria remains an imperative path to restore the autonomous probative function of electronic evidence.

Keywords: Electronic evidence, probative effectiveness, procedural production standards, expert dependency, equality of arms, civil procedure.

1 INTRODUCTION

Civil procedural systems worldwide share an ostensibly straightforward commitment to the formal admissibility of electronic evidence. Statutory frameworks across diverse jurisdictions—ranging from

Ecuador's Código Orgánico General de Procesos (COGEP) and Poland's Code of Civil Procedure to the United Arab Emirates' Civil Procedures Act No. 42 of 2022 and India's recently enacted Bharatiya Sakshya Adhiniyam 2023—explicitly recognize digital documents and technologically generated data as legitimate means of proof (República del Ecuador 2015; Fruk [Budniak-Rogala] 2025; Kandeel 2025; Chadha 2024). Although such institutional convergence implies that the legal integration of digital evidence has become a settled legislative milestone, persistent empirical and doctrinal friction suggests a far more fragmented reality. Formal admissibility functions merely as an initial threshold that most electronic evidence clears with ease. Probative effectiveness—the capacity of such evidence to generate judicial conviction and contribute autonomously to the resolution of factual disputes—remains a distinct and unfulfilled procedural achievement that statutory admission alone cannot secure.

The distinction between formal admissibility and autonomous probative effectiveness represents a foundational tenet of procedural theory rather than a recent conceptual abstraction. As established in procedural scholarship, the conditions governing the introduction of evidence differ in their entirety from the criteria determining judicial persuasion (Casey 2011; Molina-Granja 2025). Contemporary developments between 2024 and 2026, however, reveal that this operational divide induces systemic procedural breakdowns on an unprecedented scale across diverse jurisdictions. In Indonesian civil litigation, for instance, the routine dismissal of electronic proof lacking formal digital forensic verification or expert certification actively undermines statutory frameworks and fosters acute legal uncertainty (Adinda et al. 2025). This institutional friction matches observations within Saudi forensic accounting disputes, where digital evidence fails to secure independent weight absent codified production protocols, irrespective of prior entry into the judicial record (Awwad and Abdelsattar 2025). In Poland, this legal status is characterized as chaotic and inadequate by design (Kuczyńska 2024). The cumulative data underscore a transnational pattern wherein legislatures formalize admissibility while procedural codes remain silent on preservation, authentication, and weighting mechanisms. Confronted with technically complex material amid a vacuum of codified standards, the judiciary invariably defaults to expert testimony, a practice that ultimately strips electronic evidence of its autonomous function.

Technical documentation validates the precise structural deficiencies that procedural scholarship diagnoses from a normative standpoint. International guidelines—specifically ISO/IEC 27037 regarding digital evidence handling and ISO/IEC 27043 on incident investigation principles—mandate four operational conditions required to preserve the integrity and reliability of electronic proof. As established by D'Anna et al. (2023), these criteria demand a documented chain of custody, systematic integrity verification through cryptographic mechanisms such as hash functions and timestamps, medium-specific digital authentication protocols, and preservation frameworks tailored to volatile data. Rather than functioning as aspirational benchmarks, these requirements highlight a persistent structural vulnerability, as a systematic review of 25 independent studies confirms that the absence of internationally validated standards remains an unresolved gap across global legal frameworks. This preservation crisis intensifies within cloud infrastructures, distributed networks, and virtualized environments, where securing electronic data demands advanced, specialized capture protocols that no current civil procedural code codifies in functional or operational terms (Pirjade and Dhotre 2024; Santillán-Lima et al. 2026a).

The analytical gap thus centers on procedural design rather than technological capability. While civil procedural codes govern the formal admission of electronic evidence at its initial point of entry, a stark legislative silence persists during the subsequent production phase. Consequently, legal frameworks fail to address the precise operational conditions that must be sustained between initial admission and final judicial weighting for data to function as autonomous proof. This legislative silence induces what this article terms the 'formal recognition trap'—a structural configuration wherein statutory acknowledgment of digital data coexists with a procedural vacuum that renders

such recognition operationally hollow. Although the evidence resides formally within the judicial record, the regulatory framework fails to specify the mandatory verifications required before the judiciary evaluates its ultimate probative value. The statutory architecture of Ecuador's Código Orgánico General de Procesos (COGEP) exemplifies this institutional configuration. While Articles 158 and 202 explicitly admit electronic documents as legitimate evidence, the framework lacks companion provisions to govern chain-of-custody documentation or cryptographic integrity verification (República del Ecuador 2015). Legal enforcement thus operates without medium-specific digital authentication procedures or specialized assessment criteria. Consequently, the current procedural code fails to distinguish volatile electronic evidence from static, paper-based documentary proof.

The procedural consequence of this regulatory vacuum is predictable and displays structural invariance across comparative jurisdictions. When no codified standards govern the production phase, judges lack the normative mechanisms required to assess digital reliability on independent grounds. This operational deficit triggers a systemic default response. Instead of exercising autonomous judicial evaluation, the judiciary treats expert testimony as an absolute precondition before according probative weight to digital data. This subversion of the judicial function aligns with documentation by Stoykova (2021), who identifies similar systemic retreats in European criminal procedures, and Adinda et al. (2025), who observe identical patterns in Southeast Asian civil disputes. Consequently, the reliance on external technical expertise effectively displaces the judge as the ultimate arbiter of electronic proof. Such a requirement fundamentally transforms electronic evidence from an autonomous means of proof into raw material for technical opinion. Its evidentiary value ceases to be intrinsic and becomes entirely derivative—contingent upon the external assessment of an expert rather than upon the verifiable properties of the digital record itself. Analysis by Stoykova (2021) characterizes this phenomenon as a de facto reversal of the burden of proof. Under this operational shift, the presenting party must not only establish relevance and initial admissibility but also absorb the financial and logistical burdens of expert certification. Such a requirement represents an asymmetric mandate imposed on no other category of documentary evidence. Consequently, these institutional barriers actively undermine the principle of equality of arms, converting a procedural omission into a structural disadvantage for under-resourced litigants. Because expert forensic testimony remains expensive, technically specialized, and unevenly accessible, transforming it into a structural prerequisite for probative effectiveness systematically disadvantages resource-constrained litigants (Chemnad and Othman 2024).

Contemporary legislative reforms confirm the profound complexity of correcting this structural misalignment. India's Bharatiya Sakshya Adhiniyam 2023, for instance, replaces the rigid certificate-based mandates of the former Section 65-B with an architecture centered on fundamental authenticity. This shift has prompted Indian courts to reject the wholesale exclusion of electronic evidence on procedural technicalities alone (Chadha 2024). In the United Arab Emirates, the Federal Civil Procedures Act No. 42 of 2022 advances electronic litigation through the regulation of digital notifications, electronic discovery, and online adjudication frameworks. Despite these advancements, legal assessments still indicate a clear need for statutory clarification regarding specific data requirements (Kandeel 2025). Similarly, Poland's amendment to Article 183[11] codifies online mediation protocols, yet this reform formalizes pre-existing judicial practice rather than introducing production-phase rules for digital evidence (Fruk [Budniak-Rogala] 2025). This pattern extends to the civil justice reforms in England and Wales, where institutional digitalization and the governance of online procedures take precedence over substantive adjustments to the probative force of electronic evidence itself (Ahmed 2024). The operational trajectory across these diverse modernizations remains uniform: even the most updated procedural architectures fail to translate forensic-technical standards into codified evidentiary production rules, leaving the critical threshold between international technical frameworks and domestic civil codes completely unresolved.

