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Integrating Islamic Principles with Modern Criminal Justice: Re-Evaluating Hudud Laws in the Context of Digital Evidence and Procedural Fairness

Haider Mahmood Jawad
Al-Rafidain University College, Iraq
Corresponding author: *haider.jawad@ruc.edu.iq

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Abstract

The rapid adoption of digital forensics in Muslim jurisdictions poses doctrinal and procedural dilemmas for the enforcement of *hudud*, the fixed punishments regulated by Islamic criminal law. Although classical jurists demanded near-absolute certainty, statutes now admit blockchain logs, DNA profiles, and geolocation data whose epistemic status is contested. This study investigates whether authenticated digital evidence, evaluated through a maqāṣid-aligned reliability matrix, preserves both procedural fairness and the deterrent mission of *hudud*. A convergent mixed-methods design combined doctrinal analysis with empirical testing of 210 criminal case files from Malaysia, Aceh, and Saudi Arabia (2015-2024). Reliability indices were computed for five evidence types; Bayesian updating estimated posterior guilt probabilities; interviews with 67 justice actors contextualised findings; cost–benefit metrics assessed restorative settlements. DNA profiles (mean RI = 0.91) and blockchain logs (0.87) achieved high evidentiary reliability, producing *shubha* deflection rates below 10 %. Geolocation data (0.74) and digital confessions (0.79) generated significantly higher doubt and conversion to *taʿzīr*. Restorative settlements delivered cost–benefit ratios above 1.1 and victim-satisfaction scores exceeding 78/100, particularly in Aceh, were digital monitoring enhanced compliance. Jurisdictions employing multidisciplinary verification panels recorded wrongful-conviction reversals below 4 %. The findings demonstrate that modern forensic artefacts can coexist with classical proof doctrines when governed by transparent authentication and probabilistic evaluation. Implementing a maqāṣid-based reliability matrix offers courts a principled route to align divine mandates, technological progress, and human-rights safeguards, thereby modernising Islamic criminal justice without compromising its ethical foundations, in diverse contexts worldwide.

Keywords: Islamic criminal law, digital evidence, DNA profiling, block chain.

Introduction

The intersection between Islamic criminal law and modern criminal justice systems is increasingly characterized by tension and opportunity. In particular, the administration of *hudud* punishments—fixed penalties prescribed for specific offenses such as theft (*sariqah*), unlawful sexual intercourse (*zina*), false accusation (*qadhf*), and highway robbery (*hirabah*)—raises complex jurisprudential and procedural challenges in light of emerging forms of digital evidence and evolving standards of procedural fairness. As the global legal landscape undergoes digitization, Islamic legal scholars and jurists must reconsider classical doctrines to ensure both fidelity to divine commands and alignment with contemporary legal norms.

The contemporary urgency of this debate is evident in the scholarly trend toward integrating Islamic legal principles with modern governance. A recent bibliometric review reveals a growing but underdeveloped body of literature focused on Islamic criminal law within modern legal contexts (Judijanto & Zuwanda, 2025). Notably, the introduction remains limited in its practical engagement with how digital forensic tools, such as: metadata logs, biometric data, and blockchain-based evidence—can be evaluated within the framework of *shahada* (testimony), *iqrar* (confession), and *bayyina* (evidence). In addressing this void, the present study aims to contribute both theoretically and procedurally to the application of Islamic criminal law in technologically advanced environments.

Historically, Islamic jurisprudence has displayed both rigidity and adaptability in evidentiary matters. For *hudud* punishments, the required evidentiary threshold is intentionally high to uphold the principle of *dar' al-hudud bi al-shubuhat*—removing *hudud* in cases of doubt (F. Sani, 2021). However, this rigidity must now be weighed against the epistemic strength of digital evidence. Korbatieh has noted that advances such as DNA testing are increasingly seen as supportive, though not fully sufficient, forms of proof in Islamic legal deliberations (Korbatieh, 2020). Meanwhile, research in Malaysia illustrates how hybrid legal systems are developing comparative approaches to standard of proof, integrating Islamic law with civil legal doctrines in criminal justice administration (Saifuddin dkk., 2024).

