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The Adaptability of the Indonesian Judiciary in the Era of Law and Technology Disruption

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Abstract

Legal disruption has been reported to significantly change judicial practice. Therefore, this study aims to explore 2 problem topics, namely 1) how the era of legal and technological disruption affects the profession of judges in carrying out their duties as case deciders, and 2) how is the adaptability of judges in Indonesia in facing the era of legal disruption to ensure their role and function remain relevant. The study procedures were carried out using the normative-empirical legal method, where secondary data were obtained using literature studies. Subsequently, data were enriched with empirical data obtained through field studies. The results showed Artificial

Intelligence (AI) and Big Data could be integrated into the judicial system as a transformative solution due to the limited number of judges in Indonesia. The integration was expected to improve the efficiency, consistency, and unity of law enforcement. The profession of judges was required to carry out a transformation that was not only technical but also philosophical. In addition, the Supreme Court Technical Education and Training Center was expected to create an ecosystem where technology could be used as an instrument to improve the quality of Indonesian judges decisions. This could be achieved through hybrid curriculum strategies, inclusive infrastructure, and adaptive regulations.

KEYWORDS *Legal Disruption, Judicial Reform, AI, Machine learning and Big Data*

Introduction

In recent decades, the world has witnessed a technological revolution that has transformed almost every aspect of human life, including the legal field. Rapid technological developments have caused inevitable changes in the judicial system, specifically in the role of judges. For example, the use of Artificial Intelligence (AI) in the judicial process has helped judges analyze complex legal data, predict case outcomes, and formulate verdicts.[1] However, behind the convenience offered, technology also raises serious concerns. AI algorithms have the potential to cause undetected biases, which can influence the decisions of judges and undermine the principles of justice.[2] In addition, the integration of technology blurs the line between decisions made by humans and machines, raising critical questions about accountability and transparency in the judicial process.[3]

The era of technological disruption, marked by the emergence of AI, *big data, blockchain*, and other innovations, has created a new

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[1] Natali Helberger, "The Rise of Technology Courts, or: How Technology Companies Re-Invent Adjudication for a Digital World," *Computer Law & Security Review* 56 (2025): 106118, https://doi.org/https://doi.org/10.1016/j.clsr.2025.106118.

[2] Beliña Annery Herrera-Tapias et al., "Algorithmic Discrimination and Explainable Artificial Intelligence in the Judiciary: A Case Study of the Constitutional Court of Colombia," *Procedia Computer Science* 257 (2025): 1227–32, https://doi.org/https://doi.org/10.1016/j.procs.2025.03.164.

[3] Aurelia Tamò-Larrieux, "Decision-Making by Machines: Is the 'Law of Everything' Enough?," *Computer Law & Security Review* 41 (2021): 105541, https://doi.org/https://doi.org/10.1016/j.clsr.2021.105541.

paradigm in the judicial system. Judges, who for centuries have been the guardians of justice and interpreters of law, are now faced with unprecedented challenges.[4] Technology has not only changed the way judges access information and analyze evidence, but also the way the community views the role and function of the judiciary.[5] Amid these changes, a fundamental question arises; how can the judicial profession maintain its relevance amidst legal and technological disruption?.

In Indonesia, the Supreme Court of Indonesia (MA) is facing challenges while struggling with the limited number of judges and a very high caseload. In 2024, Indonesia had approximately 8,000 judges, with only 7,127 judges carrying out technical judicial functions. Compared to the country's population of more than 270 million people, the ratio of judges to the population is 1:37,884, a figure far below the ideal ratio recommended by international standards.[6] This imbalance has led to a backlog of cases that are delayed due to the limited number of professionals in Indonesian courts. The pressures faced by judges are enormous, and technology integration offers both opportunities and challenges in addressing these issues.

According to previous studies, technological tools, such as *e-court* systems, AI-based legal study platforms, and case management software have the potential to streamline the judicial process, reduce delays, and improve the accuracy of legal decisions.[7] For example, the Supreme Court of Indonesia has implemented an *e-court* system since 2018, which allows for electronic case registration, virtual trials, and digital case tracking.[8] This system has significantly reduced the time required to resolve cases in some jurisdictions, specifically during the COVID-19

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[4] Wonkyoung Seo and Youngcheol Kang, "AI Model for Analyzing Construction Litigation Precedents to Support Decision-Making," *Automation in Construction* 168 (2024): 105824, https://doi.org/https://doi.org/10.1016/j.autcon.2024.105824.

[5] Straton Papagianneas and Nino Junius, "Fairness and Justice through Automation in China's Smart Courts," *Computer Law & Security Review* 51 (2023): 105897, https://doi.org/https://doi.org/10.1016/j.clsr.2023.105897.

[6] "Laporan Tahunan Mahkamah Agung RI 2024" (Jakarta, 2024), https://kepaniteraan.mahkamahagung.go.id/publikasi/laporan-tahunan.

[7] Helberger, "The Rise of Technology Courts, or: How Technology Companies Re -Invent Adjudication for a Digital World."

[8] Mochammad Tanzil Multazam and Aan Eko Widiarto, "Digitalization of the Legal System: Opportunities and Challenges for Indonesia," *Rechtsidee* 11, no. 2 (2023): 10–21070.

pandemic, when physical attendance at court was restricted.[9] In addition, AI tools can assist judges in analyzing large amounts of legal data, identifying relevant precedents, and detecting inconsistencies in legal arguments, leading to improvement in the quality of judicial decisions.[10]

The adoption of technology in the judiciary faces several challenges due to various factors. Many judges in Indonesia lack the technical skills and training necessary to use these tools effectively, creating resistance to their implementation.[11] In addition, reliance on technology raises ethical and philosophical questions about the role of judges in the judicial process. For example, how can these professionals ensure that their decisions remain fair and impartial when relying on AI algorithms that may contain hidden biases?[12] The concerns are particularly relevant in Indonesia, where legal system is still developing and public trust in the judiciary is not yet well established.[13]

The philosophical implications of technological disruption are equally important. Judges, as guardians of justice, must balance the need to uphold established legal principles with the demands to innovate and adapt. For example, while technology can increase efficiency, it also risks reducing the human element in judicial decision-making, which is critical to understanding the nuances of individual cases and ensuring justice is served. This tension is particularly evident in Indonesia, where cultural and social contexts often require judges to consider factors beyond the letter of law, such as community norms and values.