Emerging technological interventions—ranging from blockchain-based chain-of-custody architectures to automated metadata validation and AI-assisted analytical tools—offer sophisticated technical

remedies but leave the underlying normative deficit unresolved. Although blockchain networks and smart contracts ensure digital immutability and establish verifiable audit trails (Loffi et al. 2025; Ratul et al. 2024), systematic assessments reveal severe constraints regarding scalability, formal admissibility, and regulatory compliance. These limitations currently preclude the integration of decentralized ledgers into existing procedural codes (Atlam et al. 2024). Similarly, while AI-assisted evidence systems generate quantifiable metrics capable of standardizing judicial evaluations, their deployment introduces profound challenges regarding transparency, algorithmic explainability, and the erosion of independent judicial discretion (Chen et al. 2023; Ismail and Ariffin 2025). This tension between technical capability and regulatory governance persists even under the Council of Europe's Guidelines on electronic evidence. Although this instrument provides an advanced normative framework enabling the judicial evaluation of digital authenticity and integrity without mandatory expert intervention, no civil procedural code has yet translated its principles into binding, operational standards for the production phase (Jokubauskas and Świerczyński 2020; Świerczyński and Jokubauskas 2020). These persistent omissions underscore that while advanced technology can facilitate evidentiary verification, it cannot serve as a substitute for systematic procedural codification.

The systemic vulnerability identified in this study extends far beyond narrow technical friction; it represents a fundamental challenge to evidentiary justice. When explicit legislative omissions deny electronic records the operational conditions required to function as autonomous proof, the institutional framework itself compromises the integrity of the adjudication. A litigant may introduce electronic evidence that satisfies every technical indicator of reliability, yet the judiciary routinely subordinates these data to expert testimony. This practice persists not due to judicial bias, but because domestic codes provide no statutory mechanism for a judge to verify those operational properties on independent grounds. This structural void transforms formal admissibility into an empty guarantee. Consequently, the absence of codified production standards ceases to be a mere regulatory oversight, operating instead as a systemic barrier that actively undermines the constitutional right to effective judicial protection.

Against this background, two interrelated questions guide this inquiry. The first addresses the specific procedural conditions under which electronic evidence can achieve autonomous probative effectiveness within civil litigation frameworks that lack explicit digital evidence standards. The second examines how the absence of codified production criteria generates a systemic dependency on expert testimony, alongside the normative mechanisms required to interrupt this cycle. To address these questions, this paper evaluates Ecuador's COGEP as a diagnostic baseline—not due to any idiosyncrasy in the Ecuadorian framework, but because comparative benchmarking reveals its structural similarity to other civil-law jurisdictions confronting identical challenges (Kuczyńska 2024; Adinda et al. 2025; Awwad and Abdelsattar 2025).

This diagnostic baseline is operationalized through a Multiple Mini Case Study design analyzing two extreme contemporary Ecuadorian proceedings: a contractual banking dispute adjudicated in Riobamba (2023) and a financial accounting dispute decided in Quito (2024). The empirical strategy employs *a priori* coding schema, cross-case pattern matching, and corpus-assisted doctrinal analysis integrated with a 35-source systematic literature mapping. Ultimately, the primary contribution of this study rests on a normative-philosophical analysis. By tracing the exact procedural pathway through which formal admissibility decouples from production standards, the article deconstructs the structural mechanisms that systematically deny electronic evidence its autonomous probative force.

2 METHODOLOGY

This section operationalizes the research paradigm, analytical procedures, and qualitative safeguards that structure the present study. The methodological architecture addresses a distinct epistemic challenge: developing a normative-diagnostic argument concerning systemic procedural failure based on the intensive evaluation of two extreme cases. Rather than pursuing statistical representativeness,

the inquiry seeks theoretical transferability through structured qualitative rigor. The legitimacy of this approach within doctrinal and empirical legal research rests on a robust methodological foundation, shifting the focus from statistical scale to conceptual depth (Theil 2025; Chiodelli 2025). The operationalization of this strategy through a Multiple Mini Case Study (MMCS) design has been systematically validated in recent methodological literature (Käss et al. 2024).

2.1 Research Paradigm and Epistemological Stance

Underpinned by a critical realist ontology, this study conceptualizes procedural norms—specifically codified rules governing evidentiary admission, production, and evaluation—as institutional realities whose effects on judicial outcomes remain both observable and documentable. Electronic evidence possesses distinct material-technical properties, including metadata, hash functions, and chain-of-custody records, that exist independently of judicial interpretation. The friction between what procedural codes require and what digital evidence technically demands constitutes the core ontological object of this inquiry (Casey 2011; D'Anna et al. 2023). Epistemologically, the investigation operates within an interpretive-constructionist framework, wherein legal actors attribute probative meaning to digital artifacts under institutional constraints shaped by explicit normative choices. Consequently, understanding how COGEP's procedural silence conditions, judicial reasoning requires a qualitative interpretation of legal texts, judicial decisions, and doctrinal constructs rather than a metric measurement of outcomes. Shifting away from statistical inference, the analytical strategy seeks to trace the procedural mechanisms through which legislative omissions generate specific adjudicative patterns, ultimately evaluating the normative adequacy of those patterns against comparative and technical benchmarks (Banakar 2009; Jeon 2023).

2.2 Research Design: Multiple Mini Case Study with Criterion-Based Selection

Operationalizing this paradigm, the investigation adopts a Multiple Mini Case Study (MMCS) design, an approach validated for generating rigorous qualitative insights through the intensive evaluation of strategically selected proceedings (Käss et al. 2024). Methodological data confirm that a significant majority of MMCS applications—specifically 84%—employ *a priori* theoretical framework, while 58% utilize criterion-based selection logic. The implementation of both structural features within this study strengthens its normative-diagnostic capacity. By shifting the focus from statistical scale to conceptual depth, this comparative architecture allows each selected dispute to function as an independent site to execute process tracing, map structural patterns, and advance theoretical elaboration.

