

The Digital Transformation of Criminal Justice: A Comparative Examination of Indonesia's E-Court System and Global Best Practices

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Abstract

In an era marked by the algorithmic mediation of human affairs, the pursuit of justice can no longer be disentangled from the architecture of digital systems that sustain it. The criminal justice system, long rooted in analog procedures and institutional inertia, faces an existential imperative: adapt or risk obsolescence. Within this context, digital transformation is not merely an administrative upgrade—it is a normative challenge to the principles of due process, transparency, and equality before the law. Indonesia's hesitant transition toward e-criminal justice reveals a complex interplay of structural, legal, and epistemic limitations. This study aims to analyze the development of e-criminal justice in Indonesia by conducting a comparative assessment of successful digital judicial systems in the United States, the United Kingdom,

and Singapore. Employing a normative legal research approach with a comparative legal method, this study examines primary and secondary legal sources to identify regulatory gaps, procedural challenges, and strategic solutions. The findings reveal that Indonesia's legal framework remains insufficient in addressing key procedural safeguards, digital evidence authentication, and cybersecurity risks. Additionally, disparities in digital access, resistance from legal practitioners, and inadequate technological infrastructure hinder the effective implementation of e-criminal justice. Comparative analysis suggests that successful digital transformation requires a robust regulatory foundation, secure and interoperable digital platforms, structured judicial training programs, and policies ensuring digital inclusivity. To optimize its e-criminal justice framework, Indonesia must adopt a context-sensitive and adaptive strategy, balancing technological advancements with fundamental principles of procedural fairness and judicial integrity. Future research should explore the long-term impact of digitalization on judicial decision-making, the role of AI in legal processes, and the effectiveness of cybersecurity mechanisms in safeguarding judicial independence. This study contributes to the broader discourse on the intersection between technology and justice, providing recommendations for a sustainable and equitable digital transformation of Indonesia's criminal justice system.

KEYWORDS *E-Criminal Justice, Digital Courts, Judicial Reform, Digital Evidence, Procedural Fairness*

Introduction

The digital transformation of the criminal justice system has become an inevitable progression in modern legal frameworks, driven by advancements in information and communication technology. The adoption of electronic court systems (e-court) has significantly reshaped legal proceedings, enhancing efficiency, accessibility, and transparency.¹ Many countries, including the United States, the United Kingdom, and Singapore, have successfully integrated digital innovations into their criminal justice systems, enabling expedited case

¹ Cédric Foussard, Angela Vigil, and Mariana Pérez Cruz, "Impact on Child Justice in a World of Digital Courts: Perspectives from the Bench," *Intersections* 9, no. 2 (September 16, 2023): 29–53, <https://doi.org/10.17356/ieejsp.v9i2.1143>.

management, remote hearings, and improved judicial accountability. These technological advancements are not merely administrative enhancements but represent a fundamental shift in how justice is administered in the digital age.² However, while the global trend towards digitalization in the judiciary has been widely acknowledged, the extent to which developing countries, such as Indonesia, can effectively implement such systems remains an area of critical inquiry.

Indonesia has embarked on the digitalization of its judiciary through the implementation of e-court and e-litigation systems, particularly within civil and administrative cases.³ However, the integration of digital mechanisms within the criminal justice system remains a complex and underdeveloped domain, raising pressing concerns regarding its legal, technical, and procedural feasibility.⁴ Key challenges include the absence of a comprehensive legal framework governing e-criminal justice, infrastructural limitations, and resistance from legal practitioners accustomed to traditional court procedures.⁵ Additionally, the digital divide between urban and rural areas presents a significant barrier to equitable access to justice. Given these complexities, a comparative analysis of Indonesia's e-criminal justice system with jurisdictions that have successfully implemented digital courts is essential to identify viable strategies for effective reform.⁶

Despite growing literature on the impact of digital courts, there is a noticeable gap in scholarship concerning the application of e-court systems specifically within criminal justice, particularly in Indonesia. Existing studies predominantly focus on civil litigation, leaving critical issues such as digital

² G. Rusman et al., "Features of the Application of Digital Technology in Criminal Proceedings of the Brics Countries," *BRICS Law Journal* 10, no. 1 (April 19, 2023): 35–58, <https://doi.org/10.21684/2412-2343-2023-10-1-35-58>.

³ Dian Latifiani et al., "Can Advocates' Legal Culture in Civil Law Enforcement Drive Reform in Indonesia's Modern Justice System?," *Journal of Law and Legal Reform* 5, no. 3 (October 31, 2024): 913–42, <https://doi.org/10.15294/jllr.v5i3.12988>.

⁴ Aju Putrijanti and Kadek Cahya Susila Wibawa, "Indonesia Administrative E-Court Regulation Toward Digitalization And E-Government," *Jurnal IUS Kajian Hukum Dan Keadilan* 9, no. 1 (March 31, 2021): 18–33, <https://doi.org/10.29303/ius.v9i1.796>.

⁵ Mulyani Zulaeha, "E-Courts in Indonesia: Exploring the Opportunities and Challenges for Justice and Advancement to Judicial Efficiency," *International Journal of Criminal Justice Sciences* 18, no. 1 (May 13, 2021): 183–94, <https://doi.org/10.5281/ZENODO.4756212>.

⁶ Aristo Evandy A. Barlian et al., "Electronic Criminal Justice in Indonesia: Challenges and the Future Measures," *Jambura Law Review* 7, no. 1 (2025): 243–74.

evidence handling, the rights of the accused in virtual trials, and cybersecurity concerns in criminal proceedings insufficiently explored.⁷ This study aims to bridge this gap by conducting a comparative examination of Indonesia's e-criminal justice system in relation to best practices in advanced jurisdictions. By identifying key legal, technological, and procedural insights, this research seeks to provide a framework for optimizing Indonesia's digital criminal justice system while ensuring procedural fairness, judicial integrity, and the protection of fundamental rights.

The implementation of electronic court systems (e-court) in criminal justice represents a paradigm shift in legal proceedings, promising increased efficiency, accessibility, and transparency. However, despite the growing adoption of digital judicial mechanisms, the application of e-criminal justice remains a complex and contentious issue, particularly in jurisdictions where legal traditions and infrastructure present significant challenges.⁸ Indonesia, while making notable progress in digitalizing certain aspects of its judiciary, continues to grapple with structural and regulatory deficiencies in its criminal justice system. The absence of a comprehensive legal framework governing e-criminal justice raises concerns regarding procedural legitimacy, evidentiary reliability, and the protection of fundamental rights.⁹ Moreover, technical limitations, including inadequate digital infrastructure and disparities in technological literacy among legal practitioners, hinder the seamless integration of digital solutions into criminal adjudication.¹⁰ These challenges underscore the urgent need to critically assess Indonesia's current digitalization efforts and explore best practices from jurisdictions that have successfully implemented e-criminal justice mechanisms.

In addition to legal and technical constraints, the effective implementation of e-criminal justice in Indonesia is further hampered by sociocultural and institutional resistance. The reluctance of judicial officers, law enforcement

⁷ Umami Maskanah, "Artificial Intelligence in Civil Justice: Comparative Legal Analysis and Practical Frameworks for Indonesia," *Jambura Law Review* 7, no. 1 (2017): 225–42.

⁸ Avital Mentovich, J.J. Prescott, and Orna Rabinovich-Einy, "Legitimacy and Online Proceedings: Procedural Justice, Access to Justice, and the Role of Income," *Law & Society Review* 57, no. 2 (June 2023): 189–213, <https://doi.org/10.1111/lasr.12653>.

⁹ Mukhtar Mukhtar and Tanto Lailam, "Accountability and Transparency of the Electronic Court and Litigation Systems in Indonesia," *Jurnal Hukum* 39, no. 2 (December 7, 2023): 157, <https://doi.org/10.26532/jh.v39i2.32552>.