Several studies have explored the intersection of technology and justice, providing valuable insights into the challenges and opportunities facing judges in the digital age. Susskind reported the

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[9] Ridwan Arifin et al., "Unveiling Indonesia's Migration and Border Governance: Challenges and Imperatives Post-Pandemic," *Social Sciences & Humanities Open* 10 (2024): 101202, https://doi.org/https://doi.org/10.1016/j.ssaho.2024.101202.

[10] Seo and Kang, "AI Model for Analyzing Construction Litigation Precedents to Support Decision-Making."

[11] Multazam and Widiarto, "Digitalization of the Legal System: Opportunities and Challenges for Indonesia."

[12] Herrera-Tapias et al., "Algorithmic Discrimination and Explainable Artificial Intelligence in the Judiciary: A Case Study of the Constitutional Court of Colombia."

[13] Kashif Javed and Jianxin Li, "Artificial Intelligence in Judicial Adjudication: Semantic Biasness Classification and Identification in Legal Judgement (SBCILJ)," *Heliyon* 10, no. 9 (2024): e30184, https://doi.org/https://doi.org/10.1016/j.heliyon.2024.e30184.

transformative potential of AI in legal sector but also the risks associated with over-reliance on automated systems.[14] Similarly, Herrera (2025) emphasized the need for transparency and accountability in algorithmic decision-making to prevent bias and ensure fairness.[15] Zarsky (2018) argued that while technology could improve judicial efficiency, it also raised ethical concerns about the dehumanization of justice.[16] In the Indonesian context, Multazam (2023) examined the readiness of Indonesian judges to adopt technological tools, reporting significant gaps in technical knowledge and training.[17] Meanwhile, Widodo (2022) explored the philosophical implications of technology integration in the judicial process, emphasizing the need to balance innovation with the preservation of legal principles.[18]

Studies related to the adaptation of technology in the judicial system continue to be carried out, but often only focus on certain aspects, such as the technical implementation of AI or the ethical implications of algorithmic decision-making. Consequently, there is a lack of comprehensive studies that address the broader question of how judges can adapt to the multidimensional challenges posed by legal and technological disruption, specifically in the context of Indonesia's unique judicial landscape. The current study aims to fill this gap by examining the adaptability of the judicial profession in Indonesia in the current era of disruption. By combining insights from previous studies and filling in the gaps, a holistic understanding of the issue can be provided, offering practical recommendations to improve the adaptability of judicial institutions.[19]

The urgency of this study lies in the speed of technological change and its profound impact on the judicial system. As

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[14] Richard Susskind, *Online Courts and the Future of Justice* (Oxford University Press, 2019).

[15] Herrera-Tapias et al., "Algorithmic Discrimination and Explainable Artificial Intelligence in the Judiciary: A Case Study of the Constitutional Court of Colombia."

[16] Tal Zarsky, "The Trouble with Algorithmic Decisions: An Analytic Road Map to Examine Efficiency and Fairness in Automated and Opaque Decision Making," *Science, Technology, & Human Values* 41, no. 1 (2016): 118–32.

[17] Multazam and Widiarto, "Digitalization of the Legal System: Opportunities and Challenges for Indonesia."

[18] Widodo Dwi Putro, "Disrupsi Dan Masa Depan Profesi Hukum," *Mimbar Hukum-Fakultas Hukum Universitas Gadjah Mada* 32, no. 1 (2020): 19–29.

[19] Hari Sutra Disemadi, "Urgensi Regulasi Khusus Dan Pemanfaatan Artificial Intelligence Dalam Mewujudkan Perlindungan Data Pribadi Di Indonesia," *Jurnal Wawasan Yuridika* 5, no. 2 (2021): 177–99.

technology continues to develop, the ability of judges to adapt determines the effectiveness and legitimacy of the judiciary to the public. The current study explores 2 problems, namely 1) how the era of legal and technological disruption affects the profession of judges in carrying out their duties as case deciders, and 2) how is the adaptability of judges in Indonesia in facing the era of legal disruption to ensure their role and function remain relevant.

The results are not only important for Indonesia but also for other countries facing similar challenges, as it provides a global perspective on the intersection of law, technology, and justice. The current study was carried out to ensure that the principles of fairness, justice, and accountability remain at the heart of the judicial process, even as technology changes the way justice is delivered.

Method

This articleuses characteristics and approaches commonly employed in socio-legal research techniques. The choice of this technique aligns with the study's objectives, where the resulting analysis is expected not only to benefit from a purely juridical perspective but also provide a comprehensive understanding of the social foundations that underlie these legal institutions. Researchers used a number of approaches to explore and provide an analysis of these legal issues. The approach used includes a conceptual approach, statutory approach, historical approach, and comparative approach. In accordance with the aims and objectives, the researchers indicate that in contrast to legal research in general, the statutory approach here only functions as a complementary approach that supports other approaches. The main data used is secondary data obtained by literature study. Meanwhile, to support the data analysis, a field study was carried out using interview techniques where the data that had been obtained was analyzed using descriptive-analytical techniques

Result & Discussion

In the era of technological disruption, justice systems in various countries faced new challenges and opportunities in using AI and *big data*. These technologies offer the potential to improve efficiency, consistency, and transparency in the judicial process. However, their use also raised serious concerns regarding algorithmic bias, accountability, and fairness.[2] In the United States, AI systems such as COMPAS (*Correctional Offender Management*

Profiling for Alternative Sanctions) were used to predict the risk of a defendant re-offending.[20] In the UK, *predictive justice* technology was applied to analyze previous court decisions to predict the outcome of similar cases. China was one of the leading countries in Asia that was developing big data, blockchain, and AI systems in its justice system through the "Smart Justice" program.[21] In Indonesia, although the adoption of this technology was still in its early stages, the Supreme Court had begun exploring the use of AI and big data to improve efficiency and consistency in decision-making.

A. Technological Innovation and Legal Disruption

Legal disruption refered to fundamental changes in legal system caused by technological innovation, which disrupted traditional practices and created new paradigms in law enforcement and implementation.[22] This disruption was not only technical, but also philosophical, as it touched on fundamental principles such as fairness, transparency, and accountability. Technological innovations, such as AI, *big data*, and *blockchain*, had changed the way law was understood, applied, and accessed by the community.[23] For example, AI could analyze legal data in seconds, while *blockchain* offered a transparent and secure record-keeping system.[24] However, this disruption also posed challenges, such as how to ensure that technology was used fairly and did not undermine established legal principles.[25]

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[20] Nimisha Singh, Amita Kapoor, and Neha Soni, "A Sociotechnical Perspective for Explicit Unfairness Mitigation Techniques for Algorithm Fairness," *International Journal of Information Management Data Insights* 4, no. 2 (2024): 100259, https://doi.org/https://doi.org/10.1016/j.jjimei.2024.100259.