Two contemporary Ecuadorian civil proceedings constitute the targeted case sample. Case A originates from a contractual banking dispute adjudicated by the Juzgado Primero de lo Civil in Riobamba (2023), involving electronic documentary evidence generated through automated banking information systems. Conversely, Case B stems from a financial accounting dispute decided by the Juzgado Segundo de lo Civil in Quito (2024), where electronic records generated through digital contractual and accounting architectures were introduced into the record. Both proceedings were selected through criterion-based purposive sampling anchored in the extreme case selection framework (Seawright and Gerring 2008). This selection logic was operationalized across four methodological dimensions. First, the chosen disputes exhibit clear phenomenon presence, where electronic records undergo formal admission only to face procedural neutralization. Second, they demonstrate outcome variation across evidence types, meaning that divergent digital artifacts yield identical procedural failures. Finally, both cases provide the contextual richness required to execute process tracing alongside a structural typicality within the COGEP framework (Samaniego Bravo et al. 2021; Santillán-Lima et al. 2026b).

The logic of case selection remains analytical rather than statistical. This paper does not claim that the two cases represent the entire universe of Ecuadorian civil proceedings. Rather, it posits that if two separate disputes—involving distinct evidentiary categories, different courts, unrelated litigants, and separate geographical jurisdictions—produce identical deficiency patterns during the production

phase, the most parsimonious explanation must be structural, rooted in the silence of the procedural code rather than idiosyncratic human error. This follows the inferential logic of pattern matching within MMCS designs (Seawright 2016; Käss et al. 2024).

2.3 A Priori Coding Schema

An a priori coding schema was developed before case analysis and applied systematically to both proceedings. The schema structures the analysis across four dimensions. Dimension 1—admissibility conditions—codes for legality of acquisition (stated or not stated), relevance determination (explicit or implicit), and format compliance with COGEP Articles 158 and 202. Dimension 2—production deficiencies—operationalized from the forensic integrity literature (D'Anna et al. 2023; Loffi et al. 2025), codes for chain-of-custody documentation (present, absent, or partial), integrity verification mechanisms (present or absent), preservation protocol documentation (yes or no), and authentication method applied (expert-based, technical, or none). Dimension 3—judicial evaluation pattern—operationalized from Stoykova's (2021) framework, codes for evidence weighting (autonomous, subordinated to expert testimony, or nullified), reasoning transparency (explicit, implicit, or absent), and technical criteria invoked. Dimension 4—procedural consequence—codes for burden-of-proof impact (shifted, unaffected, or unclear) and equality-of-arms implications (documented or not addressed). Collectively, these dimensions trace the complete evidentiary lifecycle from admission through production to judicial evaluation, enabling identification of the exact point at which the procedural vacuum intervenes.

2.4 Analytical Strategy

The empirical investigation is executed through a multi-phased analytical strategy, anchoring the initial assessment in a rigorous, corpus-assisted doctrinal analysis of COGEP's core evidentiary architecture—specifically Articles 158, 159 to 176, and 202 (Mazzi 2007; Goźdź-Roszkowski 2024). This phase isolates and maps key statutory terms such as authenticity, integrity, preservation, chain of custody, electronic document, and documentary evidence to deconstruct whether the procedural code recognizes digital artifacts as a distinct category with medium-specific requirements or simply assimilates them into paper-based proof paradigms. By evaluating whether the legislative design accounts for the volatile nature of digital data, this doctrinal scrutiny yields a comprehensive normative gap matrix. By mapping each domestic procedural stage against international technical frameworks—including ISO/IEC 27037—and recent legislative developments in India (Chadha 2024), the United Arab Emirates (Kandeel 2025), and Poland (Kuczyńska 2024), the analysis establishes a comparative baseline that demonstrates how COGEP's structural omissions actively isolate domestic adjudication from global forensic standards.

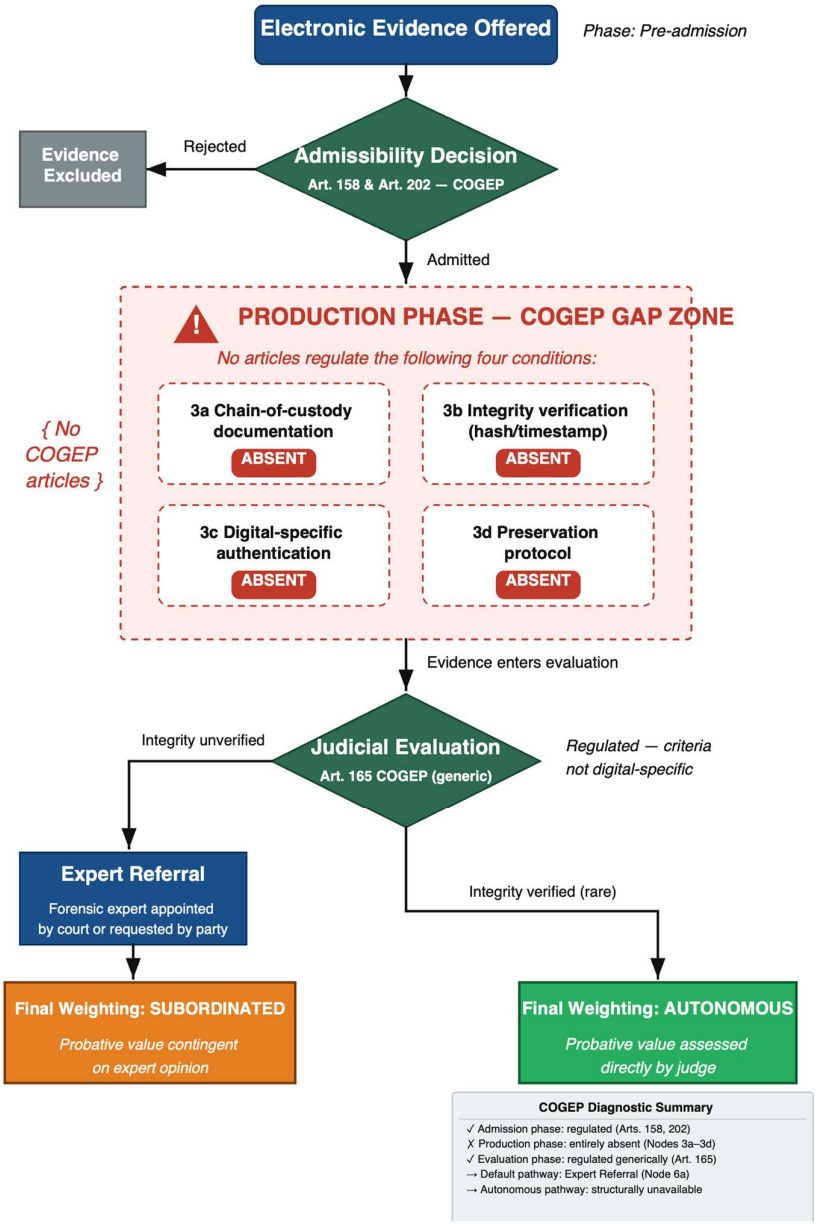

Fig. 1. Procedural Flowchart of Electronic Evidence under COGEP: From Admission to Judicial Weighting.