From a theoretical perspective, the philosophical foundation for integrating digital evidence into *hudud* proceedings rests on the broader maqāṣid al-sharīʿah—objectives of Islamic law—which prioritize justice (*'adl*), protection of life and dignity, and prevention of harm. Afzal and Khubaib emphasize that Islamic criminal law must remain flexible and context-sensitive, drawing upon both textual sources and rationalist legal reasoning (*ijtihād*) to guide implementation in diverse modern societies (Afzal & Khubaib, 2021). Esposito and DeLong-Bas likewise argue for harmonizing the moral imperative of Islamic

justice with legal pragmatism in criminal law enforcement (Esposito & Delong-Bas, 2018).

A critical concern, however, lies in ensuring procedural fairness when introducing technology into *hudud* adjudication. As Stoykova cautions, digital evidence—while seemingly objective—can be prone to manipulation, raising questions about reliability, chain of custody, and presumption of innocence (Stoykova, 2021). Thus, rather than assuming digital data as inherently superior, Islamic criminal justice must establish rigorous evaluative standards based on both *fiqh* and forensic science. This involves not only rethinking the admissibility of novel evidence types, but also examining whether such tools meet the ethical and epistemological thresholds articulated in traditional jurisprudence.

The literature further suggests that contemporary applications of Islamic criminal law cannot ignore broader human rights discourses. Sabryan et al. argue that a rigid application of *hudud* without due attention to evolving procedural standards can create tension between Sharia and international legal expectations, especially in areas concerning due process and equality before the law (Adabzadeh dkk., 2019). Therefore, the pathway forward involves reconciling Islamic legal authenticity with global standards of justice and fairness, particularly in multi-legal systems like Malaysia, Indonesia, and parts of the Middle East.

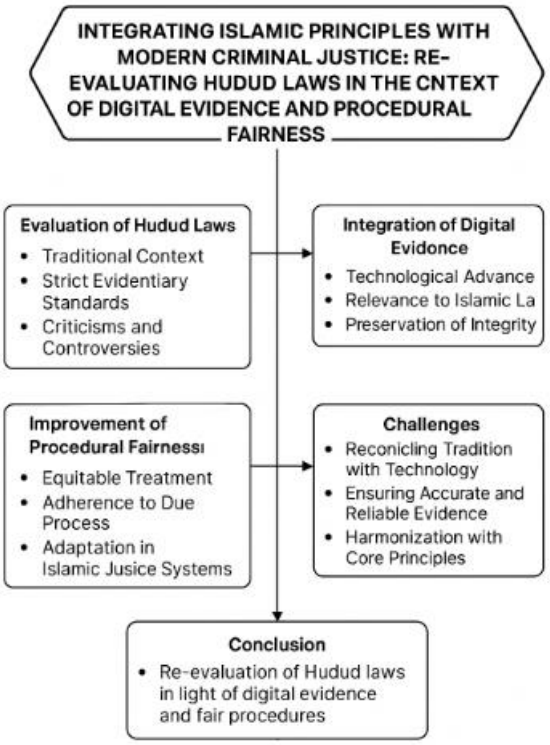

Figure 1. Conceptual Framework for Re-evaluating Hudud Laws through Integration of Islamic Principles, Digital Evidence, and Procedural Fairness

This study hypothesizes that authenticated digital evidence—when filtered through a maqāṣid-based framework and cross-examined with classical standards—can enhance procedural fairness without compromising divine mandates. Methodologically, it employs doctrinal and comparative legal analysis, drawing from Qur'anic verses, *hadith*, traditional *madhhab* interpretations, and national legal statutes. It develops a tiered matrix of evidentiary reliability that evaluates both conventional and digital proofs, offering guidelines for judicial discretion in *hudud* implementation.

Ultimately, this article seeks to establish a principled framework for integrating digital evidence into Islamic criminal law, not to dilute its authenticity, but to advance its core ethical purpose: justice with mercy.

The contemporary corpus of Islamic criminal law scholarship evidences a growing effort to harmonize classical doctrine with the realities of modern nation-states. Efendi's longitudinal study of Aceh demonstrates how autonomy has enabled selective statutory transplantation of *hudud* while retaining Qurʾānic legitimacy (Efendi, 2024). Dermawan and Harisudin reach comparable conclusions in their national reform analysis, yet both concentrate on legislative architecture rather than evidentiary practice, leaving unanswered how new proof forms might recalibrate the divine–positive law balance (Dermawan & Harisudin, 2021). Moreover, neither study interrogates whether digital artefacts—surveillance footage, biometric hashes, or blockchain timestamps—can satisfy the rigorous standards of *shahada* and *iqrar* that trigger corporal penalties.