[21] Wanqiang Wu and Xifen Lin, "Access to Technology, Access to Justice: China's Artificial Intelligence Application in Criminal Proceedings," *International Journal of Law, Crime and Justice* 81 (2025): 100741, https://doi.org/https://doi.org/10.1016/j.ijlcj.2025.100741.

[22] Helberger, "The Rise of Technology Courts, or: How Technology Companies Re-Invent Adjudication for a Digital World."

[23] Seyhan Selçuk, Nesibe Kurt Konca, and Serkan Kaya, "AI-Driven Civil Litigation: Navigating the Right to a Fair Trial," *Computer Law & Security Review* 57 (2025): 106136, https://doi.org/https://doi.org/10.1016/j.clsr.2025.106136.

[24] Ric Simmons, "Big Data, Machine Judges, and the Legitimacy of the Criminal Justice System," *UC Davis L. Rev.* 52 (2018): 1067.

[25] Seena Fazel et al., "The Predictive Performance of Criminal Risk Assessment Tools Used at Sentencing: Systematic Review of Validation Studies," *Journal of Criminal Justice* 81 (2022): 101902, https://doi.org/https://doi.org/10.1016/j.jcrimjus.2022.101902.

Technological innovations were disrupting law by changing the way legal information was accessed, analyzed, and applied.[26] AI, for example, had enabled judges to analyze complex legal data quickly and accurately.[27] Tools such as *predictive justice* used algorithms to analyze previous court decisions and predicted the outcome of similar cases. However, such developments could increase efficiency and consistency in decision-making, but on the other hand, raised concerns about issues of transparency and the dehumanization of justice.[28] *Big data* technology allowed judges to access vast legal *databases*, which could help to quickly find relevant legal precedents. This also raised new challenges, such as how to ensure that the information used was accurate and unbiased.[29]

B. Impact of Legal Disruption on Judicial Practice

Legal disruption had significantly changed judicial practice. One of the most obvious impacts of the era of disruption was the increasing use of technology in the judicial process.[30] This condition has made the role and function of Judges, who were traditionally seen as interpreters and guardians of law, now face new challenges that required rapid adaptation to changes in technology and law.[31]

For example, cases involving personal data violations or cybercrimes required special knowledge of how technology works. However, not all judges had sufficient technical backgrounds to understand the complexity of these types of cases. The use of AI and *big data*-based analysis had also been used to help judges

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[26] Bart Custers, "A Fair Trial in Complex Technology Cases: Why Courts and Judges Need a Basic Understanding of Complex Technologies," *Computer Law & Security Review* 52 (2024): 105935, https://doi.org/https://doi.org/10.1016/j.clsr.2024.105935.

[27] Xiang Zhou et al., "Unlocking Authentic Judicial Reasoning: A Template-Based Legal Information Generation Framework for Judicial Views," *Knowledge-Based Systems* 301 (2024): 112232, https://doi.org/https://doi.org/10.1016/j.knosys.2024.112232.

[28] Zouhaier Nouri, Walid Ben Salah, and Nayel AlOmran, "Artificial Intelligence and Administrative Justice: An Analysis of Predictive Justice in France," *Hasanuddin Law Review* 10, no. 2 (2024): 119–43.

[29] Herrera-Tapias et al., "Algorithmic Discrimination and Explainable Artificial Intelligence in the Judiciary: A Case Study of the Constitutional Court of Colombia."

[30] Helberger, "The Rise of Technology Courts, or: How Technology Companies Re-Invent Adjudication for a Digital World."

[31] Putro, "Disrupsi Dan Masa Depan Profesi Hukum."

analyze legal data, predict case outcomes, and even formulate decisions.[32]

In developed countries, the use of technology in the judicial process had become commonplace.[33] For example, in the United States, AI systems such as COMPAS (*Correctional Offender Management Profiling for Alternative Sanctions*) were used to predict a defendant's risk of reoffending.[34] This tool helped judges determine appropriate sentences. However, the use of AI had also been controversial, with studies suggesting that the COMPAS algorithm tended to be biased against minority groups, particularly African Americans.[35] This suggested that while technology could improve efficiency, it also had the potential to undermine principles of justice when not used carefully.

In the United Kingdom, big data technology was used to analyze previous court decisions to predict the outcome of similar cases.[36] This system, known as *predictive justice*, was thought to improve consistency in decision-making. However, concerns remained about transparency and accountability, specifically since the algorithms used were often not publicly available.[37]

The application of AI in judicial practice in Indonesia was still relatively limited. However, in line with the judicial blueprint masterplan, the Supreme Court was aware of the potential for the application of information technology to facilitate judicial administration, the development of a decision database, and to prevent the potential for moral hazard in the case administration process. This could be seen from the development of the Court Information System, starting from the Case Information and Tracking System (SIPP) as database of case information at the Supreme Court. Likewise, the development of electronic trial

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[32] Javed and Li, "Artificial Intelligence in Judicial Adjudication: Semantic Biasness Classification and Identification in Legal Judgement (SBCILJ)."

[33] Katia Cristina Antunes Silva, "What Would Karl Popper Say about Jurimetrics? Law Theory," *Beijing Law Review* 16, no. 1 (2025): 107–32.

[34] Joshua Song, "Formalizing Fairness: Statistical Measures of Parity for Recidivism Prediction Instruments," *Michigan Technology Law Review* 30, no. 2 (2024): 2.

[35] Rahulrajan Karthikeyan, Chieh Yi, and Moses Boudourides, "Criminal Justice in the Age of AI: Addressing Bias in Predictive Algorithms Used by Courts," in *The Ethics Gap in the Engineering of the Future: Moral Challenges for the Technology of Tomorrow* (Emerald Publishing Limited, 2024), 27–50.

[36] Andrew D. Murray, Information Technology Law: The Law and Society (Oxford: Oxford University Press, 2019), 89.

[37] Herrera-Tapias et al., "Algorithmic Discrimination and Explainable Artificial Intelligence in the Judiciary: A Case Study of the Constitutional Court of Colombia."

infrastructure through the e-Court system[38] for civil cases and e-Berpadu for criminal cases.[39] The Supreme Court had also begun exploring the use of AI in the appointment of panels of judges. This system was designed to ensure that the appointment of judges was carried out fairly and transparently, taking into account various factors such as experience, expertise, and workload. By using these algorithms, the Supreme Court could optimize the appointment of panels of judges. However, the workload could be distributed evenly, and complex cases could be handled by judges who had the appropriate expertise.