Underpinned by this baseline, the second phase operationalizes within-case process tracing by applying the a priori coding schema independently to each proceeding, adhering to the qualitative protocols established for mini-case designs (Käss et al. 2024). To eliminate individual bias, two investigators execute the coding process separately, subsequently resolving interpretive discrepancies through formal consensus conferences documented within a structured decision audit trail. This systematic treatment yields dense case narratives that map each evidentiary trajectory within the established four-dimensional taxonomy. Following the textual analysis methodology formulated by Mazzi (2010), this granular extraction targets critical passages where the judge explicitly addresses the probative weight of digital proof, expresses uncertainty regarding data integrity, delegates assessment to an expert witness, or completely omits technical evaluation criteria. By isolating these specific evaluative phrases, the within-case analysis deconstructs the micro-mechanisms of judicial reasoning, exposing the exact inflection points where procedural silence translates into institutional uncertainty.

Building upon the within-case findings, the third phase executes cross-case pattern matching to systematically compare the coded outputs and isolate structural convergences or divergences across both proceedings. This step directly addresses whether production deficiencies remain uniform despite variations in evidence types, court levels, and geographical jurisdictions. While full congruence across cases strengthens the inference of systemic causation rooted in structural legislative omissions, partial congruence highlights specific analytical dimensions that require further theoretical elaboration. To safeguard the validity of these inferences, alternative explanations—including whether the observed patterns stem from litigant negligence, technical limitations inherent to specific evidence types, or individual judicial idiosyncrasy—undergo systematic evaluation against the empirical case material, ensuring that the final diagnosis reflects an institutional vulnerability rather than isolated procedural anomalies.

The fourth phase executes corpus-assisted triangulation, integrating the empirical case findings with a systematic mapping aligned with PRISMA principles that examines a corpus of 35 peer-reviewed studies published between 2015 and 2026. Encompassing core domains such as cloud forensics, blockchain applications, chain of custody, and AI-assisted judicial assessment, this corpus functions as an active analytical comparator rather than a passive literature review. Specifically, it establishes international benchmarks, supplies theoretical frameworks, and drives a thematic synthesis that situates the Ecuadorian findings within a transnational trajectory of procedural insufficiency documented by contemporary scholarship (Atlam et al. 2024; Chemnad and Othman 2024). Concluding the strategy, the fifth phase advances toward theoretical generalization to integrate these multi-layered outputs into a coherent diagnostic framework. In alignment with Yin (2018), this generalization operates on an analytical rather than statistical plane, demonstrating that the identified procedural vulnerability constitutes a predictable, structural pattern whose trajectory can be traced through case evidence, confirmed via cross-case matching, and validated through international comparative comparison.

2.5 Validity, Trustworthiness, and Saturation

To anchor the empirical findings, methodological trustworthiness is operationalized through a matrix of four qualitative validity criteria derived from the foundational framework established by Lincoln and Guba (1985), Cheong et al. (2023), and Ademolu (2023). Credibility is achieved through data source triangulation—encompassing primary statutes, judicial rulings, doctrinal literature, and technical standards—combined with multi-lens theoretical triangulation that applies procedural gap theory, equality of arms, and chain-of-custody integrity to the same case material while systematically testing rival structural explanations during cross-case pattern matching. Dependability is secured through the stable execution of the a priori coding schema alongside a detailed, documented decision audit trail that logs all investigator discrepancies, ensuring analytical consistency by locking interpretive categories prior to raw data exposure. Confirmability is addressed through a reflexive disclosure of institutional positioning within Ecuadorian universities, independent double-coding, and treating statutory silence as a neutral analytical variable to control for confirmation bias regarding the normative primacy of codified standards over judicial discretion. Finally, transferability is established through a thick description of the COGEP operational environment, comparative mapping against diverse regulatory traditions (India, the UAE, and Poland), and the explicit delineation of scope boundaries, providing the contextual transparency required for external researchers to assess the applicability of this diagnostic framework to alternative civil-law jurisdictions.

The assessment of thematic saturation strictly followed the qualitative protocols established for mini-case designs (Käss et al. 2024), reaching complete conceptual closure upon the comprehensive coding of both case records. No alternative deficiency profiles emerged beyond the four predefined analytical dimensions: chain-of-custody documentation, integrity verification, digital-specific authentication, and judicial evaluation criteria. This uniform cross-case deficiency profile indicates that additional proceedings adjudicated under the same COGEP framework would yield highly reproducible

patterns, an empirical consistency that aligns with the transnational evidence of procedural vulnerability documented in comparable developing legal frameworks, including Indonesia (Adinda et al. 2025) and Saudi Arabia (Awwad and Abdelsattar 2025), and Poland (Kuczyńska 2024).

2.6 Ethical Considerations and Methodological Limitations

Adhering to strict international research standards, the investigation relies exclusively on publicly available judicial decisions and codified legal provisions, eliminating the requirement to recruit, interview, or survey human participants. To preserve institutional anonymity and confidentiality, all case identification details remain strictly restricted to court level, geographic jurisdiction, and adjudication year, ensuring that no party names, judicial identities, or other personal identifiers appear within the analysis. Because the empirical material consists entirely of open-access public records and contains no identifiable human data, institutional research protocols did not mandate formal ethical approval from a university review board, confirming that the study carries no risk of privacy infringement or ethical compromise.

Four distinct limitations constrain the scope of this inquiry and require upfront clarification. First, the selection of a two-case sample precludes statistical generalization; the inferential strategy relies instead on theoretical generalization driven by the comparative design, corpus-assisted triangulation, and international benchmarking. This diagnostic framework finds external support in the identical vulnerability profiles confirmed across multiple jurisdictions within the 35-paper corpus, lending analytical validation to the model. Second, the study makes no claim that all COGEP proceedings exhibit these precise deficiencies, but rather that the underlying procedural architecture renders their occurrence structurally likely. Third, the analysis depends strictly on documented judicial reasoning within the available rulings, meaning that unarticulated dimensions of decision-making—such as tacit knowledge, informal consultations, or extra-legal considerations—remain inaccessible. The a priori coding schema mitigates this limitation by systematically accounting for omissions, prioritizing what the judicial record explicitly documents over unexpressed intent. Fourth, the findings are specific to the COGEP framework and cannot be directly transposed to alternative procedural systems without contextual adjustment; while comparative benchmarking reveals structural similarities that support transferability, the thick description is intended to enable researchers to assess cross-systemic applicability (Lincoln and Guba 1985). Finally, the study omits litigant and judicial interviews—a deliberate methodological choice aligned with a doctrinal-diagnostic orientation that establishes a clear boundary for future empirical research.

3 RESULTS

The empirical findings are structured around four analytical themes derived from the multi-phase methodology. The first establishes a normative gap diagnosis through systematic doctrinal analysis and international comparative benchmarking. The second delineates the production deficiencies identified via within-case process tracing across the selected proceedings. The third encompasses cross-case pattern matching and the systematic testing of rival explanations to isolate systemic causality. The fourth presents the multi-lens theoretical triangulation that generates the final diagnostic framework. These empirical data are reported factually throughout the following sections, strictly reserving analytical interpretation and broader policy implications for the subsequent discussion.