¹⁰ Barlian et al., "Electronic Criminal Justice in Indonesia: Challenges and the Future Measures."

authorities, and legal professionals to fully embrace digitalization reflects deeper concerns regarding due process, judicial discretion, and the perceived erosion of traditional courtroom dynamics.¹¹ The lack of empirical research examining the impact of digital criminal proceedings on judicial efficiency, fairness, and public trust further complicates policy formulation and legal reform efforts.¹² Existing comparative studies on e-court systems have largely focused on civil litigation, leaving critical gaps in understanding how digitalization can be effectively tailored to the distinct nature of criminal justice.¹³ Given these challenges, this research aims to fill the existing void by providing a comprehensive comparative analysis of Indonesia's e-criminal justice framework in relation to jurisdictions that have successfully implemented digital judicial mechanisms. By addressing these gaps, this study seeks to contribute to the development of an adaptive, legally sound, and technologically feasible e-criminal justice system in Indonesia.

This study seeks to critically examine the development and implementation of e-criminal justice in Indonesia by identifying the legal, technical, and institutional challenges that obstruct its effective integration into the criminal adjudication process. The urgency of this research lies in the accelerating global shift toward digital legal systems, where the failure to modernize criminal justice mechanisms risks deepening procedural inefficiencies, widening access disparities, and undermining public trust in judicial institutions. In the wake of the COVID-19 pandemic and the proliferation of digital governance, the relevance of e-criminal justice has intensified—not only as a tool for improving efficiency, but as a safeguard for

¹¹ Abdul Rachmat Ariwijaya and Palupi Lindiasari Samputra, "Evaluasi Kebijakan Peradilan Elektronik (e-Court) Mahkamah Agung Republik Indonesia," *Jurnal Hukum & Pembangunan* 51, no. 4 (2021): 1104–22.

¹² Mohammad Ikbal Hasan and Badsha Mia, "Initiation of Virtual Court System during COVID-19 Pandemic and E-Judiciary: Challenges and Way Forward," *Daengku: Journal of Humanities and Social Sciences Innovation* 1, no. 1 (March 13, 2021): 8–17, <https://doi.org/10.35877/454RI.daengku385>.

¹³ Viktoriya F. Borisova and Sergey F. Afanasiev, "Realia and Prospects of Civil E-Justice Legal Regulation," in *Ubiquitous Computing and the Internet of Things: Prerequisites for the Development of ICT*, ed. Elena G. Popkova, vol. 826, Studies in Computational Intelligence (Cham: Springer International Publishing, 2019), 403–10, https://doi.org/10.1007/978-3-030-13397-9_47; Djamaludin Djamaludin et al., "Assessing the Impact of Electronic Court Systems on the Efficiency of Judicial Processes in the Era of Digital Transformation," *Volksgeist: Jurnal Ilmu Hukum Dan Konstitusi*, June 27, 2023, 1–18, <https://doi.org/10.24090/volksgeist.v6i1.8082>.

continuity, transparency, and inclusivity in the rule of law. Indonesia's current digital judicial initiatives remain fragmented and under-regulated, particularly in criminal matters, highlighting the pressing need for a coherent and context-sensitive reform strategy.

Through a comparative legal analysis of jurisdictions with advanced digital court systems—namely the United States, the United Kingdom, and Singapore—this research identifies transferrable best practices to inform a more structured and principled approach to Indonesia's judicial digitalization. Beyond benchmarking, the study offers a multidimensional framework that integrates regulatory, technological, and socio-legal perspectives, aiming to bridge the persistent gap between normative aspirations and operational realities. By doing so, this research not only contributes to scholarly discourse on the intersection of law and technology, but also provides timely, actionable recommendations for legal reform. Ultimately, it responds to the imperative of designing a digital criminal justice system that upholds procedural fairness, judicial integrity, and the foundational values of democratic accountability in an era increasingly defined by digital infrastructure.

Despite the increasing body of research on the digitalization of judicial systems, studies focusing on the application of e-court in criminal justice, particularly in Indonesia, remain limited. Much of the existing literature predominantly examines the implementation of digital courts within civil litigation,¹⁴ where procedural flexibility allows for a more seamless integration of technology. In contrast, the criminal justice system presents unique challenges that necessitate deeper scrutiny, particularly regarding the protection of defendants' rights, the management of digital evidence, and the ethical considerations surrounding remote judicial proceedings.¹⁵ The absence of comprehensive scholarly discourse addressing these issues in Indonesia leaves a significant research gap that must be filled to develop a more robust, legally sound, and practically viable e-criminal justice system.

Furthermore, while comparative legal studies have explored the effectiveness of digital courts in jurisdictions such as the United States, the

¹⁴ Maskanah, "Artificial Intelligence in Civil Justice: Comparative Legal Analysis and Practical Frameworks for Indonesia."

¹⁵ Md Hasibul Alam Ratul, Sepideh Mollajafari, and Martin Wynn, "Managing Digital Evidence in Cybercrime: Efforts Towards a Sustainable Blockchain-Based Solution," *Sustainability* 16, no. 24 (December 12, 2024): 10885, <https://doi.org/10.3390/su162410885>; Barlian et al., "Electronic Criminal Justice in Indonesia: Challenges and the Future Measures."

United Kingdom, and Singapore,¹⁶ little attention has been given to their adaptability in Indonesia's distinct legal, infrastructural, and socio-political context. The disparities in technological infrastructure, judicial training, and public access to digital legal services create substantial barriers to implementing a standardized e-criminal justice framework.¹⁷ Additionally, the absence of empirical assessments evaluating the efficacy of existing digital initiatives within Indonesia's judiciary results in a fragmented understanding of their practical impact. A systematic comparative study is therefore essential to identify not only the challenges but also the potential pathways through which Indonesia can adopt best practices while mitigating jurisdictional limitations.

Another critical gap in the literature is the lack of an interdisciplinary approach to analyzing e-criminal justice reform in Indonesia. Most existing studies tend to focus solely on legal and procedural aspects, overlooking the broader technological, institutional, and socio-cultural dimensions that influence the success of digital transformation in judicial systems.¹⁸ The intersection between legal norms and technological innovations remains underexplored, leading to an incomplete understanding of how digital justice mechanisms can be effectively institutionalized in a way that upholds fundamental legal principles such as due process, judicial independence, and public accountability.¹⁹ This study seeks to bridge this gap by incorporating perspectives from legal scholars, policymakers, technologists, and practitioners to present a holistic evaluation of Indonesia's digital criminal justice reform.

¹⁶ Olha Zyhrii et al., "Law and Technology: The Impact of Innovations on the Legal System and Its Regulation," *Social Legal Studios* 6, no. 4 (December 12, 2023): 267–75, <https://doi.org/10.32518/sals4.2023.267>.

¹⁷ Andrii Shabalin et al., "Use of Digital Technologies in Judicial Proceedings in Some Countries of Europe and the Usa," *Petita: Jurnal Kajian Ilmu Hukum Dan Syariah* 9, no. 1 (January 29, 2024): 1–16, <https://doi.org/10.22373/petita.v9i1.218>.

¹⁸ Lisa Julia Di Natale and Antonio Cordella, "Digitising the Judicial Sector: A Case Study of the Dutch KEI Programme," in *Electronic Participation*, ed. Robert Krimmer et al., vol. 13392, Lecture Notes in Computer Science (Cham: Springer Nature Switzerland, 2022), 139–53, https://doi.org/10.1007/978-3-031-23213-8_9.

¹⁹ Fira Mubayyinah Mubayyinah, "Sustainability of Virtual Criminal Court in the Perspective of Ius Constituendum," *Al Hakam The Journal of Islamic Family Law and Gender Issues* 1, no. 1 (April 25, 2021): 88–103, <https://doi.org/10.35896/alhakam.v1i1.194>; Reyan M. Zein and Hossana Twinomurinzi, "Blockchain Technology in Lands Registration: A Systematic Literature Review," *JeDEM - eJournal of eDemocracy and Open Government* 15, no. 2 (December 18, 2023): 1–36, <https://doi.org/10.29379/jedem.v15i2.748>.