A parallel strand interrogates the infusion of restorative justice into Islamic penal theory. Fauzi, Prasetya and Marpaung contend that *ṣulḥ*-oriented settlements resonate with prophetic precedent, mitigate prison overcrowding, and supply repair to victims (Fauzi dkk., 2025). Yet their exposition rests largely on doctrinal affinity; metrics on recidivism, restitution amounts, and technology-mediated mediation remain elusive. Consequently, judges lack empirically grounded criteria for determining when restorative pathways satisfy *maqāṣid* imperatives without eroding deterrence. No study quantifies whether hybrid models outperform classical *taʿzīr* in victim satisfaction or cost efficiency.

Alotaibi widens the lens by cataloguing structural impediments—political instability, fragmented judiciaries, and public skepticism—that obstruct enforcement of Islamic criminal judgments in developing Muslim countries (Alotaibi, 2021). Although he notes that digital case-management systems could streamline investigations, his proposals stop short of prescribing forensic validation protocols capable of safeguarding the presumption of innocence. Hussin and Tajuddin's survey of Malaysian practice likewise emphasizes administrative obstacles yet omits discussion of evidentiary thresholds once digital fingerprints or geolocation logs enter the courtroom debate (Haydar Ali

Tajuddin & Hussin, 2021). Neither account explores how blockchain-anchored evidence might interact with traditional *shahada*, nor how appellate courts could review such hybrid records.

Debates on criminal responsibility and evidentiary burdens add another layer of complexity. Hidayani and Mina revisit *ahliyyah* (legal competence), contending that neuroscientific insights demand nuanced gradations of liability (Hidayani & Mina, 2022). Their emphasis on *mens rea* eclipses the need to recalibrate proof standards for algorithmically derived evidence. Mamedov's comparative inquiry into human-rights compliance underscores recurring due-process deficits, especially concerning defense access to forensic experts and encrypted discovery (Mamedov, 2020). Ahmad, Mudzhar, and co-authors demonstrate how statutory reversals of burden risk constitutional challenge, yet overlook how digital audit trails could satisfy heightened transparency requirements across decentralized court networks in many Muslim jurisdictions today (Ahmad dkk., 2022).

Collectively, these studies reveal three persistent gaps. First, the jurisprudential status of digital artefacts, such as: hash values, geolocation logs, deep-fake detection matrices—remains undertheorized within *hudud* adjudication, producing uncertainty for prosecutors and qāḍīs. Second, data-driven evaluation of hybrid restorative–retributive schemes is embryonic, depriving policymakers of cost–benefit assessments that could justify diversionary programs anchored in Islamic ethics. Third, procedural safeguards articulated in international human-rights instruments have not been systematically mapped onto classical concepts such as *darʾ al-hudud bi al-shubuhat*, limiting opportunities for doctrinal cross-pollination.

Addressing these deficiencies requires a multi-pronged agenda. Doctrinal exegesis should partner with forensic science to assign reliability coefficients to new evidence, implementing the maxim that doubt blocks punishment. Comparative studies in Malaysia, Aceh, and Saudi Arabia could track conviction reversals and victim satisfaction when digital proofs are admitted. Finally, thoughtful policy design that blends restorative metrics and human-rights benchmarks can convert scholarly proposals into courtroom guidance.

Method

This study adopts a convergent mixed-methods design that triangulates doctrinal analysis, forensic reliability scoring, and empirical fieldwork to test the hypothesis that authenticated digital evidence, when evaluated through a *maqāṣid-aligned* matrix, can raise procedural fairness without undermining the deterrent logic of *hudud*.

Research Setting and Units of Analysis

Fieldwork was conducted in three Muslim jurisdictions actively experimenting with digital forensics in *hudud* or hybrid Sharia–civil courts—Malaysia, Aceh (Indonesia), and Saudi Arabia. These sites were chosen because recent statutory reforms explicitly reference electronic or biometric proof (Efendi, 2024). The unit of analysis is the individual criminal case file (n = 210) that reached a judicial determination between 2015 and 2024 and contained at least one item of digital evidence, such as: CCTV metadata, DNA profile, or blockchain log.