3.1 Normative Gap Diagnosis: Admissibility Without Production Standards

Doctrinal analysis of COGEP's 176 evidentiary articles—encompassing general rules on proof (Articles 158 to 176) and electronic document provisions (Article 202)—reveals a profound structural asymmetry between statutory regulation and legislative omission. Articles 158 and 202 explicitly establish that electronic documents constitute admissible evidence, granting parties the right to offer them while reserving free judicial evaluation under Article 165, meaning the procedural framework thoroughly governs the initial entry point of digital evidence into civil litigation. The code remains

entirely silent, however, regarding the technical and procedural conditions that must be satisfied during the critical interval between initial admission and final judicial weighting for such data to function as autonomous proof.

Specifically, the doctrinal analysis identifies four operational dimensions completely omitted from the evidentiary architecture. First, the framework lacks any provision mandating chain-custody documentation, leaving litigants under no obligation to demonstrate who extracted the digital material, when, from which system, or through what secure protocols prior to court presentation. Second, the text contains no requirements for integrity verification mechanisms, omitting any mention of cryptographic hash values, secure timestamps, or metadata preservation logs necessary to confirm that data escaped alteration from extraction. Third, the code establishes no authentication procedures specific to digital media, relying instead on a legacy framework designed for paper documents and applied analogically without technical adaptation. Fourth, COGEP fails to provide specialized judicial evaluation criteria tailored to the volatility, reproducibility, and susceptibility to undetectable modification inherent in digital proof, thereby forcing judges to rely solely on the generic standards of Article 165—which structurally equate a cloud-stored spreadsheet with a notarized paper contract. Comparative benchmarking indicates that this legislative silence does not constitute an isolated outlier but a structurally typical configuration across diverse civil-law traditions.

Table 1. Comparative Procedural Standards for Electronic Evidence Production Across Four Jurisdictions and ISO/IEC 27037.

Procedural Requirement	COGEP (Ecuador)	India (BSA 2023)	UAE (Civil Proc.)	Poland (CCP)	ISO/IEC 27037
Chain-of-custody documentation	None	Partial (certification)	None	None	Required
Integrity verification	None	Implicit	None	None	Required
Metadata preservation	None	None	None	None	Required
Authentication protocol	Analogical (paper rules)	Certificate-based	E-discovery rules	Projection requirement	Technical standard
Judicial evaluation criteria	Free evaluation (generic)	Not specified	Not specified	Not specified	N/A

Comparative benchmarking reveals that no statutory framework within the comparative sample fully incorporates ISO/IEC 27037 benchmarks into codified procedural law, illustrating that this legislative silence is structurally shared across legal traditions. India's 2023 legislative reform emerges as the most significant movement toward authenticity-focused rules, yet courts continue to confront substantial uncertainty regarding probative assessment once digital evidence is admitted (Chadha 2024). Similarly, the United Arab Emirates' procedural reform provides no formal mechanisms for metadata validation (Kandeel 2025), while Poland requires a "faithful projection" presentation without establishing clear, verifiable criteria to assess that faithfulness (Kaczmarek-Templin 2023). Consequently, the identified vulnerability is not a localized anomaly within the Ecuadorian civil code, but a systemic limitation across international jurisdictions where codified procedural law lags global forensic and technical standards.

3.2 Production Deficiencies: The Four Absences

Application of the *a priori* coding schema to both proceedings yielded identical deficiency profiles

across all four production conditions, demonstrating that the structural vulnerabilities under analysis operate independently of specific factual configurations. This systemic symmetry persists despite substantial variations in evidence types, court levels, geographical jurisdictions, and litigating parties. By generating uniform profiles across highly diverse case parameters, the empirical baseline indicates that the observed procedural failures do not stem from isolated litigation anomalies or judicial idiosyncrasies but are directly driven by the shared omissions within the underlying legislative architecture.

Neither case record contains documentation tracing electronic evidence from initial creation or extraction to formal court presentation, a deficiency explicitly identified by the judiciary in both proceedings. In Case A, the claimant offered electronic banking records generated through a specialized information system, yet no log accompanied the submission to indicate who extracted the data, on what date, using which software, or whether the files were stored on a secure medium prior to filing, prompting the court to explicitly note that the plaintiff had not demonstrated who extracted the bank records, on what date, using which software version, or whether the data was stored on a secure medium prior to filing. This absence is precisely mirrored in Case B, where the court observed that the chain of custody for the digital accounting files was completely blank and that the tribunal did not know whether the files had been copied from the original server or from a personal USB drive.

Neither proceeding contains any evidence of integrity verification mechanisms—no cryptographic hashes, secure timestamps, or metadata preservation logs appear in either case file to confirm that the data escaped alteration since extraction. Authentication in both cases occurred entirely outside any digital-specific protocol, relying exclusively on post-hoc expert testimony as the sole mechanism to assess evidentiary reliability. Specifically, the court in Case A ordered a retroactive expert report subsequent to admitting the evidence, whereas the tribunal in Case B conditioned the final probative evaluation of the accounting files entirely upon the future production of a forensic expert report. The authentication methodology across both cases remained fundamentally expert-dependent and retrospective, functioning as a reactive judicial response to the total absence of production-phase statutory standards rather than an enforcement of proactive procedural requirements.

Judicial evaluation across both proceedings followed a remarkably uniform trajectory, characterized by a subordinate posture in which judges acknowledged digital submissions but immediately expressed deep uncertainty regarding their integrity, subsequently mandating external expert validation before assigning any probative weight. Rather than assessing electronic evidence autonomously through distinct analytical reasoning tailored to the volatile properties of electronic proof, both tribunals substituted substantive analysis with generic admissions of technical incapacity. Consequently, reasoning transparency remained notably low; neither judgment engaged with technical criteria, referenced established forensic standards, or articulated a clear framework to distinguish reliable from unreliable digital evidence, demonstrating a systematic reliance on external expertise to resolve the ambiguities generated by statutory silence.

The primary procedural consequence of these production-phase deficiencies was a de facto reversal of the burden of proof. In both proceedings, the party introducing electronic evidence was required not merely to present the data and demonstrate its relevance—the standard generally applicable to paper-based documentary evidence—but was forced to assume the additional onus of procuring and financing external expert certification. The court in Case B rendered this financial burden explicit, ordering the plaintiff to bear the cost of the forensic expert, which had to be advanced within ten days, with the warning that failure to pay would result in digital evidence being disregarded. This judicial mandate transforms the burden of proof into a direct economic barrier to evidence utilization, wherein a claimant's inability to finance forensic expertise results not in a standard adverse inference but in the outright exclusion of otherwise admissible evidence—a severe consequence imposed on no other documentary proof category under COGEP. Although the specific equality-of-arms implications were not explicitly articulated in Case A, they remain directly inferable from the identical underlying

procedural architecture.

Table 2. Coded Case Analysis Using A Priori Schema: Within-Case Process Tracing Results.