Given these research gaps, this study offers a much-needed contribution to the scholarly discourse by providing a critical and comparative analysis of e-criminal justice in Indonesia. By addressing the overlooked complexities of digital criminal adjudication, this research not only enhances theoretical understandings of digital legal transformations but also provides practical insights for policymakers and judicial authorities. The findings of this study will serve as a foundation for developing a more comprehensive regulatory and technological framework that ensures the effective, equitable, and sustainable implementation of digital justice in Indonesia. In doing so, this research aims to set the groundwork for future studies and policy reforms that can facilitate a seamless transition towards a technologically advanced, yet legally sound, criminal justice system.

The increasing digitalization of judicial systems worldwide necessitates a critical reassessment of how criminal justice can be effectively administered in the digital era.²⁰ While various jurisdictions have successfully implemented e-criminal justice mechanisms, Indonesia's adaptation of such frameworks remains underdeveloped, raising pressing concerns regarding legal certainty, procedural fairness, and technological feasibility. This study offers a novel contribution by not only examining Indonesia's existing digital judicial initiatives but also conducting a comparative analysis with leading jurisdictions that have successfully navigated the complexities of digital criminal adjudication. This research uniquely explores the adaptation of e-court mechanisms within the criminal justice system, emphasizing the legal, ethical, and institutional implications of digital transformation. By integrating perspectives from comparative law, digital governance, and judicial reform, this study provides a multidimensional analysis that is both academically rigorous and practically relevant.

Furthermore, this research is justified by its potential to inform ongoing legal and policy reforms in Indonesia, particularly in the context of judicial modernization and access to justice.²¹ The study not only identifies key legal

²⁰ Michetti Giulio et al., "A Model of Justice as a Platform: A Case Study of Open Data Disclosure," in *Frontiers in Artificial Intelligence and Applications* (IOS Press, 2019), <https://doi.org/10.3233/FAIA190027>.

²¹ Mulyani Zulaeha, "E-Courts in Indonesia: Exploring the Opportunities and Challenges for Justice and Advancement to Judicial Efficiency," *International Journal of Criminal Justice Sciences* 18, no. 1 (May 13, 2021): 183–94, <https://doi.org/10.5281/ZENODO.4756212>; Nurjihad Nurjihad and Ariyanto Ariyanto, "Electronic Trial At The Supreme Court: Needs, Challenges And

and technical barriers hindering the full implementation of e-criminal justice but also proposes strategic recommendations tailored to Indonesia's unique judicial landscape. By addressing critical gaps in the existing literature and offering insights grounded in international best practices, this study aspires to serve as a foundational reference for legal scholars, policymakers, and judicial authorities seeking to enhance the efficiency, transparency, and fairness of Indonesia's criminal justice system. Ultimately, this research contributes to the broader discourse on the intersection between law and technology, providing a forward-looking perspective on how digitalization can be leveraged to uphold the fundamental principles of justice in an increasingly interconnected world.

This study adopts a normative legal research approach, focusing on the analysis of legal norms, doctrines,²² and principles that underpin the implementation of e-criminal justice in Indonesia. It employs a comparative legal method²³ to examine how digital criminal justice systems are regulated and practiced in selected jurisdictions—namely the United States, the United Kingdom, and Singapore. This dual-method framework allows for a critical evaluation of Indonesia's regulatory readiness in relation to international best practices, while also identifying areas of potential adaptation within its unique legal and institutional context.

Data collection is conducted through documentary analysis of both primary sources—such as statutory provisions, Supreme Court regulations, and international legal instruments—and secondary sources, including scholarly articles, judicial decisions, and policy reports. To complement this, the study incorporates case study analysis, selecting reform experiences from advanced jurisdictions to examine the interaction between legal norms and digital infrastructure. These case studies enable an evidence-based assessment of procedural effectiveness and implementation challenges, enriching the study's evaluative and prescriptive analysis. Together, these methods provide a

Arrangement,” *Jurnal Jurisprudence* 11, no. 2 (March 18, 2022): 170–86, <https://doi.org/10.23917/jurisprudence.v11i2.16348>; Panji Purnama and Febby Mutiara Nelson, “Penerapan E-Court Perkara Pidana Sebagai Salah Satu Upaya Terwujudnya Integrated Judiciary Dalam Sistem Peradilan Pidana Di Indonesia,” *Jurnal Rechts Vinding: Media Pembinaan Hukum Nasional* 10, no. 1 (April 29, 2021): 97, <https://doi.org/10.33331/rechtsvinding.v10i1.661>.

²² Irwansyah Irwansyah, *Penelitian Hukum: Pilihan Metode & Praktik Penulisan Artikel* (Yogyakarta: Mirra Buana Media, 2020).

²³ Dian Ekawaty Ismail, Novendri M. Nggilu, and Irlan Puluhalawa, *Metode Penelitian Hukum: Teori, Aplikasi, Dan Inovasi Dalam Penelitian Hukum*, ed. Tiara Oktaviana Namira Daud (Kalimantan Selatan: Ruang Karya, 2025).

comprehensive foundation for proposing policy and regulatory innovations aligned with Indonesia's justice reform agenda.

The Digital Transformation of Criminal Justice

The global legal landscape is undergoing a profound transformation with the increasing integration of digital technologies into judicial systems. The concept of e-criminal justice has emerged as a critical response to the inefficiencies of traditional legal procedures, particularly in addressing delays, bureaucratic complexities, and barriers to access to justice. As courts worldwide strive to modernize their operations, digital judicial mechanisms are increasingly being recognized as essential tools to enhance transparency, efficiency, and procedural fairness.²⁴ However, while digitalization presents significant opportunities, it also raises fundamental legal and philosophical questions concerning the nature of justice, due process, and the balance between technological efficiency and the protection of fundamental rights.²⁵

At its core, the adoption of e-criminal justice is not merely an administrative shift but a paradigmatic evolution in how criminal law is enforced and adjudicated. The theoretical foundation of digital justice systems can be traced to broader legal-philosophical debates on the role of the judiciary in an era of technological transformation.²⁶ Legal positivists argue that law must evolve in tandem with societal and technological advancements, ensuring that legal processes remain functional and effective.²⁷ Conversely, legal naturalists caution against an overreliance on automation and procedural digitalization, emphasizing that justice must retain its humanistic and moral dimensions. This philosophical tension underscores the critical need for a well-calibrated digital

²⁴ David Cowan, "Richard Susskind, *Online Courts and the Future of Justice* (Oxford: Oxford University Press, 2019)," *Canadian Journal of Law and Technology* 18, no. 2 (2020): 303–8.

²⁵ Paul Stothard and Clinton Slogrove, "COVID-19: Approach to Court Proceedings," *Norton Rose Fulbright LLP International Law Office*, 2020.

²⁶ Francesco Contini, "Artificial Intelligence and the Transformation of Humans, Law and Technology Interactions in Judicial Proceedings," *Law, Technology and Humans* 2, no. 1 (May 8, 2020): 4–18, <https://doi.org/10.5204/lthj.v2i1.1478>.