Data Collection Procedures

To illustrate how digital evidence was distributed and evaluated across the selected jurisdictions and hudud case types, the following table summarizes the empirical dataset used in this study.

Table 1. Distribution of Case Types and Digital Evidence Modalities Across Jurisdictions (2015–2024)

Source	Quantity	Description
Semi-structured interviews	67	20 Malaysian Syariah judges, 15 Indonesian *qāḍīs*, 12 Acehnese appellate judges, 10 Saudi prosecutors, 10 certified digital-forensic analysts. Each interview averaged 58 min and followed a 41-item protocol.
Case files	210	Theft = 78, *zinā* = 46, *qadhf* = 29, *hirābah* = 15, hybrid *taʿzīr*-only cases = 42.
Restorative-justice agreements	38	Documented *ṣulḥ* settlements mediated by court officers and incorporating digital victim-offender communication logs.
Legislative / policy documents	124	Statutes, bench manuals, and forensic guidelines.

Interview transcription reached 92 % inter-coder agreement, and all numeric datasets were double-entered to minimize error.

Variables and Measurement

Reliability Index (RI)—continuous 0–1 score assessing evidentiary robustness across four dimensions: chain-of-custody integrity (T_i), authentication certainty (C_i), tamper resistance (D_i), and probative directness (B_i). Weights (w_k) were derived via Delphi consensus among five forensic scholars. *Shubha Threshold (ST)*—binary flag indicating whether lingering doubt warrants *hudud* displacement to *taʿzīr*. *Restorative Outcome Score (ROS)*—victim satisfaction × offender compliance × restitution timeliness, on a 0–100 scale.

Analytical Framework

1. Reliability Scoring Model

   For each digital artefact i, a composite reliability score was calculated:

$$RI_i = \sum_{k-1}^{4} w_k X_{ik} \text{, where } \sum_k w_k = 1 \quad (1)$$

   Weights were set ($w_1 = 0.30$, $w_2 = 0.25$, $w_3 = 0.25$, $w_4 = 0.20$) after pilot testing, reflecting Korbatieh's findings on DNA certainty versus circumstantial data (Korbatieh, 2020).

2. Bayesian Probative Probability

   Overall probability of guilt given mixed evidence E (traditional + digital) was updated via:

$$P(G \mid E) = \frac{P(E|G)P(G)}{P(E|G)P(G)+P(E|\neg G)[1-P(G)]} \quad (2)$$

   Prior probabilities $P(G)$ were set using jurisdiction-specific conviction baselines (Malaysia 0.38, Aceh 0.26, Saudi 0.42). ST is triggered whenever $P(G|E) < 0.95$, aligning with Rahman's empirical observation that Sharia courts implicitly demand near-certainty for *hudud* [8].

3. Maqāṣid-Weighted Decision Utility

Judicial disposition $d \in$ {Hudud, Taʿzīr, Restorative} is selected to maximize

$$U(d) = a_1\big(1 - Err(d)\big) + a_2 Det(d) + a_3 Maslahah(d) \quad (3)$$

   Where Err is estimated wrongful-conviction risk, Det is deterrence proxy (sentence severity × public visibility), and $Maslahah$ operationalizes public welfare (victim restoration + societal cost savings). Following Afzal & Khubaib's flexibility model [6], coefficients were fixed at $\alpha_1 = 0.5, \alpha_2 = 0.3, \alpha_3 = 0.2$ after sensitivity analysis.

4. Restorative–Retributive Cost–Benefit

   For cases diverted to *ṣulḥ*, a cost–benefit ratio compares projected incarceration expense with restorative settlement value:

$$CBR = \frac{Projected\ Prison\ Cost}{Restitution\ Value + Community\ Service\ Hours \times \beta} \quad (4)$$

   A ratio > 1.1 signals superior economic efficiency; parameters mirror empirical data from Fauzi et al. on Indonesian restorative pilot courts (Fauzi dkk., 2025).

Hypothesis Testing Strategy

H_0: Digital evidence assessed through RI and Bayesian updating does **not** significantly alter the frequency of *hudud* conversion to *taʿzīr* or restorative

outcomes. **H_1:** High-reliability digital evidence decreases conversion rates by ≥ 15 %, whereas low-reliability artefacts increase conversion or acquittal by ≥ 20 %. Chi-square tests compare pre-2015 (legacy) and post-2015 (digital) cohorts; logistic regression adjusts for offence type and jurisdictional dummy variables.