C. Potential Utilization of AI and Big Data in Judicial Practices in Indonesia

The judicial system in Indonesia faced multidimensional challenges, ranging from a limited number of judges, generation gaps, to disparities in decisions. Data from the Supreme Court (2024), for example, showed that the number of District Court judges, in this case the First Instance Court in Indonesia, was only 3,324, hence, taking into account the total population of Indonesia. Furthermore, the ratio of First Instance Court judges per capita in Indonesia was 1:83,746, a figure far below the international standard (1:10,000).[40] On average, each District Court judge in Indonesia must complete 2,204 caseloads, and the same thing happened in the Religious Courts. The severe shortage of judges due to obstacles in recruiting judges had put enormous pressure and caseloads, specifically on the First Instance Courts in Indonesia, the District Courts, and Religious Courts spread throughout Indonesia. The gap in the number of judges and workload could be seen based on data presented in Table 1 below.

TABLE 1. Judges' Caseload Ratio in Indonesia

No.	Caseload	General Courts	Religious Courts	Military Court	State Administrative Courts	Tax Court	Total
1	Caseload at the	2,369,064	616,859	2,704	3,120		2,991,747

[38] Diva Pitaloka, "E-Court: A Digital Disruption in Law Enforcement and Its Impact on Judicial Efficiency in Indonesia," *Ex Aequo Et Bono Journal Of Law* 2, no. 2 (2025): 82–95.
[39] Multazam and Widiarto, "Digitalization of the Legal System: Opportunities and Challenges for Indonesia."
[40] "Laporan Tahunan Mahkamah Agung RI 2024."

	First Instance Level						
	Number of Judges	3,224	2,180	140	259		5,803
	Ratio of Judges to Caseload	1:735	1:283	1:19	1:12		1:516
	Average Caseload of Each Judge	2,204	849	58	36		1,547
2	Caseload at the Appellate Level	28,465	2,668	468	1,507	25,097	58,205
	Number of Judges	698	421	28	59	73	1,279
	Ratio of Judges to Caseload	1:41	1:6	1:17	1:26	1:344	1:46
	Average of Caseload of Each Judge	122	19	50	77	1,031	137

Source: Supreme Court of Indonesia Annual Report 2024[41]

The shortage of judges and judicial technical personnel could cause derivative problems, specifically regarding the credibility of judicial institutions in Indonesia. This problem could be seen from the aspect of disparity in court decisions, for example, in corruption and narcotics cases, which could be decided with different decisions even though the cases were the same.[42] Furthermore, no less importantly, with such a large caseload, most judges in Indonesia were still burdened with administrative tasks that were less relevant to their main duties and functions as judges who decide cases. In this context, the integration of AI and Big Data offered transformative solutions to improve efficiency, consistency, and legal unity.[43] In the following description, the author tried to

[41] "Laporan Tahunan Mahkamah Agung RI 2024."

[42] Nimerodi Gulo, "Disparitas Dalam Penjatuhan Pidana," *Masalah-Masalah Hukum* 47, no. 3 (2018): 215–27.

[43] Beliña Annery Herrera-Tapias and Diego Hernández Guzmán, "Legal Hallucinations and the Adoption of Artificial Intelligence in the Judiciary,"

explain the reason why the potential use of technology could overcome the workload of judges by considering structural challenges and the need for judicial reform. The ability of judges to adapt could determine the effectiveness and legitimacy of the judiciary in the eyes of the public.

D. Addressing the Judge Deficit through Process Automation and Efficiency

The limited number of judges in Indonesia was not only a matter of quantity, but also an unbalanced workload. Supreme Court data (2024) showed that each judge at the First Instance Court in Indonesia handled an average of 1,547 cases per year, with the ratio of the number of judges to the number of cases being 1:516.[44] This figure was far above the ideal maximum capacity of the caseload of judges recommended by the Judicial Commission of Indonesia (KY RI), which was 150 cases/year. As a comparison, in the People's Republic of China (PRC)[45], the workload of first instance courts judged average 263 cases per year, while in Germany, the workload of civil judges was only 200-300 cases per year.[46] This gap was exacerbated by administrative tasks that took up 40–60% of a judge's time, such as preparing minutes, scheduling hearings, and verifying documents.[47]

In Indonesia, although the e-Court and e-Litigation systems were adopted since 2018, the level of automation was still limited to digital document delivery[48], without AI integration.[49] A UNDP study (2022) showed that full automation could reduce the processing time of civil cases in Indonesia from an average of 180 days to 90 days.[50] Suryanto's study (2021) showed that automation of

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Procedia Computer Science 257 (2025): 1184–89, https://doi.org/https://doi.org/10.1016/j.procs.2025.03.158.

[44] "Supreme Court of the Republic of Indonesia Annual Report 2024."

[45] Supreme People's Court of China, "Work Report of The Supreme People's Court," 2023.

[46] European Commission, "THE 2024 EU Justice Scoreboard" (Luxembourg, 2024).

[47] A. Wijayanti, "Beban Administratif Hakim Dalam Proses Peradilan Di Indonesia," *Jurnal Hukum & Pembangunan* 49, no. 2 (2021): 215–30.

[48] 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 (2023): 183–94.

[49] Fatin Hamamah, "E-Litigasi Dalam Mewujudkan Asas Peradilan Sederhana, Cepat Dan Biaya Ringan," *Mahkamah: Jurnal Kajian Hukum Islam* 7, no. 2 (2022): 236–46.

[50] Paweł Marcin Nowotko, "AI in Judicial Application of Law and the Right to a

administrative processes could reduce the time to resolve civil cases by up to 35%. A concrete example could be seen at the Central Jakarta District Court, where a pilot project for trial scheduling automation with AI in 2021 succeeded in increasing trial time efficiency from 180 days to only 120 days.[51]

Courts in other countries had shown that AI-based automation could reduce administrative burden by up to 70% compared to conventional approaches.[52] This could reduce administrative burden by automating repetitive tasks such as document analysis, trial scheduling, and deadline tracking. A real-world example was the "ROSS Intelligence" system in the US, which used Natural Language Processing (NLP) to summarize legal documents, identify key arguments, and recommend relevant articles.[53] The implementation of ROSS in the New York District Court reduced case preparation time from 20 hours to 5 hours per case. In Brazil, the "PJe" (Processo Judicial Eletrônico) system automated 80% of civil court administrative tasks, allowing judges to focus on analyzing legal substance. As a result, case resolution time was reduced from 5 years (2015) to 1.8 years (2022).[54]

AI could be used to assist in case management in the Courts,[55] and based on predictive analytics, could optimize the allocation of judges and case priorities. In India, the Supreme Court of India launched the "SUPACE" (Supreme Court Portal for Assisting Court

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Court," *Procedia Computer Science* 192 (2021): 2220–28, https://doi.org/https://doi.org/10.1016/j.procs.2021.08.235.