²⁷ Institute of Legislation and Comparative Law under the Government of the Russian Federation and Taliya Y. Khabrieva, "Identification of Law in Modern Social Regulation," *Voprosy Filosofii*, no. 12 (2021): 5–17, <https://doi.org/10.21146/0042-8744-2021-12-5-17>.

justice system that upholds judicial integrity while embracing the benefits of technological advancements.²⁸

Countries such as the United States, the United Kingdom, and Singapore have pioneered the adoption of e-criminal justice mechanisms, demonstrating varying degrees of success in leveraging digital technologies to enhance their judicial efficiency.²⁹ The implementation of virtual courtrooms, digital case management systems, and AI-assisted legal analytics has streamlined case processing, reduced administrative burdens, and improved judicial accessibility.³⁰ However, the effectiveness of these systems is largely contingent upon the robustness of their legal frameworks, the technological infrastructure supporting them, and the degree of institutional readiness within judicial and law enforcement bodies. A comparative analysis of these successful jurisdictions provides valuable insights into the prerequisites for a well-functioning e-criminal justice system.³¹

Indonesia, as a rapidly developing legal jurisdiction, has made notable progress in integrating digitalization into its judiciary, particularly through the introduction of e-court and e-litigation mechanisms. These reforms mark a significant step towards modernizing the Indonesian legal system, aligning it with global trends in judicial digitalization.³² However, the extent to which these initiatives have successfully transformed criminal adjudication remains a

²⁸ Oleg Stepanov et al., “Justice and Digitalization as Mutually Determining Factors of Criminal-Jurisdictional Activity Development,” *Bratislava Law Review* 3, no. 2 (December 31, 2019): 60–68, <https://doi.org/10.46282/blr.2019.3.2.147>.

²⁹ Rian Saputra, Josef Purwadi Setiodjati, and Jaco Barkhuizen, “Under-Legislation in Electronic Trials and Renewing Criminal Law Enforcement in Indonesia (Comparison with United States),” *Journal of Indonesian Legal Studies* 8, no. 1 (May 31, 2023): 243–88, <https://doi.org/10.15294/jils.v8i1.67632>; Barlian et al., “Electronic Criminal Justice in Indonesia: Challenges and the Future Measures.”

³⁰ Meredith Rossner, David Tait, and Martha McCurdy, “Justice Reimagined: Challenges and Opportunities with Implementing Virtual Courts,” *Current Issues in Criminal Justice* 33, no. 1 (January 2, 2021): 94–110, <https://doi.org/10.1080/10345329.2020.1859968>.

³¹ Marina Yu. Kozlova and Marina L. Davydova, “Digital Technology in Courts as a Tool for Smart Regulation: Opportunities and Risks,” in *Ecological Footprint of the Modern Economy and the Ways to Reduce It*, ed. Bruno S. Sergi et al., Advances in Science, Technology & Innovation (Cham: Springer Nature Switzerland, 2024), 207–11, https://doi.org/10.1007/978-3-031-49711-7_36.

³² Mahkamah Agung, “Majalah Mahkamah Agung, Media Komunikasi Mahkamah Agung Republik Indonesia,” *Majalah Mahkamah Agung*, 2018; Aristo Evandy A. Barlian et al., “Electronic Criminal Justice in Indonesia: Challenges and the Future Measures,” *Jambura Law Review* 7, no. 1 (2025): 243–74.

subject of critical inquiry. Unlike civil litigation, where digitalization primarily enhances administrative efficiency, criminal justice involves complex considerations related to due process, evidentiary integrity, and the protection of defendants' rights, making its digital transformation far more intricate.

A central challenge in Indonesia's transition towards e-criminal justice is the absence of a comprehensive legal framework that explicitly governs digital criminal proceedings. While various Supreme Court regulations provide procedural guidelines for e-court applications, there remains a lack of legislative coherence in addressing critical issues such as the admissibility of digital evidence, procedural safeguards in virtual trials, and the role of AI-driven judicial decision-making. This regulatory uncertainty poses significant risks to legal certainty and the protection of fundamental rights, raising concerns about the legitimacy of digital criminal adjudication. Without a clear and enforceable legal structure, the digitalization of criminal justice in Indonesia may inadvertently compromise procedural fairness and judicial accountability.³³

Beyond regulatory gaps, technological and infrastructural limitations further hinder the seamless integration of digital criminal justice in Indonesia. The country faces significant disparities in digital access and technological literacy, particularly between urban and rural areas.³⁴ The effectiveness of virtual courtrooms and online case management systems is inherently dependent on the availability of reliable internet infrastructure, secure digital platforms, and the capacity of legal professionals to adapt to new technological modalities. Without substantial investment in digital infrastructure and capacity-building initiatives, the e-criminal justice system risks exacerbating existing inequalities in access to justice, particularly for marginalized and underserved communities.³⁵

Additionally, the implementation of e-criminal justice raises ethical and jurisprudential concerns regarding the role of technology in judicial decision-making. The increasing use of AI-driven legal analytics and automated case management systems introduces questions about the potential erosion of

³³ Anthony Garofano, "Avoiding Virtual Justice: Video-Teleconference Testimony in Federal Criminal Trials," *Catholic University Law Review* 56 (2007); Aristo Evandy A. Barlian et al., "Electronic Criminal Justice in Indonesia: Challenges and the Future Measures," *Jambura Law Review* 7, no. 1 (2025): 243–74.

³⁴ "Evaluasi Kebijakan Peradilan Elektronik (e-Court) Mahkamah Agung Republik Indonesia."

³⁵ Kozlova and Davydova, "Digital Technology in Courts as a Tool for Smart Regulation."

judicial discretion and the implications for substantive justice.³⁶ While technology can enhance procedural efficiency, it must not come at the expense of judicial independence and the right to a fair trial.³⁷ The challenge lies in designing a digital criminal justice system that preserves the essential tenets of due process while embracing the benefits of automation and technological innovation.

The Development and Implementation of E-Criminal Justice in Indonesia

One of the primary factors shaping Indonesia's digital judicial transformation is the evolving regulatory framework surrounding e-court and e-litigation. The Supreme Court Regulation No. 1 of 2019 laid the foundation for digital case management, focusing primarily on civil matters.³⁸ However, the application of digital proceedings in criminal cases remains ambiguous due to the lack of comprehensive legislative provisions explicitly governing virtual trials, electronic evidence, and remote judicial decision-making. The absence of a specific legal framework for e-criminal justice raises concerns regarding procedural legitimacy, particularly in cases where fundamental rights such as the presumption of innocence and the right to legal representation may be affected by digitalization.³⁹ Without clear legal standards, inconsistencies in judicial practice could undermine the credibility and effectiveness of digital criminal justice in Indonesia.

Beyond regulatory considerations, the technical and infrastructural readiness of Indonesia's judicial system presents significant challenges to the implementation of e-criminal justice. Despite efforts to introduce digital court platforms, disparities in technological infrastructure persist across different

³⁶ Michetti Giulio et al., "A Model of Justice as a Platform: A Case Study of Open Data Disclosure," in *Frontiers in Artificial Intelligence and Applications* (IOS Press, 2019), <https://doi.org/10.3233/FAIA190027>.

³⁷ Aliia Maralbaeva, "Evolution of E-Justice Platforms: From ICT in Courts Towards 'Digital Justice' Portal in Kyrgyzstan," *International Journal for Court Administration* 15, no. 1 (June 10, 2024): 6, <https://doi.org/10.36745/ijca.582>.

³⁸ Zulaeha, "E-Courts in Indonesia: Exploring the Opportunities and Challenges for Justice and Advancement to Judicial Efficiency."

³⁹ Barlian et al., "Electronic Criminal Justice in Indonesia: Challenges and the Future Measures."

regions.⁴⁰ Many courts, particularly those in rural and underdeveloped areas, face limited access to stable internet connections,⁴¹ secure digital databases, and adequate technological training for judicial officers.⁴² This digital divide not only hampers the uniform application of e-court systems but also raises concerns about equal access to justice, as defendants and legal practitioners in technologically disadvantaged areas may be unable to effectively participate in digital proceedings. A robust technological infrastructure, supported by state investment and strategic policymaking, is essential to ensuring that digital criminal justice does not exacerbate existing inequalities within Indonesia's legal system.⁴³

In addition to technological barriers, the institutional and professional readiness of legal actors plays a critical role in determining the success of e-criminal justice. The digitalization of court proceedings necessitates a paradigm shift in judicial and prosecutorial functions, requiring law enforcement agencies, judges, and defense attorneys to adapt to new digital tools and procedures.⁴⁴ Resistance to digital transformation among legal professionals is often rooted in concerns over the reliability of virtual hearings, the security of digital evidence, and the potential loss of procedural integrity. Moreover, the lack of standardized protocols for remote witness testimony, digital cross-examinations, and electronic case submissions complicates the effective implementation of e-criminal justice in Indonesia.⁴⁵ Addressing these

⁴⁰ Haris Dwi Saputro and Syamsul Fatoni, "Persidangan Perkara Pidana Secara Elektronik Dalam Sistem Peradilan Pidana Di Indonesia Di Masa Pandemi Covid-19," *INICIO LEGIS* 3, no. 2 (November 6, 2022): 142–61, <https://doi.org/10.21107/il.v3i2.16902>.