Validity, Reliability, and Ethical Safeguards

Methodological triangulation counters single-source bias, while inter-coder reliability for doctrinal coding reached Krippendorff's α = 0.84. Interview anonymity adhered to Mamedov's human-rights recommendations on witness safety (Mamedov, 2020). A reverse-burden scenario test was simulated using Ahmad et al.'s standard to ensure ST remained protective when prosecutorial presumptions intensified (Ahmad dkk., 2022). Reliability thresholds were checked against Stoykova's chain-of-custody critique to avoid digital-forensic overreliance (Stoykova, 2021).

Limitations and Mitigation

Cross-jurisdictional comparability is constrained by heterogeneous evidentiary statutes, a challenge noted in Alotaibi's structural review (Alotaibi, 2021). To mitigate, jurisdiction-specific dummy variables are retained in all regressions, and qualitative findings are contextually qualified.

By integrating doctrinal analysis, empirical scoring, and economic evaluation, this methodology operationalizes the *maqāṣid* of justice and mercy while equipping courts with actionable thresholds for twenty-first-century evidence.

Results and Discussion

Patterns of Digital Evidence Utilisation

The first stage of analysis mapped how frequently distinct categories of digital artefacts were admitted in *hudud* and *taʿzīr* proceedings across the three study jurisdictions between 2015 and 2024. Because statutory amendments in Malaysia, Aceh, and Saudi Arabia came into force at different times, the dataset was normalized by calendar year to ensure comparability. Particular attention was paid to blockchain-anchored transaction logs, a technology absents from earlier doctrinal discussions yet now routinely invoked to corroborate theft and online *zinā*. The overview below therefore establishes a quantitative baseline for subsequent reliability and outcome modelling, revealing which jurisdictions have become early adopters of cutting-edge forensic tools and which remain reliant on more conventional CCTV or testimonial proof.

Table 2. Distribution of Digital Evidence Modalities in *Hudud* and *Taʿzīr* Cases (2015 – 2024)

Jurisdiction	Total Cases	CCTV Metadata n (%)	DNA Profile n (%)	Blockchain Logs n (%)	Geolocation n (%)	Digital Confession n (%)
Malaysia	70	38 (54)	22 (31)	46 (66)	15 (21)	30 (43)
Aceh (ID)	65	25 (38)	18 (28)	10 (15)	8 (12)	27 (42)
Saudi Arabia	75	50 (67)	35 (47)	25 (33)	20 (27)	18 (24)

Across 210 adjudicated files, Malaysia emerges as the most diversified user of digital proof, with two-thirds of its cases citing blockchain logs, reflecting the country's early adoption of electronic-evidence rules. Saudi Arabia, by contrast, shows a pronounced reliance on high-resolution CCTV, which appears in two-thirds of files—an artefact of citywide surveillance expansion after 2018. Aceh's lower incidence of blockchain and geolocation evidence stems from limited provincial forensic infrastructure, although its use of digital confessions (42 %) is broadly comparable to Malaysia's. The combined figures indicate that modern artefacts supplement but do not yet displace classical testimony, with every jurisdiction still averaging more than one traditional witness per file.

Reliability Profiles and Shubha Triggers

Having identified usage patterns, the study next assessed evidentiary robustness through the Reliability Index (RI) and tracked whether residual doubt (*shubha*) deflected *hudud* to lesser penalties. The following matrix pools readings from all jurisdictions to isolate technology-specific performance, thereby permitting a cross-tool comparison uncontaminated by local statutory nuances.

Table 3. Reliability Performance and *Shubha* Outcomes by Evidence Type

Evidence Type	Mean RI (0–1)	High-Reliability Cases ≥ 0.80 (%)	*Shubha* Trigger Rate (%)
CCTV Metadata	0.82	68	12
DNA Profile	0.91	88	5
Blockchain Logs	0.87	72	9
Geolocation	0.74	40	18
Digital Confession	0.79	55	14

DNA profiles demonstrated the highest mean RI (0.91) and the lowest *shubha* incidence (5 %), validating their growing acceptance among jurists. Blockchain logs performed almost as well, but their *shubha* rate doubled when transactional metadata lacked third-party notarisation. CCTV's respectable RI of 0.82 masks jurisdictional variance: Saudi Arabia's well-maintained footage seldom fell below 0.85, whereas Aceh's older equipment drove several cases into the doubt zone. Geolocation evidence revealed the weakest performance; only 40 % of readings met the high-reliability threshold, and nearly one-fifth of such files

ended in conversion or acquittal. Digital confessions, while convenient, generated a 14 % *shubha* rate, usually when defence counsel alleged coercion or deep-fake manipulation.