Coding Dimension	Indicator	Case A (Banking)	Case B (Contractual)	Cross-Case Pattern
Admission	Legality stated?	Yes	Yes	Consistent
	Relevance determined?	Implicit	Implicit	Consistent
Production Deficiencies	Chain-of-custody?	No	No	Identical
	Integrity verification?	No	No	Identical
	Authentication method?	Expert post-hoc	Expert post-hoc	Identical
	Preservation protocol?	No	No	Identical
Judicial Evaluation	Evidence weighting	Subordinated	Subordinated	Identical
	Reasoning transparency	Low	Low	Consistent
Procedural Consequence	Burden of proof	Shifted (de facto)	Shifted (de facto)	Consistent
	Equality of arms	Not documented	Explicit cost barrier	Consistent–divergent

Note. A priori coding schema derived from Stoykova (2021), D'Anna et al. (2023), and Loffi et al. (2025). Case A = banking-record dispute (Riobamba, 2023); Case B = contractual-system dispute (Quito, 2024). Identifiers anonymized.

3.3 Cross-Case Pattern Matching and Rival Explanation Testing

The primary procedural consequence of these production-phase deficiencies was a de facto reversal of the burden of proof. In both proceedings, the party introducing electronic evidence was required not merely to present the data and demonstrate its relevance—the standard generally applicable to paper-based documentary evidence—but was forced to assume the additional onus of procuring and financing external expert certification. The court in Case B rendered this financial burden explicit, ordering the plaintiff to bear the cost of the forensic expert, which had to be advanced within ten days, with the warning that failure to pay would result in digital evidence being disregarded. This judicial mandate transforms the burden of proof into a direct economic barrier to evidence utilization, wherein a claimant's inability to finance forensic expertise results not in a standard adverse inference but in the outright exclusion of otherwise admissible evidence—a severe consequence imposed on no other documentary proof category under COGEP. Although the specific equality-of-arms implications were not explicitly articulated in Case A, they remain directly inferable from the identical underlying procedural architecture.

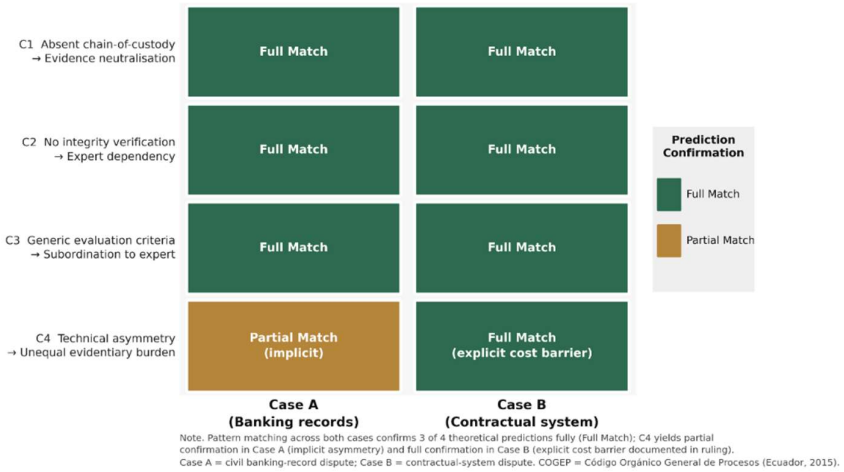

Fig. 2. Cross-Case Pattern Matching Matrix: Theoretical Predictions Against Observed Outcomes.

Three rival explanations were systematically eliminated to isolate systemic causality. First, the litigant negligence hypothesis is inconsistent with empirical evidence, as both claimants possessed substantial financial incentives to succeed, and the appearance of identical patterns across independent proceedings renders isolated negligence implausible as a systematic explanation. Second, the evidence-type limitation hypothesis fails because the procedural outcome remains constant across fundamentally different digital technologies and storage architectures. Third, the judicial idiosyncrasy hypothesis is severely weakened by the structural convergence of reasoning across distinct jurisdictions, where two judges in separate cities produced parallel rationales—expressing identical uncertainty, ordering identical expert interventions, and applying identical subordination logic. Consequently, the most parsimonious explanation remains structural, demonstrating that COGEP's total absence of production-phase standards systematically forces judges into expert dependency (Käss et al. 2024; Adinda et al. 2025; Kuczyńska 2024).

3.4 Theoretical Triangulation and Emergent Framework

Three independent theoretical lenses produced convergent findings, strengthening the internal validity of the diagnostic analysis. First, procedural gap theory—the proposition that the absence of explicit production standards generates structural expert dependency (Adinda et al. 2025)—was fully confirmed in both cases. The judicial record in each proceeding follows a predictable four-step sequence: (1) the court acknowledges the electronic evidence; (2) the court expresses acute uncertainty regarding data integrity; (3) the court requires external expert validation as a mandatory precondition for probative assessment; and (4) the court subordinates the autonomous electronic evidence to the expert's technical opinion. This sequence is not explicitly prescribed by COGEP; rather, it emerges as the only viable judicial response when the code provides no clear criteria for autonomous evaluation.

Second, equality of arms—the proposition that technical asymmetry generates unequal evidentiary burdens (Stoykova 2021; Chemnad and Othman 2024)—received full confirmation in Case B and partial confirmation in Case A. Case B's judicial order requiring the plaintiff to fund expert testimony within ten days constitutes a direct instantiation of this concern, illustrating that the capacity to deploy electronic evidence effectively becomes contingent on financial resources rather than on the intrinsic properties of the proof itself. Third, chain-of-custody integrity—the proposition that absent documentation results in eventual neutralization (D'Anna et al. 2023; Loffi et al. 2025)—was fully confirmed in both cases

Table 3. Theoretical Triangulation Convergence Matrix.

Theoretical Lens	Core Prediction	Case A	Case B	Convergence	Verbatim Excerpt from Judicial Ruling

Procedural gap theory	No production standards → expert dependency	Full match	Full match	High	*"The court lacks technical means to establish the authenticity of the electronic record without the intervention of a qualified expert."*
Equality of arms	Technical asymmetry → unequal burden	Partial	Full match	Moderate	*"The plaintiff is ordered to bear the cost of the forensic expert, which shall be advanced within ten days under penalty of the evidence being declared inadmissible."*
Chain-of-custody integrity	No documented CoC → neutralization	Full match	Full match	High	*"The chain of custody of the digital files presented by the claimant is a complete blank; no extraction protocol, no hash value, no certifying authority."*

Note. Lenses applied following Adinda et al. (2025), Stoykova (2021), Chemnad and Othman (2024), D'Anna et al. (2023), and Loffi et al. (2025). Verbatim excerpts translated from Spanish originals.

The integration of all analytical phases converges on a single diagnostic proposition: under the current COGEP framework, the pathway from formal admission to autonomous probative effectiveness is structurally blocked. Electronic evidence routinely clears the initial admissibility threshold; however, achieving actual probative effectiveness demands four distinct production-phase conditions that the code entirely omits. Because these statutory standards are absent, the only available judicial pathway runs through external expert testimony, transforming expert dependency from an isolated procedural anomaly into a structural necessity. Furthermore, this comprehensive framework exposes a self-perpetuating feedback mechanism: because ongoing legal disputes are continuously resolved through ad hoc expert interventions despite the legislative vacuum, the legislature perceives no immediate urgency to codify modern production standards, thereby perpetuating the systemic cycle of omission.