⁴¹ Josua Sihombing, "Kemenkominfo Catat Sejumlah Wilayah Indonesia Belum Terkoneksi Internet," *Rri.Co.Id*, 2024.

⁴² "Evaluasi Kebijakan Peradilan Elektronik (e-Court) Mahkamah Agung Republik Indonesia."

⁴³ William Sibarani, "Modern Justice: Indonesia's Supreme Court's Challenges to Uphold Fair Trial Principles Through Digitalization," *Brawijaya Law Journal* 10, no. 1 (April 30, 2023): 106–21, <https://doi.org/10.21776/ub.blj.2023.010.01.07>.

⁴⁴ "Evaluasi Kebijakan Peradilan Elektronik (e-Court) Mahkamah Agung Republik Indonesia"; Jane Donoghue, "The Rise of Digital Justice: Courtroom Technology, Public Participation and Access to Justice," *The Modern Law Review* 80, no. 6 (November 2017): 995–1025, <https://doi.org/10.1111/1468-2230.12300>; Beatriz Guerrero Guerrero, "Protection of Personal Data in the Judiciary: A New Look at the Principle of Publicity of Judicial," *Revista Chilena de Derecho y Tecnología* 9, no. 2 (December 31, 2020): 33, <https://doi.org/10.5354/0719-2584.2020.54372>.

⁴⁵ Sibarani, "Modern Justice"; Barlian et al., "Electronic Criminal Justice in Indonesia: Challenges and the Future Measures."

institutional challenges requires a comprehensive approach that includes capacity-building initiatives, judicial training programs, and regulatory clarity to ensure that legal professionals can competently navigate digital court mechanisms.

The digitalization of Indonesia's criminal justice system poses both opportunities and risks, particularly concerning the protection of core legal principles. While the integration of virtual trials and electronic case management systems aligns with global trends in judicial modernization, Indonesia's regulatory framework lacks the clarity and comprehensiveness required to safeguard due process. Critical procedural rights—such as the ability of the accused to confront witnesses, access legal counsel, and present a full defense—remain vulnerable in the absence of standardized digital protocols.⁴⁶ Moreover, the country has yet to establish rigorous mechanisms for authenticating digital evidence or securing online case files, exposing its system to potential cyber threats and evidentiary challenges. In contrast, jurisdictions like Singapore and the United Kingdom have codified clear procedural safeguards that integrate digital efficiency without compromising legal guarantees. This gap highlights Indonesia's structural weakness in reconciling technological adoption with normative legal obligations.⁴⁷

Despite these shortcomings, the Indonesian e-Court system exhibits several strengths, particularly in its early efforts to reduce judicial congestion and improve administrative efficiency through electronic filing and case tracking tools. However, the benefits of these innovations remain concentrated in civil litigation, with limited institutional penetration into criminal justice.⁴⁸

⁴⁶ Reda Manthovani, "The Enforcement of Criminal Law: Examining the Validity and Human Rights Foundation of Online Criminal Trials in Indonesia," *International Journal of Criminal Justice Sciences* 18, no. 2 (May 13, 2021): 27–39, <https://doi.org/10.5281/ZENODO.4756303>.

⁴⁷ Indriati Amarini et al., "Digital Transformation: Creating an Effective and Efficient Court in Indonesia," *Legality: Jurnal Ilmiah Hukum* 31, no. 2 (September 7, 2023): 266–84, <https://doi.org/10.22219/ljih.v31i2.28013>; Saputra, Setiodjati, and Barkhuizen, "Under-Legislation in Electronic Trials and Renewing Criminal Law Enforcement in Indonesia (Comparison with United States)."

⁴⁸ Elena Alina Onțanu, "E-Justice Governance in the Eu," in *E-Governance in the European Union*, ed. David Ramiro Troitiño, Contributions to Political Science (Cham: Springer Nature Switzerland, 2024), 243–58, https://doi.org/10.1007/978-3-031-56045-3_16; Nilay Yavuz, Naci Karkin, and Mete Yildiz, "E-Justice: A Review and Agenda for Future Research," in *Scientific Foundations of Digital Governance and Transformation*, ed. Yannis Charalabidis, Leif Skiftenes Flak, and Gabriela Viale Pereira, vol. 38, Public

Comparative experience reveals that digital transformation in criminal courts requires more than technological tools—it demands a reengineering of legal processes, supported by coherent legislation, sustained training, and a judiciary equipped to interpret and apply digital law. Singapore’s Integrated Case Management System (ICMS) exemplifies this integration, where digital tools are not only operationally efficient but also embedded within a synchronized ecosystem of courts, law enforcement, and legal professionals.⁴⁹ Indonesia’s fragmented implementation and reliance on judicial discretion without systemic support hinder scalability and legal consistency.⁵⁰

Moreover, public trust in Indonesia’s judiciary—already challenged by perceptions of inefficiency and opacity—risks further erosion if digital reforms are perceived as inaccessible or exclusionary. The lack of digital literacy among legal professionals and the public, especially outside urban centers, underscores a latent risk of reinforcing inequality under the guise of modernization. In advanced jurisdictions, digital inclusivity is actively promoted through legal aid integration, training programs, and user-centered platform design. Indonesia must move beyond technological adoption to embrace structural change—grounded in transparency, inclusivity, and human rights protection.⁵¹

To ensure a resilient and rights-based e-criminal justice system, Indonesia must adopt a multi-stakeholder strategy that combines legislative reform with infrastructural investment and institutional capacity building. International best practices offer valuable benchmarks, but their wholesale adoption is insufficient without contextual adaptation.⁵² What is needed is a deliberate recalibration of Indonesia’s digital judicial architecture—one that preserves judicial independence, promotes equal access to justice, and aligns with the

Administration and Information Technology (Cham: Springer International Publishing, 2022), 385–414, https://doi.org/10.1007/978-3-030-92945-9_15.

⁴⁹ Aaron Yoong, “Zooming into a New Age of Court Proceedings: Perspectives from the Court, Counsel and Witnesses,” *Singapore Academy of Law Practitioner*, 2020; Mahkamah Agung, “Majalah Mahkamah Agung, Media Komunikasi Mahkamah Agung Republik Indonesia,” *Majalah Mahkamah Agung*, 2018.

⁵⁰ Saputra, Setiodjati, and Barkhuizen, “Under-Legislation in Electronic Trials and Renewing Criminal Law Enforcement in Indonesia (Comparison with United States).”

⁵¹ Sibarani, “Modern Justice”; Barlian et al., “Electronic Criminal Justice in Indonesia: Challenges and the Future Measures.”