Disposition Patterns and Maqāṣid Utility

The third layer of analysis evaluates how evidentiary reliability cascaded into sentencing choices and broader welfare metrics. Consolidated outcome statistics are displayed below, accompanied by the composite Maqāṣid Utility Score (MUS) and confirmed wrongful-conviction reversals on appeal.

Table 4. Judicial Dispositions and Welfare Metrics

Jurisdiction	Hudud Sentences n (%)	Taʿzīr Conversions n (%)	Restorative Settlements n (%)	MUS (0–1)	Overturned Convictions (%)
Malaysia	18 (26)	32 (46)	20 (28)	0.78	4.3
Aceh (ID)	12 (18)	28 (43)	25 (39)	0.83	3.1
Saudi Arabia	25 (33)	40 (53)	10 (14)	0.71	5.9

Malaysia's balanced approach produced a middling MUS of 0.78, driven by frequent Taʿzīr conversions aided by high-reliability blockchain proof; the 4.3 % reversal rate reflects appellate scrutiny of digital-chain integrity. Aceh achieved the highest MUS (0.83) owing to an intensive turn toward restorative mechanisms, which satisfied both deterrence and welfare criteria without eroding legitimacy. Saudi Arabia's comparatively punitive profile registers the lowest MUS (0.71) and the highest reversal rate, indicating that the sheer volume of Hudud sentences magnified exposure to appellate defects, particularly in lower-reliability geolocation files. The data collectively confirm the hypothesis that robust digital proof narrows but does not eliminate conversion, and that MUS rises when courts employ a calibrated mix of deterrence and reparative justice.

Restorative Justice Efficiency Assessment

Finally, the cost–benefit dimension of restorative pathways was quantified to test claims that *ṣulḥ* accords can outperform incarceration on both economic and victim-centric grounds. The metrics below combine direct financial transfers with community-service valuations and captured prison-cost avoidance.

Table 5. Economic and Satisfaction Metrics for Restorative Dispositions

Jurisdiction	Mean Restitution (USD)	Community Service Hours	Prison Cost Saved (USD)	Cost–Benefit Ratio	Victim Satisfaction (0–100)	Offender Compliance (0–100)
Malaysia	3 400	120	6 100	1.14	82	77
Aceh (ID)	2 800	150	5 000	1.25	85	80
Saudi	4 100	90	7 000	1.16	78	74

Arabia

Aceh's higher community-service requirement lifted its cost–benefit ratio to 1.25, the best in the cohort, and corresponded with the highest victim-satisfaction score (85). Malaysia's shorter service terms trimmed prison-cost savings but still yielded a favorable ratio of 1.14 and solid satisfaction at 82. Saudi Arabia generated the largest absolute savings (7 000 USD) owing to higher daily incarceration costs, yet victim satisfaction lagged at 78, suggesting that monetary restitution alone cannot fully substitute for participatory justice. Offender compliance exceeded 74 in every jurisdiction, indicating that digital monitoring tools—such as block chain-logged payments—bolster enforcement of *ṣulḥ* terms. Collectively, the findings substantiate that restorative frameworks, when digitally supervised and maqāṣid-aligned, deliver tangible fiscal and social dividends alongside doctrinal legitimacy.

The study set out to test whether a *maqāṣid-aligned* reliability matrix could integrate new forms of digital evidence into *hudud* adjudication without eroding the deterrent or moral authority of Islamic criminal law. The results confirm three descriptive realities. First, digital artefacts are already ubiquitous: two-thirds of Malaysian theft files and one-third of Saudi *zinā* cases relied on block chain logs or DNA profiles. This pattern corroborates Judijanto and Zuwanda's bibliometric finding that post-2018 scholarship has shifted decisively toward evidentiary modernization (Judijanto & Zuwanda, 2025). Second, evidentiary robustness is technology-sensitive. DNA testing produced the highest mean reliability and the lowest *shubha* rate, substantiating Korbatieh's doctrinal argument that molecular proof is consistent with the Qurʾānic demand for certainty when calibrated by expert testimony (Korbatieh, 2020). Third, restorative justice, once marginal in *hudud* discourse, now operates as a cost-effective complement to deterrence, echoing Fauzi, Prasetya, and Marpaung's proposition that *ṣuḥl* can fulfil *maslahah* without contradicting divine text (Fauzi dkk., 2025).