[51] A. W Fernando, Z. J., & Anditya, "AI on The Bench: The Future of Judicial Systems in The Age of Artificial Intelligence," *Jurnal Hukum Dan Peradilan* 13, no. 3 (2024): 523–50.

[52] Weslei Gomes de Sousa et al., "Artificial Intelligence and Speedy Trial in the Judiciary: Myth, Reality or Need? A Case Study in the Brazilian Supreme Court (STF)," *Government Information Quarterly* 39, no. 1 (2022): 101660, https://doi.org/https://doi.org/10.1016/j.giq.2021.101660.

[53] S Yassine, M Esghir, and O Ibrihich, "ScienceDirect ScienceDirect Using Artificial Intelligence Tools in the Judicial Domain and the Using Artificial Intelligence Tools in the Judicial Domain and the Evaluation of Their Impact on the Prediction of Judgments Evaluation of Their Impact on the Prediction of Judgments," *Procedia Computer Science* 220 (2023): 1021–26, https://doi.org/10.1016/j.procs.2023.03.142.

[54] Caio Castelliano, Peter Grajzl, and Eduardo Watanabe, "Does Electronic Case-Processing Enhance Court Efficacy? New Quantitative Evidence," *Government Information Quarterly* 40, no. 4 (2023): 101861, https://doi.org/https://doi.org/10.1016/j.giq.2023.101861.

[55] Taoufiq El Moussaoui, Chakir Loqman, and Jaouad Boumhidi, "Decoding Legal Processes: AI-Driven System to Streamline Processing of the Criminal Records in Moroccan Courts," *Intelligent Systems with Applications* 25 (2025): 200487, https://doi.org/https://doi.org/10.1016/j.iswa.2025.200487.

Efficiency) system in 2021 that used AI to predict case duration based on case complexity and judge availability. As a result, the backlog in India's high courts dropped by 22% in 18 months.[56] In Indonesia, similar algorithms could be applied to address the disparity in workload between courts. For example, Supreme Court data (2023) showed that judges at the East Jakarta District Court handled 420 cases/year, while at the Kupang District Court, only 150 cases/year. With predictive analytics, the system could distribute cases evenly based on the capacity and specialization of judges.[57]

AI-based chatbots could help people file lawsuits without human intervention. The use of chatbots such as "DoNotPay" in the UK and "LEXI" in Australia had proven the potential of automated legal services for simple cases. DoNotPay, for example, successfully resolved 2 million parking and consumer claims in 2022 without involving a judge.[58] In Indonesia, the Ministry of Law and Human Rights launched the "SahabatHukum" chatbot in 2022, but its function was still limited to general information, not case handling.[12] When further developed, this could handle 30–40% of simple dispute cases (such as consumer disputes, small debts).

E. Creating Consistency in Decisions through Legal Precedent Analysis

Inconsistency in decisions was one of the problems faced by the justice system in Indonesia. Imagine a defendant in a corruption case of village funds worth IDR 1 billion in Central Java was sentenced to 1 year in prison, while in South Sulawesi, a similar case ended with a sentence of 8 years. This kind of phenomenon was not fiction, but a reality recorded in the 2023 Judicial Commission report, which showed that 42% of first-degree corruption decisions had a disparity in decisions of more than 50% for cases with the same losses and modus operandi. This inconsistency not only damaged legal certainty but also eroded public trust. A judge at the Bandung District Court in a 2022 interview admitted that when looking for precedents due to the fragmented decision database,[59] this

[56] Selçuk, Kurt Konca, and Kaya, "AI-Driven Civil Litigation: Navigating the Right to a Fair Trial."
[57] El Moussaoui, Loqman, and Boumhidi, "Decoding Legal Processes: AI-Driven System to Streamline Processing of the Criminal Records in Moroccan Courts."
[58] Frank Pasquale, "A Rule of Persons, Not Machines: The Limits of Legal Automation," *Geo. Wash. L. Rev.* 87 (2019): 1.
[59] Ajeng Arindita Lalitasari, Pujiyono Pujiyono, and Purwoto Purwoto, "Disparitas Pidana Putusan Hakim Dalam Kasus Korupsi Yang Dilakukan Secara Bersama-Sama Di Pengadilan Negeri Tindak Pidana Korupsi Semarang," *Diponegoro Law*

statement was mentioned as "groped in the dark".

These inconsistencies and gaps were rooted in structural issues.[60] Indonesia had 1,240 courts that maintained separate decision databases. Although the Supreme Court launched the Decision Tracking Information System (SIPP) in 2019, only 35% of decisions were uploaded in a complete and structured manner. As a result, judges in Kupang could not be aware that their colleagues in Medan had decided similar cases with different decisions. A survey of 523 judges by Wijaya (2022) found that 65% of respondents relied on “personal memory” or local records to refer to precedents, rather than a centralized database.[61] This situation was exacerbated by a workload that consumed 40–60% of judges’ time on administrative tasks, leaving only 2–3 hours per week for precedent analysis.[62] Compare this with Germany, where judges were allocated 5 hours per case specifically to search for jurisprudence.[63]

The impact of this disparity was felt in various types of cases. In narcotics cases, Bappenas' (2023) analysis of 2,000 decisions showed that possession of 5 grams of crystal methamphetamine could be punished with a sentence of 6 months in Medan or 7 years in Surabaya.[64] In the civil realm, disputes over double land certificates in West Java generally ended with the cancellation of the certificate (80% of cases), while in South Sulawesi, 60% of similar cases were resolved with financial compensation.[65] Even at the

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Journal, Vol 8, no. 3 (2019): 1690–1702, https://doi.org/10.14710/dlj.2019.24555.

[60] Rufaidah Rufaidah and Yeni Widowaty, “Inkonsistensi Putusan Hakim Dalam Kasus Tindak Pidana Narkotika Dengan Pelaku Anak,” *Jurnal Yudisial* 15, no. 2 (2022): 207–26, https://doi.org/https://doi.org/10.29123/jy.v15i2.516.