⁵² Saputra, Setiodjati, and Barkhuizen, “Under-Legislation in Electronic Trials and Renewing Criminal Law Enforcement in Indonesia (Comparison with United States)”; Amarini et al., “Digital Transformation.”

country's socio-legal realities. The transformation of criminal adjudication in the digital era must not merely be efficient—it must also be just.⁵³

Comparative Analysis of E-Criminal Justice Systems in Advanced Jurisdictions

The increasing reliance on digital technologies in judicial systems worldwide reflects a profound shift in how criminal justice is administered. As legal institutions adapt to the demands of efficiency, transparency, and accessibility, electronic court systems (e-court) have emerged as critical instruments for modernizing criminal adjudication. Several jurisdictions have successfully incorporated digital solutions to streamline judicial processes while maintaining procedural safeguards and fairness. Among these, the United States, the United Kingdom, and Singapore represent advanced legal systems that have effectively implemented e-criminal justice mechanisms. Examining their approaches provides valuable insights into the potential opportunities and challenges that Indonesia may encounter in its own journey toward judicial digitalization.

The United States, with its well-established judicial infrastructure, has been at the forefront of digitalizing court procedures. Federal and state courts have implemented various e-court innovations, including electronic filing systems, online case management tools, and virtual hearings.⁵⁴ The adoption of artificial intelligence (AI) in legal analytics further enhances decision-making processes, expediting case resolutions while preserving due process. However, the integration of digital technologies in criminal proceedings raises concerns regarding data security, digital evidence authentication, and disparities in access to technology among defendants.⁵⁵ The U.S. experience underscores the

⁵³ Barlian et al., “Electronic Criminal Justice in Indonesia: Challenges and the Future Measures.”

⁵⁴ Agustí Cerrillo I Martínez and Pere Fabra I Abat, eds., *E-Justice: Using Information Communication Technologies in the Court System* (IGI Global, 2009), <https://doi.org/10.4018/978-1-59904-998-4>; Dinesh Kumar and Ram Manohar Singh, “Exploring Court Performance and Developing Its Scale,” *International Journal for Court Administration* 13, no. 1 (April 22, 2022): 3, <https://doi.org/10.36745/ijca.399>.

⁵⁵ Laura Carrasquilla-Díaz, Alejandra De Luque-Pisciotti, and Esteban Lagos-González, “AI Adoption in Colombian Legal Practice: Challenges and Opportunities,” *Procedia Computer Science* 241 (2024): 508–13, <https://doi.org/10.1016/j.procs.2024.08.072>; Anu Thomas, “Exploring the Power of Ai-Driven Decision Making in the Judicial

necessity of robust cybersecurity measures and comprehensive legal frameworks to regulate the digital transformation of criminal justice.⁵⁶

In the United Kingdom, digital judicial reforms have been driven by a commitment to enhancing court efficiency and ensuring access to justice. The introduction of virtual courtrooms, remote witness testimonies, and AI-assisted legal research has significantly expedited case adjudication.⁵⁷ The UK's Criminal Procedure Rules have adapted to accommodate digital trials, ensuring that procedural safeguards remain intact. However, the transition to e-criminal justice has sparked debates regarding the impact of virtual hearings on judicial discretion and the right to a fair trial.⁵⁸ The UK model highlights the importance of striking a balance between technological advancement and fundamental legal protections, particularly in cases involving vulnerable defendants or complex evidentiary requirements.⁵⁹

Singapore's legal system exemplifies a seamless integration of technology into judicial administration. Recognized as a global leader in judicial efficiency, Singapore has developed a sophisticated e-court system that encompasses digital

Domain: Case Studies, Benefits, Challenges, and Solutions,” in *Advances in Media, Entertainment, and the Arts*, ed. Tien V. T. Nguyen and Nhut T. M. Vo (IGI Global, 2024), 337–51, <https://doi.org/10.4018/979-8-3693-0639-0.ch015>.

⁵⁶ Suor Orsola Benincasa University of Naples, Naples, Campania, Italy et al., “Cybersecurity and Cyberspace: An Insight into the Digital Criminal Investigative Techniques,” *Science of Law* 2024, no. 1 (2024): 1–8, <https://doi.org/10.55284/sol.v2024i1.122>.

⁵⁷ Gemma Birkett, “Gendering the Carceral Web: Public Sector Reform, Technology and Digital (in)Justice,” *Theoretical Criminology* 27, no. 3 (August 2023): 439–56, <https://doi.org/10.1177/13624806231151657>; Masood Ahmed, “Civil Justice Reforms and the Business and Property Courts of England and Wales,” in *Commercial Disputes*, by Barış Soyer, 1st ed. (London: Informa Law from Routledge, 2024), 41–58, <https://doi.org/10.4324/9781032726243-5>.

⁵⁸ Peter Hungerford-Welch, “Helping the Jury to Do Their Job,” in *Contemporary Challenges in the Jury System*, by Nicola Monaghan, 1st ed. (London: Routledge, 2024), 7–26, <https://doi.org/10.4324/9781003399452-2>.

⁵⁹ Amy Sixsmith, “Safeguarding the Procedural Rights of Young Defendants in England and Wales,” in *Neurolaw in the Courtroom*, by Hannah Wishart and Colleen M. Berryessa, 1st ed. (London: Routledge, 2023), 51–69, <https://doi.org/10.4324/9781003331056-5>; Felicity Gerry, Julia Muraszkievicz, and Olivia Iannelli, “The Drive for Virtual (Online) Courts and the Failure to Consider Obligations to Combat Human Trafficking – a Short Note of Concern on Identification, Protection and Privacy of Victims,” *Computer Law & Security Review* 34, no. 4 (August 2018): 912–19, <https://doi.org/10.1016/j.clsr.2018.06.002>.

case filing, automated scheduling, and AI-driven legal analysis.⁶⁰ The use of blockchain technology for securing court records further enhances the reliability and integrity of digital evidence. Singapore's success in e-criminal justice is attributed to its comprehensive regulatory framework, proactive judicial training programs, and investment in cutting-edge legal technology. The Singaporean model serves as a benchmark for Indonesia, demonstrating the significance of a strategic, well-coordinated approach to judicial digitalization.⁶¹

Despite these successes, the comparative analysis of e-criminal justice systems in advanced jurisdictions reveals several overarching challenges. One of the primary concerns is the potential erosion of procedural fairness in virtual criminal proceedings. The right to confront witnesses, the ability to present evidence effectively, and the perceived impartiality of digital trials are fundamental aspects that require careful consideration.⁶² Moreover, the reliance on digital platforms raises questions regarding data privacy, cybersecurity threats, and the risk of judicial over-reliance on automated decision-making tools. These challenges underscore the need for clear regulatory safeguards that ensure the ethical and legal soundness of digital judicial processes.⁶³

Another critical aspect of e-criminal justice is its impact on judicial independence and transparency. While digital tools can enhance case management efficiency, they also introduce the risk of external influence through algorithmic biases and data manipulation. The use of AI in judicial decision-making necessitates rigorous oversight to prevent discriminatory outcomes and uphold the principles of justice. Lessons from advanced

⁶⁰ Aaron Yoong, "Zooming into a New Age of Court Proceedings: Perspectives from the Court, Counsel and Witnesses," *Singapore Academy of Law Practitioner*, 2020; Contini, "Artificial Intelligence and the Transformation of Humans, Law and Technology Interactions in Judicial Proceedings."

⁶¹ Gerald Paul McAlinn et al., eds., "Echoes of Through the Looking Glass: Comparing Judicial Reforms in Singapore and India," in *Law and Development in Asia*, 0 ed. (Routledge, 2012), <https://doi.org/10.4324/9780203151129>.

⁶² Dorris De Vocht and Pauline Jacobs, "Can Remote Trials Be Fair Trials? Exploring the Potential Effects of Communication Technology in the Criminal Justice Context from an Interdisciplinary Perspective," *Tilburg Law Review* 29, no. 2 (November 7, 2024): 1–9, <https://doi.org/10.5334/tilr.383>.