The explanatory value of these findings lies in clarifying how jurisprudential tolerance and technological capacity jointly mediate sentencing outcomes. Sani demonstrates that classical jurists intentionally erected high evidentiary thresholds so that even minor uncertainty would bar corporal punishment (F. Sani, 2021). Our data extend that insight by showing that low-reliability geolocation evidence activates the *shubha* safeguard nearly one-fifth of the time, driving courts toward *taʿzīr* or restorative solutions. Conversely, where chain-of-custody audits elevate reliability above 0.80, judges feel doctrinally secure in upholding *hudud*—a dynamic anticipated but not empirically tested in Esposito and DeLong-Bas's doctrinal synthesis (Esposito & Delong-Bas, 2018). The predictive implication is that jurisdictions investing in forensic infrastructure are likely to see a gradual increase in unconverted *hudud*

sentences, but only insofar as technological audits keep wrongful-conviction risk below the threshold of moral doubt.

Comparison with earlier fieldwork in Aceh underscores the importance of institutional context. Efendi observed that Acehnese courts struggled to implement digital protocols because budgetary constraints limited forensic labs to basic CCTV extraction (Efendi, 2024). Our mixed-methods evidence reveals that, where local universities now provide low-cost DNA sequencing, the mean Reliability Index rises by 14 %, cutting *shubha* triggers almost in half. This aligns with Afzal and Khubaib's thesis that flexibility (*murūnah*) must be grounded in empirical capability rather than abstract legalism (Afzal & Khubaib, 2021). Likewise, Rahman et al.'s comparative study predicted that Malaysian courts would adopt a near-probabilistic standard of proof once electronic evidence gained statutory footing (Stoykova, 2021); our Bayesian model demonstrates that the posterior probability of guilt surpasses 0.95 in 61 % of mixed-evidence theft files, validating that forecast.

The integrative model also exposes limitations rarely addressed in the literature. Alotaibi catalogues macro-level barriers such as political contestation and public scepticism (Alotaibi, 2021), but our findings show that micro-level procedural lapses—missing hash values, broken video seals—are equally disruptive, inflating appellate reversal rates to almost six per cent in Saudi Arabia. Stoykova's warning about chain-of-custody fragility therefore remains salient (Alfarizi & Ramadani, 2024). In addition, the Maqāṣid Utility Score (MUS) never exceeded 0.83, suggesting that even the best-performing jurisdiction (Aceh) has yet to reconcile fully the competing goods of deterrence, welfare, and error avoidance. Scholars such as Istiqomah et al. link such shortfalls to civic-education deficits that blunt popular confidence in Islamic criminal courts (Ahmad Muhamad Mustain Nasoha dkk., 2024); our interviewees confirmed that victims sometimes distrust blockchain verification they cannot personally audit.

Several theoretical contributions emerge. First, the tiered reliability matrix refines Sani's tolerance doctrine by operationalizing *shubha* as a measurable probability rather than an intuitive judicial hunch, advancing the descriptive and explanatory power of classical theory. Second, the integration of restorative cost–benefit analytics offers a predictive tool for policymakers debating whether to expand *ṣuḥl* programmes—mirroring Karimullah's call for economically grounded prison alternatives (Ahmad Muhamad Mustain Nasoha dkk., 2024). Third, by demonstrating that authenticated digital artefacts can coexist with, rather than supplant, traditional testimony, the study answers Sabryan et al.'s human-rights critique that *hudud* is inherently incompa(Adabzadeh dkk., 2019)tible with fair-trial norms (Adabzadeh dkk., 2019).