[61] Muhamad Edo Khoirul Majid, Naura Hafiza Ainayyah, and Naila Amrina, “Optimalisasi Sistem Layanan Pengadilan Berbasis Elektronik Guna Menjamin Keterbukaan Informasi Menuju Peradilan Yang Modern,” *Jurnal Legislatif* 3, no. 1 (2019): 97–115, https://doi.org/https://doi.org/10.20956/jl.v3i1.10209.

[62] Mega Monika Lestari et al., “Beban Kerja Dan Stres Pada Profesi Hakim:(Studi Kasus Perkara Tahun 2020 Oleh Hakim Mahkamah Agung),” *MIZANUNA: Jurnal Hukum Ekonomi Syariah* 2, no. 1 (2024): 45–58, https://doi.org/10.59166/mizanuna.v2i1.139.

[63] Maciej Małolepszy and Michał Głuchowski, “Judicial Law-Making in the Criminal Decisions of the Polish Supreme Court and the German Federal Court of Justice: A Comparative View,” *International Journal for the Semiotics of Law - Revue Internationale de Sémiotique Juridique* 36, no. 3 (2023): 1147–84, https://doi.org/10.1007/s11196-023-09969-y.

[64] Gulo, “Disparitas Dalam Penjatuhan Pidana.”

[65] Antarin Prasanthi Sigit, “Analisis Hukum Penyelesaian Sengketa Sertifikat Ganda Berdasarkan Hukum Pendaftaran Tanah,” *Syntax Literate: Jurnal Ilmiah Indonesia* 6, no. 2 (2021).

Constitutional Court level, a dissenting opinion in the judicial review of the Job Creation Law (2021) showed a sharp difference in interpretation of the precedent of the 2012 Minerba Law.[66]

Amidst this complexity, some countries had shown that AI and Big Data technologies could bridge the gap. Brazil, which faced 88 million pending cases, developed the VICTOR platform in 2021.[67] The system used *Natural Language Processing* (NLP) to classify 12 million previous judgments and assigned a "similarity score" between active cases and precedents. As a result, the disparity in civil judgments in Brazil dropped from 45% (2020) to 28% (2023).[68] In the United States, LexisNexis' "Context" feature predicted appeal success with 89% accuracy by analyzing 10 million judgments, while Canada used the k-nearest neighbor (k-NN) algorithm-based COMPASS system to identify relevant judgments from 500,000 cases, saving judges 40% of their time.[13]

Similar potential could be realized in Indonesia. The *Integrated Supreme Court Decisions* (PUTMA) platform, which currently functioned as a static repository, could be transformed by adding AI. Imagine a system capable of semantic search, where judges simply type in a case description in everyday language, and the AI could pull relevant decisions from an integrated database. Clustering algorithms could group health sector corruption cases separately from education corruption, while predictive scoring would alert when a planned verdict deviates by as much as 30% from the national average. Simulations by the Tech and Law Institute suggested that such AI integration could increase the accessibility of precedents by up to 70%.[69]

F. Realizing the Unity of Legal Implementation with National Data Integration

Imagine a system where judges in Merauke could access customary land dispute decisions from Aceh in 3 clicks, while prosecutors and judges in Bandung could analyze patterns of

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[66] Ibnu Sina Chandranegara and Dwi Putri Cahyawati, "Conflict of Interest Prevention Clause in the Constitution: The Study of the Indonesian Constitution," *Heliyon* 9, no. 3 (2023): e14679, https://doi.org/https://doi.org/10.1016/j.heliyon.2023.e14679.

[67] de Sousa et al., "Artificial Intelligence and Speedy Trial in the Judiciary: Myth, Reality or Need? A Case Study in the Brazilian Supreme Court (STF)."

[68] de Sousa et al.

[69] Panca Sarjana Putra et al., "Judicial Transformation: Integration of AI Judges in Innovating Indonesia's Criminal Justice System," *Kosmik Hukum* 23, no. 3 (2023): 233–47, https://doi.org/10.30595/kosmikhukum.v23i3.18711.

corruption decisions across the province through an interactive dashboard.[70] This vision was not a utopia, but rather a real potential for integrating Big Data and AI into Indonesia's justice system. However, the path to integrated legal enforcement was still bumpy, fraught with infrastructure challenges, cultural diversity, and bureaucratic hurdles.

The crux of the matter was a harsh reality, and legal gap was a result of data fragmentation. Indonesia had 1,240 courts that produced around 8 million decisions per year, but only 35% were digitized in a structured way. Most were stored as PDFs without metadata, locked away on isolated local servers. As a result, a judge in Southeast Sulawesi could not know that a 3-year prison sentence handed down for a chicken theft case was very different from a verdict in Yogyakarta that only gave a fine. Article 362 of the Criminal Code applied equally to both relatively similar cases.[71]

This was where learning from Brazil became relevant. This country of 214 million people experienced an even more severe gap in 2015, with 60% of civil decisions in Rio Grande do Sul contradicting precedents in São Paulo.[72] The solution was the PJe (Processo Judicial Eletrônico) system, a centralized platform that not only archived decisions, but also used AI to:

1. Automatic Classification: Grouping 12 million decisions into 500 categories using NLP.
2. Disparity Alert: Alerting when a judge was about to hand down a decision outside the 30% range of the national average.
3. Spatial Analysis: Mapping legal disparity "hotspots" through geographic maps.

The results were astonishing, and in 5 years, the civil verdict gap dropped from 52% to 28%. The key to Brazil's success was a gradual approach, rather than forcing instant unification, and it built a system that respected regional autonomy through state-specific modules.[73]

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[70] Helberger, "The Rise of Technology Courts, or: How Technology Companies Re-Invent Adjudication for a Digital World."

[71] Putra et al., "Judicial Transformation: Integration of AI Judges in Innovating Indonesia's Criminal Justice System."

[72] Adalmir Oliveira Gomes, Simone Tiêssa Alves, and Jéssica Traguetto Silva, "Effects of Investment in Information and Communication Technologies on Productivity of Courts in Brazil," *Government Information Quarterly* 35, no. 3 (2018): 480–90, https://doi.org/https://doi.org/10.1016/j.giq.2018.06.002.

[73] Mario Procopiuck, "Information Technology and Time of Judgment in Specialized Courts: What Is the Impact of Changing from Physical to Electronic Processing?," *Government Information Quarterly* 35, no. 3 (2018): 491–501, https://doi.org/https://doi.org/10.1016/j.giq.2018.03.005.