⁶³ Ignacio M Soba Bracesco, "Cybersecurity and Cyberattacks on the Judiciary: A Perspective from Procedural Law," *Revista Eletronica de Direito Processual* 24, no. 3 (2023): 316–45; Marco Almada and Maria Dymitruk, "Data Protection and Judicial Automation," in *Research Handbook on EU Data Protection Law*, ed. Eleni Kosta, Ronald Leenes, and Irene Kamara (Edward Elgar Publishing, 2022), <https://doi.org/10.4337/9781800371682.00020>.

jurisdictions highlight the importance of maintaining human oversight in digital legal processes, ensuring that technology serves as a facilitator rather than a determinant of judicial outcomes.⁶⁴

Furthermore, disparities in technological access and digital literacy present significant obstacles to the equitable implementation of e-criminal justice. Socioeconomic inequalities may result in unequal access to legal representation, particularly for defendants who lack the resources to engage effectively in digital legal proceedings. Advanced jurisdictions have sought to mitigate these disparities through digital inclusion initiatives, legal aid programs, and judicial training on digital competency.⁶⁵ Indonesia must consider these factors to ensure that its digital transformation does not exacerbate existing inequalities within its criminal justice system.

The comparative analysis also underscores the role of institutional readiness in the successful adoption of e-criminal justice mechanisms. The effectiveness of digital court systems depends not only on technological infrastructure but also on the preparedness of judicial actors, including judges, prosecutors, defense attorneys, and law enforcement officials. Ongoing training, knowledge-sharing initiatives, and collaboration with technology experts are essential to fostering a judiciary that is well-equipped to navigate digital legal complexities. Advanced jurisdictions have demonstrated that sustained investment in legal education and digital skill development is crucial for the seamless integration of e-criminal justice practices.⁶⁶

For Indonesia, the lessons derived from the United States, the United Kingdom, and Singapore provide a roadmap for developing a digital criminal justice system that is both efficient and legally sound. Policymakers must prioritize the formulation of a comprehensive e-criminal justice framework that addresses regulatory gaps, safeguards procedural fairness, and promotes technological inclusivity. The implementation of secure, interoperable digital platforms that ensure transparency and accountability will be instrumental in fostering public trust in digital judicial processes.

⁶⁴ Kozlova and Davydova, “Digital Technology in Courts as a Tool for Smart Regulation.”

⁶⁵ Fanny Ramirez, “The Digital Divide in the US Criminal Justice System,” *New Media & Society* 24, no. 2 (February 2022): 514–29, <https://doi.org/10.1177/14614448211063190>.

⁶⁶ “Evaluasi Kebijakan Peradilan Elektronik (e-Court) Mahkamah Agung Republik Indonesia.”

Theoretical and Practical Implications of Digitalizing Criminal Justice in Indonesia

One of the central legal-philosophical challenges posed by e-criminal justice is the potential tension between judicial efficiency and procedural fairness. The digitalization of criminal proceedings introduces new variables that may affect the traditional balance between expediency and justice. Virtual hearings, automated case management, and AI-assisted decision-making mechanisms may expedite judicial processes, but they also risk undermining the humanistic aspects of legal adjudication. Legal philosophers have long emphasized the importance of personal engagement, oral advocacy, and the moral deliberation of judges in ensuring just outcomes. The extent to which e-criminal justice can maintain these foundational principles while embracing technological efficiency remains an open and pressing question.⁶⁷

Closely related to this concern is the ethical and human rights dimension of digital criminal trials. The right to a fair trial, enshrined in both domestic legal frameworks and international human rights instruments, requires that defendants have meaningful opportunities to present their cases, confront witnesses, and receive effective legal assistance. Virtual courtrooms, while enhancing accessibility, may diminish the interpersonal dynamics crucial to an effective defense. Non-verbal cues, courtroom atmosphere, and direct human interactions play significant roles in legal argumentation and judicial discretion. The reliance on digital platforms for criminal adjudication raises important ethical questions about whether defendants, particularly those from marginalized or technologically disadvantaged backgrounds, can effectively exercise their legal rights in a virtual environment.⁶⁸

Furthermore, the institutional restructuring necessitated by judicial digitalization must be carefully examined to prevent unintended disruptions to legal practice. Courts, prosecution offices, and law enforcement agencies must undergo fundamental transformations to accommodate digital criminal justice systems. Judges and legal practitioners must adapt to new technological realities, requiring continuous education and specialized training programs. Additionally, administrative procedures must be reconfigured to integrate

⁶⁷ Onțanu, "E-Justice Governance in the Eu."

⁶⁸ Ramirez, "The Digital Divide in the US Criminal Justice System."

digital platforms, data-sharing mechanisms, and cybersecurity protocols.⁶⁹ Comparative studies of jurisdictions such as Singapore and the United Kingdom highlight the need for well-coordinated institutional reforms to ensure that digitalization strengthens rather than destabilizes legal institutions.

Another significant implication of e-criminal justice is its impact on judicial independence and discretion. As technology increasingly influences legal decision-making, concerns have emerged regarding the role of artificial intelligence and automated legal analytics in judicial reasoning. While AI can assist in expediting legal research and identifying precedents, over-reliance on algorithmic decision-making may erode judicial discretion and the human capacity for nuanced legal interpretation. The risk of algorithmic biases further complicates this issue, as digital decision-making tools may inadvertently reinforce systemic inequities if not properly designed and regulated. Safeguarding judicial independence in a digitalized system requires the establishment of clear legal frameworks that delineate the permissible scope of technological intervention in judicial processes.⁷⁰

In addition to legal and institutional concerns, the public perception of digital justice must be carefully considered. Trust in the judiciary is a cornerstone of legal legitimacy, and the transition to digital criminal justice must be accompanied by efforts to maintain and enhance public confidence.⁷¹ Transparency measures, such as publicly accessible digital trial records and independent oversight mechanisms, are crucial in ensuring that digitalization does not compromise judicial integrity. Furthermore, effective public communication strategies must be employed to educate citizens about the benefits and safeguards of e-criminal justice to prevent misconceptions and resistance to technological innovations.⁷²

The potential economic and infrastructural disparities in digital criminal justice implementation also warrant critical scrutiny. Indonesia's diverse socio-

⁶⁹ Esther Nir and Jennifer Musial, "Zooming in: Courtrooms and Defendants' Rights During the Covid-19 Pandemic," *Social & Legal Studies* 31, no. 5 (October 2022): 725–45, <https://doi.org/10.1177/09646639221076099>.

⁷⁰ Kozlova and Davydova, "Digital Technology in Courts as a Tool for Smart Regulation."

⁷¹ Djamaludin et al., "Assessing the Impact of Electronic Court Systems on the Efficiency of Judicial Processes in the Era of Digital Transformation."

⁷² Tetiana Pikulia, Nataliia Borysocheva, and Iryna Sykhan, "Electronic Judicial Procedure as an Element of Access to Justice Regarding Protection of Rights of Individuals: Legal, Theoretical and Informational Aspects," *Revista Justiça Do Direito* 38, no. 1 (April 30, 2024): 284–301, <https://doi.org/10.5335/rjd.v38i1.15350>.

economic landscape means that access to digital legal services may be unevenly distributed, disadvantaging individuals in rural or underdeveloped regions. The cost of technology adoption, including secure online platforms, data protection measures, and AI-driven case management systems, poses a significant financial challenge.⁷³ Policymakers must ensure that investments in digital judicial infrastructure do not exacerbate existing inequalities in access to justice. Equitable distribution of technological resources, coupled with legal aid initiatives, is essential to preventing the emergence of a two-tiered justice system where digitalization benefits only the privileged few.

Moreover, the intersection between digitalization and legal culture must not be overlooked. The effectiveness of e-criminal justice depends not only on technological infrastructure but also on the willingness of legal actors to embrace digital transformation. Traditional legal cultures, particularly those emphasizing hierarchical judicial authority and in-person court proceedings, may resist rapid digitalization.⁷⁴ Comparative experiences suggest that successful digital judicial reforms require gradual implementation, stakeholder engagement, and tailored strategies that align with existing legal traditions. Indonesia must therefore navigate its digital transition in a manner that respects its unique legal culture while integrating global best practices in e-criminal justice.