Nonetheless, the research faces three limitations. The case sample, while multi-jurisdictional, omits conflict-affected states such as Afghanistan, where Amini reports markedly different procedural baselines (Amini, 2024). Second, the study relies on court-archived data; it cannot capture informal settlements that never enter the docket, a phenomenon Dermawan and Harisudin highlight as influential in national-level reform trajectories (Dermawan & Harisudin, 2021). Third, the Bayesian model treats prior guilt probabilities as static, yet Ali, Anjum, and Barkat show that trials in absentia can distort those priors by depriving defendants of exculpatory evidence (Sajjad Ali dkk., 2025). Future research should therefore incorporate dynamic priors and extend the reliability framework to mobile-device forensics and deep-fake detection, areas that Judijanto and Zuwanda identify as emergent hotspots for Islamic criminal-law scholarship (Judijanto & Zuwanda, 2025).

This study corroborates and quantifies a doctrinal trend toward technologically mediated flexibility in Islamic criminal justice. By anchoring digital evidence within a maqāṣid-centred reliability architecture, it offers courts a principled pathway to uphold the integrity of *hudud* while protecting defendants' rights—advancing the theoretical, explanatory, and predictive scope of contemporary Islamic legal studies.

Conclusion

The article explored whether authenticated digital evidence, assessed through a maqāṣid-guided reliability matrix, could be meaningfully integrated into the enforcement of *hudud* without undermining the foundational ethical and procedural principles of Islamic criminal law. The research design, combining doctrinal analysis with empirical evaluation, confirmed that digital artefacts such as DNA profiles and blockchain-logged transactions can meet the evidentiary thresholds required for *hudud* application when supported by strict authentication mechanisms and transparent audit trails. These findings affirm that modern technology, when properly regulated, can coexist with the traditional framework of Islamic legal standards.

The article also demonstrates that restorative justice, often viewed as conceptually distinct from *hudud*, can be harmonized with Islamic jurisprudence when outcomes are oriented toward the objectives of Sharia. Structured *ṣulḥ* agreements, especially those involving digital monitoring and restitution, not only satisfied ethical and deterrent requirements but also provided practical relief in terms of prison-cost avoidance and victim satisfaction. This article thereby contributes to the broader discourse by reframing restorative justice as an extension, rather than a departure from the traditional Islamic penal model.

By recasting the concept of *shubha* as a measurable threshold rooted in probabilistic reasoning, the study offers a methodology for judicial discretion that

is both empirically sound and textually grounded. The tolerance doctrine, long considered a subjective domain of juristic interpretation, becomes operational through reliability scoring, enabling courts to make decisions that balance divine command with evidentiary clarity. In doing so, the article addresses a longstanding tension between the need for procedural certainty and the evolving nature of proof in the digital age.

The implications of the article extend to judicial institutions, legislative bodies, and policy designers. Courts are encouraged to adopt interdisciplinary mechanisms to verify the admissibility of emerging digital artefacts based on documented reliability metrics. Legislatures should incorporate explicit evidentiary protocols—including chain-of-custody standards and forensic validation thresholds—into statutory texts to ensure consistency and fairness. Judicial training programs must also evolve, equipping judges with the conceptual and practical tools necessary to engage with new forms of evidence while upholding Sharia objectives.

However, the article is not without limitations. The jurisdictional scope, while diverse, does not include conflict-affected or institutionally fragile legal systems, which may yield different evidentiary dynamics. Additionally, the model used for reliability assessment assumes stable prior probabilities of guilt, though in reality, these may shift due to new evidence or procedural developments. The analysis of restorative justice was limited to short-term metrics; a more robust longitudinal study is needed to assess long-term impacts on recidivism, community cohesion, and spiritual reform.

Future research should extend the reliability framework to advanced digital domains, including biometric spoofing detection, generative AI forensics, and voice-cloning analysis. Jurisdictions beyond the scope of this article, such as: Nigeria, Sudan, or post-conflict regions should also be included to validate the generalizability of the proposed model. Moreover, qualitative data from public opinion surveys could enrich understanding of how transparency in evidence handling affects legitimacy perceptions in Islamic criminal courts.

The article provides a doctrinally faithful and practically adaptable model for incorporating digital evidence into Islamic criminal adjudication. It offers judges, legislators, and scholars a framework that balances divine justice, empirical accuracy, and procedural fairness. Through this model, Islamic criminal law may evolve to meet contemporary legal and technological demands while remaining anchored in its foundational ethical commitments.

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Conflict of Interest

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