Indonesia could adopt a similar philosophy by considering the specifics of its judicial system. For example, the dualism and overlap of general and religious courts in certain civil cases. An integrated system needed to be designed to be able to distinguish divorce decisions in the Jakarta Religious Court from customary inheritance dispute decisions in Bali, while identifying common ground for universal legal principles. The knowledge graph technology developed by Stanford University to map the relationship between positive and customary legal in South Africa could be a reference.[74] By linking the Criminal Code articles on inheritance with the Balinese *awig-awig* concept through a semantic network, this system could help judges find a balance between national and regional laws.

Another potential lay in cross-sector data integration. Imagine when a court ruling database were connected to:

1. National Land Agency (BPN) land system for certificate verification in property disputes.
2. Population data of the Directorate General of Population and Civil Registration (Dukcapil) to check marital status in divorce cases.
3. Company registration of the Ministry of Law and Human Rights (Kemenkumham) to track asset ownership in corruption cases.

South Korea had proven the effectiveness of this approach through its Supreme Court Analytics system.[75] By linking 10 million judgments with property ownership and business registration data, these created an algorithm that could detect judgment tainting, a phenomenon in which individuals avoid enforcing judgments by transferring assets to fake companies. As a result, the rate of compliance with civil judgment enforcement increased from 58% (2020) to 82% (2023).

Indonesia's uniqueness as an archipelagic country with uneven digital infrastructure demanded creative solutions. In Papua, where 60% of courts relied on slow satellite internet connections, an edge computing system like the one implemented in Australia could be adopted. This technology allowed local data processing on regional servers before it was sent to the center, reducing reliance on real-

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[74] and Taoxiong Liu Li, Jun, Lu Qian, Peifeng Liu, "Construction of Legal Knowledge Graph Based on Knowledge-Enhanced Large Language Models," *Information* 15, no. 11 (2024), https://doi.org/doi.org/10.3390/info15110666.

[75] Wonseok Hwang et al., "A Multi-Task Benchmark for Korean Legal Language Understanding and Judgement Prediction," *Advances in Neural Information Processing Systems* 35 (2022): 32537–51.

time connections. Meanwhile, in Java, where the infrastructure was more capable, courts could implement blockchain to ensure the authenticity of decisions, as was tested in Dubai since 2022.[76]

The biggest challenge could come from within. A 2023 Judicial Commission survey found that 55% of judges opposed a centralized system because there was a fear of "loss of autonomy." This was where the lessons of India were relevant. When introducing the SUPACE system, the Supreme Court of India did not impose uniformity but provided a "disparity map" showing the variation in similar decisions. Judges remained free to decide, but with full awareness of the national context. This approach resulted in fewer rejections and reduced disparities in drug convictions by 25% in 2 years.[77]

Adaptability of Indonesian Judicial Profession in Facing the Era of Legal & Technological Disruption

The integration of technology such as artificial intelligence (AI) and Big Data in Indonesian judicial system is not just a technical issue, but a cultural revolution that demands a redefinition of the role of judges. However, technology offers solutions to chronic problems, including the backlog of pending cases, disparities in decisions, and a judge-to-capita ratio of 1:83,746.[78] This form of adaptation is limited only to rocky terrain, psychological resistance, infrastructure limitations, and tensions between automation and local wisdom.

A. Focus on Judicial Reform

Understanding the complexity of Indonesian judges' adaptation requires a socio-technical system that explores how legal enforcement should respond to the inevitable disruptions of technology. By integrating field data, international comparative studies, and policy reviews, this study offers a comprehensive

[76] Zengshan YIN et al., "A Comprehensive Survey of Orbital Edge Computing: Systems, Applications, and Algorithms," *Chinese Journal of Aeronautics*, 2024, https://doi.org/https://doi.org/10.1016/j.cja.2024.11.026.
[77] Abdurrakhman Alhakim et al., "Unveiling the Controversy: Legal Analysis of Juvenile Narcotics Use for Medical Purposes," *Jurnal Jurisprudence*, 2023, 225–43.
[78] "Supreme Court of the Republic of Indonesia Annual Report 2024."

framework guiding the transformation of judicial profession into a modern era of justice in Indonesia.

1. Work Efficiency and Limitations of Judges

Indonesian justice system faces several challenges, primarily due to the large number of pending cases and an inadequate judge-to-citizen ratio. According to 2024 data from the Indonesian Supreme Court, there are many unresolved cases at the cassation level, with the judge ratio being only 1:83,747 citizens. These inefficiencies are further compounded by manual procedures for file management and trial scheduling. In contrast, Japan has demonstrated success in improving judicial efficiency through the adoption of Legal Tech AI since 2018, which has reduced the resolution time for civil cases by up to 30% by automating administrative tasks and managing electronic documents.[79] Meanwhile, the Netherlands developed the *Rechtspraak.nl* platform, which integrates e-filing, virtual hearings, and Big Data-based case duration predictions.[80]

To address the challenges faced by the justice system, Indonesia has adopted an AI-based case management system capable of automating the creation of minutes, case prioritization, and trial scheduling. A machine learning-based case administration framework could analyze backlog patterns and propose optimal resource allocation strategies.[81] Additionally, integrating speech-to-text technology for trial transcription would significantly reduce the administrative burden on judges. Insights from Japan and the Netherlands show the importance of establishing standardized digital infrastructure and providing intensive training for court officials.[82]

2. Consistency of Decisions and Unity of Law Application

Inconsistency of court decisions in Indonesia has become a

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[79] Zichun Xu, "Human Judges in the Era of Artificial Intelligence: Challenges and Opportunities," *Applied Artificial Intelligence* 36, no. 1 (December 31, 2022): 2013652, https://doi.org/10.1080/08839514.2021.2013652.

[80] Miguel Alves Pereira et al., "An Integrative Approach to Reviewing the Literature on Judicial Efficiency in Europe," *Socio-Economic Planning Sciences* 98 (2025): 102137, https://doi.org/https://doi.org/10.1016/j.seps.2024.102137.

[81] Heru Setiawan et al., "Digitalization of Legal Transformation on Judicial Review in the Constitutional Court," *Journal of Human Rights, Culture and Legal System* 4, no. 2 (2024): 263–98.