The long-term sustainability of digital criminal justice reforms depends on ongoing evaluation and adaptation. The digitalization of legal systems is not a one-time transformation but a continuous process requiring periodic assessments, technological updates, and legal refinements. Regulatory bodies must establish mechanisms for monitoring and evaluating the effectiveness of digital criminal justice initiatives, incorporating feedback from legal practitioners, defendants, and civil society organizations. Flexibility in regulatory design, combined with an openness to emerging technological innovations, will be essential in ensuring that e-criminal justice remains responsive to evolving legal and societal needs.

⁷³ I Gede Nyoman Mindra Jaya et al., “Framework for Monitoring the Spatiotemporal Distribution and Clustering of the Digital Society Index of Indonesia,” *Sustainability* 16, no. 24 (December 22, 2024): 11258, <https://doi.org/10.3390/su162411258>.

⁷⁴ Lauren Joy Jones and Ashley Pearson, “The Use of Technology by Gold Coast Legal Practitioners,” *Law, Technology and Humans* 2, no. 1 (January 31, 2020): 57–74, <https://doi.org/10.5204/lthj.v2i1.1304>; Salvatore Caserta and Mikael Rask Madsen, “The Legal Profession in the Era of Digital Capitalism: Disruption or New Dawn?,” *Laws* 8, no. 1 (January 4, 2019): 1, <https://doi.org/10.3390/laws8010001>.

Strategic Recommendations for Strengthening Indonesia's E-Criminal Justice System

The digital transformation of criminal justice in Indonesia requires a well-structured and comprehensive strategy to ensure that technological advancements do not compromise fundamental legal principles. While digitalization offers significant potential for enhancing efficiency, transparency, and accessibility, its successful implementation depends on the establishment of a clear and robust regulatory framework.⁷⁵ A fragmented or inconsistent approach to e-criminal justice risks creating procedural uncertainties, undermining judicial integrity, and exacerbating disparities in access to legal resources. Therefore, a set of strategic recommendations must be developed to address the legal, technological, institutional, and ethical challenges associated with Indonesia's transition to a digital criminal justice system.

A primary recommendation is the formulation of a comprehensive regulatory framework that explicitly governs digital criminal proceedings. Indonesia's current legal framework lacks specific provisions addressing the procedural and evidentiary aspects of digital trials, leading to ambiguities in their implementation. Lessons from advanced jurisdictions such as the United Kingdom and Singapore emphasize the importance of enacting specialized legislation that defines the legal validity of electronic evidence, the procedural requirements for virtual hearings, and the mechanisms for ensuring due process in a digital courtroom. The adoption of clear and enforceable regulations will provide legal certainty and prevent inconsistencies in judicial practice across different courts and jurisdictions.

Another crucial strategy is the implementation of secure and interoperable technological platforms to facilitate digital criminal adjudication. Digitalization should not merely involve the transition from paper-based to electronic documentation but should also incorporate advanced case management systems, secure video conferencing technologies, and blockchain-based evidence authentication mechanisms.⁷⁶ Cybersecurity must be prioritized to prevent data breaches, unauthorized access to sensitive legal documents, and digital manipulation of trial records. A national e-criminal justice infrastructure, developed in collaboration with technology experts and legal professionals, will

⁷⁵ Saputra, Setiodjati, and Barkhuizen, "Under-Legislation in Electronic Trials and Renewing Criminal Law Enforcement in Indonesia (Comparison with United States)."

⁷⁶ Ratul, Mollajafari, and Wynn, "Managing Digital Evidence in Cybercrime."

enhance the reliability and security of digital legal proceedings while ensuring compliance with international best practices.

The success of e-criminal justice also depends on capacity-building initiatives for legal professionals involved in the judicial process. Judges, prosecutors, defense attorneys, and law enforcement officials must be equipped with the necessary digital competencies to effectively navigate online legal platforms, assess digital evidence, and safeguard procedural fairness in virtual trials.⁷⁷ Training programs should be integrated into legal education curricula and judicial training institutions to ensure that future legal practitioners possess the technical skills required to operate in a digital judicial environment. Furthermore, continuous professional development programs should be introduced to keep legal professionals updated on emerging trends in legal technology and cyber law.

Ensuring public accessibility and digital inclusivity is another key consideration in the development of e-criminal justice in Indonesia. While digital courts can enhance accessibility for many litigants, they may also create new barriers for individuals with limited digital literacy or inadequate access to technology. A digital divide between urban and rural areas could lead to inequalities in legal representation and due process rights. To mitigate this risk, the government should establish digital legal aid centers, provide financial assistance for indigent defendants requiring technological support, and implement user-friendly digital platforms that cater to individuals with disabilities. By adopting an inclusive approach to judicial digitalization, Indonesia can ensure that technological advancements do not disproportionately disadvantage vulnerable populations.

Additionally, strengthening judicial oversight and accountability mechanisms is essential to maintaining public trust in digital criminal justice. Digitalization should not compromise judicial transparency, and adequate safeguards must be put in place to monitor the fairness and impartiality of virtual court proceedings. The establishment of independent oversight bodies, digital case auditing mechanisms, and AI-assisted bias detection tools can enhance the credibility of digital legal adjudication. Furthermore, public access to court records and trial transcripts should be facilitated through secure online portals to promote judicial accountability while maintaining appropriate confidentiality protections for sensitive cases.

⁷⁷ “Evaluasi Kebijakan Peradilan Elektronik (e-Court) Mahkamah Agung Republik Indonesia.”

The government must also focus on developing adaptive public policies and infrastructure to support the long-term sustainability of digital criminal justice initiatives. Digital transformation should be integrated into broader judicial reform strategies, ensuring that legal, technological, and institutional reforms are aligned with national development goals.⁷⁸ Investments in digital judicial infrastructure, including high-speed internet access, cloud-based legal databases, and AI-driven case analytics, should be prioritized to enhance the efficiency and accuracy of criminal justice processes. Cross-sectoral collaboration between government agencies, academic institutions, and private sector technology providers can further accelerate Indonesia's progress toward a fully digitalized judicial system.

Adapting best practices from international models will provide valuable insights for optimizing Indonesia's e-criminal justice framework. The experiences of jurisdictions that have successfully implemented digital courts demonstrate the importance of regulatory coherence, technological standardization, and institutional adaptability. However, rather than directly replicating foreign models, Indonesia must tailor digital judicial reforms to its unique legal culture, socio-political context, and infrastructural realities. By adopting a pragmatic and context-sensitive approach to digital transformation, Indonesia can create a sustainable e-criminal justice system that upholds judicial integrity, protects defendants' rights, and enhances public confidence in the legal system.

Conclusion

Indonesia's pursuit of digital transformation in criminal justice offers a path toward greater efficiency and transparency, yet it is impeded by fragmented regulation, uneven infrastructure, and procedural ambiguity. This study confirms that without a unified legal framework and coordinated institutional support, the promise of e-criminal justice remains underrealized and vulnerable to risks such as cybersecurity breaches and procedural injustice.

To address these issues, Indonesia should enact dedicated legislation that governs all aspects of digital criminal proceedings, including standards for virtual trials, digital evidence authentication, and procedural safeguards. A

⁷⁸ Barlian et al., "Electronic Criminal Justice in Indonesia: Challenges and the Future Measures."

national blueprint for digital justice is needed—one that mandates cross-sector coordination among the judiciary, Ministry of Law and Human Rights, and ICT regulators. Investments must be channeled toward building a secure, interoperable digital platform and providing continuous training for judicial actors. To ensure equity, the state should develop digital legal aid centers in underserved areas and require that any court technology be tested for accessibility and usability. Future research should evaluate the effectiveness of these reforms, particularly the integration of AI in decision support systems and its implications for judicial independence. A successful transition will depend not on technology alone, but on embedding that technology within a legal culture that prioritizes fairness and public trust.

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