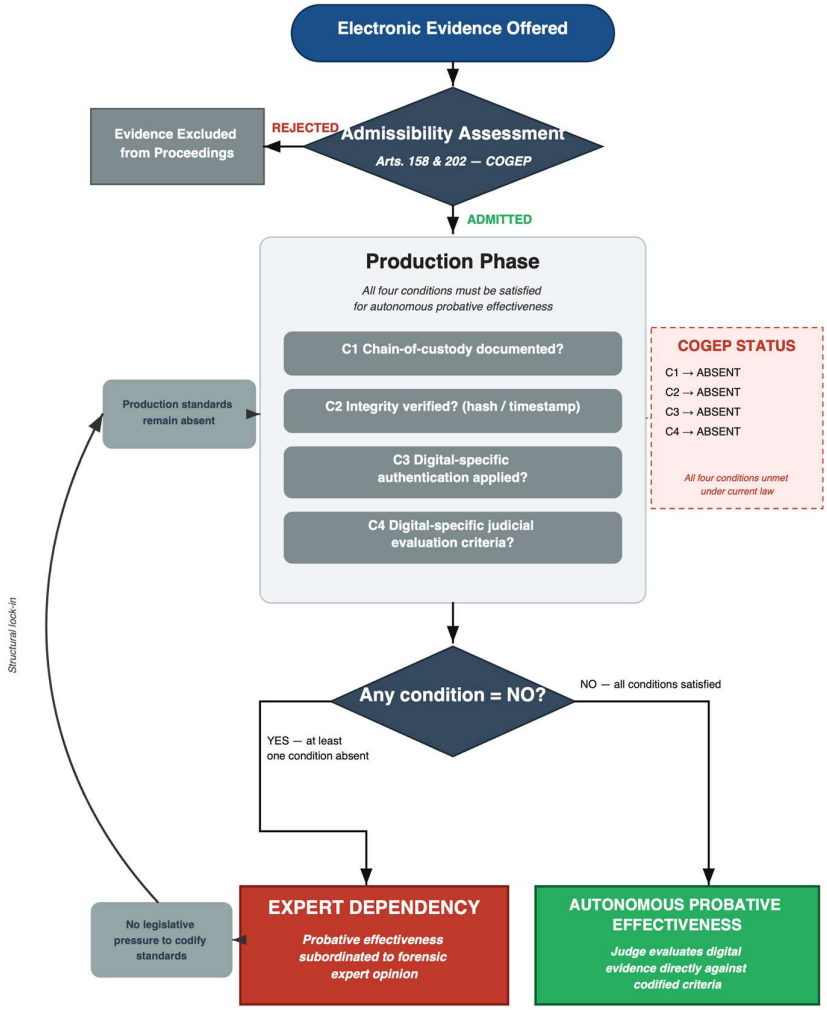

Fig. 3. Diagnostic Framework: The Conditional Pathway from Formal Admissibility to Probative Effectiveness.

4 DISCUSSION

4.1 The Normative Gap as Structural Inheritance

The finding that COGEP contains no provisions for chain-of-custody documentation, integrity verification, digital-specific authentication, or data preservation invites a deceptively simple explanation: legislative oversight. The comparative evidence, however, renders this explanation insufficient. India, the United Arab Emirates, Poland, and England and Wales have each undertaken sweeping procedural reforms within the last three years, yet none has successfully translated ISO/IEC 27037 requirements into binding production-phase rules (Ahmed 2024; Chadha 2024; Fruk [Budniak-Rogala] 2025; Kandeel 2025). If legislative oversight were the primary driver of this vacuum, at least one reformed jurisdiction would have closed the gap; that none has underscores a deeper, systemic resistance embedded within contemporary procedural architectures.

A more structural explanation emerges from contemporary doctrinal literature. Molina-Granja (2025) argues that the conflation of admissibility with probative effectiveness is a conceptual artefact of civil-law traditions wherein the notion of a "document" was historically coextensive with physical paper. When legislatures extend documentary evidence rules to encompass electronic records, they import a

framework designed for paper—a regime in which preservation is physical, authentication is visual, and integrity is presumed from the medium's inherent resistance to undetectable alteration.

Electronic evidence violates every one of these presumptions: it is volatile, infinitely reproducible, susceptible to modification without visible trace, and entirely dependent on metadata for contextualization (Casey 2011). Extending a paper-based framework by analogy is not a neutral procedural choice but a category error with profound structural consequences. Kaczmarek-Templin (2023) captures this within the Polish context, noting that the statutory requirement for "faithful projection" presupposes that a printout can represent the totality of an electronic record—a presupposition that digital evidence inherently contradicts.

If the gap results from applying an analogue-era framework to digital-era evidence, then incremental amendments are unlikely to resolve the crisis. What is required is a comprehensive reconceptualization of the production phase as a distinct procedural stage governed by autonomous, digital-native requirements.

Comparative models provide useful templates but also issue critical cautions. For instance, India's authenticity-focused rules alter the form of authentication without specifying the precise technical criteria that make authentication meaningful (Chadha 2024), while the Council of Europe's Guidelines on electronic evidence remain advisory rather than binding (Jokubauskas and Świerczyński 2020).

4.2 The Invariant Pattern and Its Inferential Force

The identical deficiency profile across both proceedings—despite substantial variations in evidence type, court levels, adjudicative timelines, and litigating parties—constitutes the strongest inferential result of this study. When highly diverse cases produce identical procedural outcomes under the same institutional conditions, qualitative pattern matching strongly supports structural causation, even within a small sample (Käss et al. 2024). The core claim is not that every single COGEP proceeding exhibits these flaws, but that the code's current procedural architecture makes such deficiencies structurally predictable. This finding converges with independent international evidence from Indonesia, Saudi Arabia, and Poland (Adinda et al. 2025; Awwad and Abdelsattar 2025; Kuczyńska 2024), validating the proposition that the formal recognition trap is a structural vulnerability inherent to civil-law systems that formalize admission while leaving production conditions undefined. While two cases cannot establish statistical prevalence, and future research employing systematic data-mining of national judicial databases remains necessary, the immediate practical implication is clear: case-by-case judicial discretion cannot compensate for statutory silence. Therefore, the reform pathway must be strictly legislative, requiring the implementation of mandatory procedural checklists that mandate documentation of chain of custody, integrity verification, and digital-specific authentication at the exact point of evidence submission.

4.3 The Expert Dependency Mechanism: Denaturing as Procedural Consequence

The four-step judicial reasoning sequence—acknowledgment, doubt, delegation, subordination—constitutes the core operational mechanism through which the formal recognition trap produces its systemic effects. Under this regime, electronic evidence is not abruptly rejected at the gateway; rather, it is progressively denatured. It enters the evidentiary record as a formally recognized means of proof, yet it exits the judicial reasoning process as mere raw material for expert opinion. This finding directly validates the study's central claim: formal admissibility, when divorced from production standards, remains a structurally empty guarantee.

The foundational architecture outlined in Casey's (2011) forensic integrity framework exposes the underlying mechanisms of this evidentiary degradation. When the baseline parameters governing digital reliability—namely documented provenance, verified integrity, and authenticated origin—remain uncodified within procedural statutes, courts inevitably confront a severe epistemic deficit during the evaluation of electronic records. Factually pristine digital evidence loses its autonomous

utility because the legal framework provides no normative criteria for verification absent external technical intervention. Although expert testimony fills this statutory vacuum, the intervention introduces a substantial systemic distortive effect: the expert presentation shifts from an objective verification tool to a complete supplantation of the data's independent probative value. Consequently, rather than assessing the intrinsic characteristics of the electronic record, the judicial determination becomes entirely subordinated to the narrow analytical filter of the expert opinion.

An alternative perspective posits that systemic reliance on expert testimony may serve as an implicit quality control mechanism, ensuring that only verified data influences judicial outcomes. This position carries clear initial plausibility, especially given the empirical documentation by Bérubé et al. (2025) regarding legitimate judicial skepticism toward unverified digital traces. A critical distinction must be drawn, however, between expert intervention triggered by explicit, codified conditions—which remains legally predictable and uniform—and testimony necessitated solely by the absence of alternative procedural pathways. When expert dependency arises from statutory silence rather than regulated triggers, the process ceases to function as systematic quality control, operating instead as a manifestation of informational asymmetry. This analytical inference is bounded by the parameters of written rulings, which may not capture the full depth of judicial deliberation; nevertheless, the absence of explicit technical engagement in the record demonstrates a clear deficit in transparent, reviewable reasoning.

Two complementary reform pathways offer potential resolution to this structural constraint. The first approach introduces standardized judicial assessment criteria designed to facilitate autonomous evaluation once threshold conditions are satisfied, a framework extensively developed within the Council of Europe's Guidelines (Świerczyński and Jokubauskas 2020). The second approach incorporates decentralized ledger infrastructure to establish an immutable, timestamped chain of custody, thereby providing a technical foundation for self-verification (Loffi et al. 2025; Ratul et al. 2024). Rather than functioning as mutually exclusive options, these models operate concurrently: standardized criteria define the scope of judicial assessment, whereas cryptographic systems provide the objective infrastructure necessary to demonstrate evidentiary reliability. Ultimate efficacy depends on simultaneous deployment, as decentralized verification systems without formal procedural integration remain legally ineffective (Atlam et al. 2024), whereas normative evaluation criteria lacking a modern technical infrastructure become merely aspirational standards impossible to operationalize.

4.4 Partial Congruence on Technical Asymmetry and Normative Synthesis

The varying degree of confirmation regarding technical asymmetry—manifested as full validation in Case B but only indirect verification in Case A—exposes an inherent limitation in the reliance on case-file analysis as a primary qualitative methodology. While judicial records systematically document final procedural outcomes, they routinely fail to capture the severe resource constraints that litigants endure during the production phase of electronic proof. This methodological boundary underscores a broader systemic pattern identified in the literature, where Stoykova (2021) contends that mandating expert certification as a prerequisite for evidentiary effectiveness operates as a de facto reversal of the burden of proof, disproportionately penalizing resource-limited parties. Furthermore, documentation by Chemnad and Othman (2024) reveals persistent accessibility gaps within modern digital implementations, while Chen et al. (2023) demonstrate that automated or advanced judicial assessments risk compounding these exact socio-legal imbalances. Consequently, verifying whether technical asymmetry systematically disenfranchises underfunded litigants requires future empirical designs incorporating structured judicial interviews, litigant surveys, and case withdrawal data. Any prospective legislative modernization must therefore integrate robust accessibility mechanisms—such as subsidized forensic certification or state-funded digital evidence units—to ensure that compliance costs do not reinforce the very structural inequalities the new standards seek to eliminate.

The coordination of these four empirical findings establishes a unified argument: the formal

recognition trap operates as a concrete procedural mechanism defined by distinct components, traceable operations, and predictable legal consequences. Statutory silence during the production phase generates a normative vacuum that systematically forces an absolute judicial reliance on retrospective expert testimony. This pervasive expert dependency progressively degrades the electronic record, transforming it from an autonomous source of proof into dependent material evaluated exclusively through an external analytical filter.

Such a denaturing effect orchestrates a de facto reversal of the burden of proof, generating a deep, structural imbalance in the equality of arms between litigating parties. Furthermore, the entire mechanism proves self-perpetuating because ongoing legal disputes undergo resolution through ad hoc expert interventions; this continuous mitigation of the statutory void insulates the legislature from any immediate institutional urgency to codify formal production standards, thereby perpetuating the cycle of vulnerability.

Breaking this systemic loop requires a decisive legislative intervention at the point of evidence submission. This statutory overhaul must be informed by international technical standards, guided by comparative procedural experience, and intentionally designed to secure financial accessibility. While the diagnostic framework developed in this study maps the precise locus for statutory intervention, the comparative evidence identifies the operational models necessary to safeguard the equality of arms.

CONCLUSIONS

This study demonstrates, through a theoretically driven diagnostic analysis employing a multiple mini-case study design, a priori coding, cross-case pattern matching, corpus-assisted triangulation, and comparative benchmarking, that the gap dividing formal admissibility from autonomous probative effectiveness within the Ecuadorian Organic General Code of Processes (COGEP) framework is structural rather than accidental. While the procedural code explicitly admits electronic evidence under Articles 158 and 202, the statutory text provides no provisions specifying the critical production-phase conditions—chain-of-custody documentation, integrity verification, digital-specific authentication, and tailored judicial evaluation criteria—required for such evidence to function as autonomous proof.

The documented outcome across two distinct civil proceedings—subsequently validated through triangulation with a 35-source comparative corpus—manifests as a predictable, four-step judicial reasoning pattern. This systemic sequence subordinates electronic evidence to retrospective expert testimony, thereby enacting a de facto reversal of the burden of proof and generating a structural inequality of arms. Because this pattern remains invariant across diverse evidence types, geographical jurisdictions, and adversarial contexts, qualitative pattern matching strongly indicates a failure of procedural design rather than a deficiency in judicial competence or litigant diligence.

The core contribution of this study lies in identifying and formally mapping the "formal recognition trap"—the structural configuration wherein statutory acknowledgment paradoxically coexists with operational emptiness—alongside articulating the normative conditions required to interrupt this cycle. Future legislative reform must introduce technology-neutral production standards informed by the ISO/IEC 27037 international standard and the Council of Europe's Guidelines on electronic evidence. These standards must be codified as binding procedural requirements and paired with accessibility provisions ensuring that compliance costs do not replicate the structural inequalities the new framework is designed to correct. Because the trap remains deeply structural, any viable reform pathway must be equally structural.

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