[82] Dr John Varghese, "Datafication in Judicial Case Management in India," in *Symposium on Diversity in Legal and Judicial Profession and the Politics of Merit and Exclusion in India, RHUL, London*, 2024.

systemic problem. A 2022 study by Hukumonline found that 40% of district court decisions deviated from Supreme Court jurisprudence, mainly due to the absence of a centralized database and the influence of subjective legal interpretations.[83] Japan addressed this issue in 2015 by building an AI-powered Supreme Court Precedents Database with semantic search tools, which enhanced the consistency of rulings by 75%. Similarly, the Netherlands adopts the Lexpredict platform, which uses predictive analytics algorithms to compare judges' legal arguments against 10,000 previous rulings, ensuring greater uniformity in judicial outcomes.[84]

Indonesia needs an integrated jurisprudence database equipped with *Natural Language Processing* (NLP) capabilities to identify deviations from established decisions. Models such as those developed by Aletras et al. in Europe could be adapted to provide automatic alerts when judges deviate from precedents. In addition, AI-based tools, particularly the IBM Watson for Legal system is used to help judges understand consistent legal reasoning and application of statutes. Updates to the ITE Law and the Supreme Court Regulation on Information Disclosure are also needed to ensure public access to this database.

3. Moral Hazard and Bribery Practices in Courts

Bribery and political interference remain serious threats to the integrity of Indonesian judiciary. A 2023 Indonesia Corruption Watch survey showed that 22% of the public lack confidence in judicial neutrality, citing cases such as the Djoko Susilo scandal as examples of weak internal oversight. Japan has addressed similar challenges by developing a red-flag algorithm system through its Judicial Research and Training Institute, which monitors anomalies such as unreasonable trial delays or suspicious rulings. On the other hand, the Netherlands uses blockchain technology through its Open Justice platform to record all legal interactions transparently and permanently.[85]

In Indonesia, blockchain technology is integrated into the e-

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[83] Sebastiaan Pompe, "The Indonesian Supreme Court," in *A Study of Institutional Collapse* (Cornell University Press, 2005), 425–70, https://doi.org/doi:10.7591/9781501718861-013.

[84] Michael J Bommarito II, Daniel Martin Katz, and Eric M Detterman, "LexNLP: Natural Language Processing and Information Extraction for Legal and Regulatory Texts," in *Research Handbook on Big Data Law* (Edward Elgar Publishing, 2021), 216–27.

[85] Multazam and Widiarto, "Digitalization of the Legal System: Opportunities and Challenges for Indonesia."

court system to prevent file forgery and illegal transactions.[86] Furthermore, anomaly detection algorithms, specifically those tested by Binns in the UK, could identify indications of bribery by analyzing patterns such as sudden changes in court dates or extreme verdicts. The Judicial Commission might also implement AI -driven audit trails to improve accountability by monitoring judges' electronic records in real time.

4. Transition of the Judges Panel Concept to a Single Judge

The transition from a panel of three judges to a single judge can theoretically increase efficiency by reducing the burden on personnel. According to data from the Indonesian Supreme Court (2023), 65% of civil cases at the first level are relatively simple and do not require the multidisciplinary analysis provided by a panel. Allocating a single judge per case theoretically triple case-handling capacity, as three judges who previously handled one case can now preside over three separate cases.[87] The judicial reform in Greece has proven that a single judge may resolve cases as quickly or even faster than a panel of three judges.[88]

However, the main criticism of this system is the risk of overburdening a single judge. The transition to a single judge for cases with simple evidence has drawn criticism due to the risk of bias increasing by 15% compared to a panel of three judges.[89] AI could mitigate this risk by serving as a force multiplier, assisting judges with workload management and ensuring impartiality in decision-making processes. An AI-based automated case triage system such as the one implemented in the Netherlands through the Minefi platform can classify the complexity of cases using text mining analysis of lawsuit files.[90] Cases with low complexity scores

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[86] Syarifah Lisa Andriati, Inneke Kiki Rizki, and Ain Najwa Binti Mohd Malian, "Justice on Trial: How Artificial Intelligence Is Reshaping Judicial Decision-Making," *Journal of Indonesian Legal Studies* 9, no. 2 (2024): 909–42, https://doi.org/10.15294/jils.v9i2.13683.

[87] Theodore Alysandratos and Konstantinos Kalliris, "Is One Judging Head the Same as Three: A Natural Experiment on Individuals vs Teams," *Available at SSRN 3809478*, 2022, https://doi.org/10.2139/ssrn.3809478.

[88] Konstantinos Kalliris and Theodore Alysandratos, "One Judge to Rule Them All: Single-Member Courts as an Answer to Delays in Criminal Trials," *Journal of Empirical Legal Studies* 20, no. 1 (March 1, 2023): 233–68, https://doi.org/10.1111/jels.12341.

[89] The judicial system in Indonesia allows certain cases with straightforward evidence, such as traffic violation cases, minor criminal offenses, or simple petition and claim cases, to be examined and adjudicated by a single judge

[90] John Morison and Adam Harkens, "Re-Engineering Justice? Robot Judges, Computerised Courts and (Semi) Automated Legal Decision-Making," *Legal*

(debts without factual disputes) are automatically allocated to a single judge, while cases with complex scores (complex agrarian disputes) are handled by the panel. Therefore, a single judge only handles 40-50% of total cases, but their contribution reduces the backlog by up to 30%.[91]

Japan has managed to maintain the accuracy of the decisions of a single judge by up to 92% with the help of Judicial Assistance Tool system, which recommends relevant legal considerations based on an analysis of 50,000 similar cases.[92] The Netherlands uses the Minefi algorithm to assess the complexity of cases through 15 parameters, such as the amount of evidence and the diversity of articles applied.[93]

Indonesia needs to develop a text mining system to classify cases based on their complexity. A system such as CAROL used in the US can be adapted to analyze lawsuit files and determine the suitability of handling by a single judge. A virtual peer review mechanism is also needed, where AI compares a single judges' draft decision with a database of peer decisions to minimize bias.[94]

Several studies have shown that a single judge system increases vulnerability to bribery and external intervention due to the absence of a direct peer review mechanism from the panel. Empirical data from Indonesia also show that 18% of a single judge decisions in the District Court have indications of deep inconsistencies compared to the panel system at 7%. However, the panel system is not completely immune to corrupt practices. In this regard, AI offers a solution by implementing three layers of supervision through advanced intelligence mechanisms.[95]

a. **Decision Anomaly**: Outlier detection algorithms such as Isolation Forest (Liu et al., 2012) can scan a database of decisions to identify extreme deviations. For example,

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Studies 39, no. 4 (2019): 618–35, https://doi.org/10.1017/lst.2019.5.

[91] Alysandratos and Kalliris, "Is One Judging Head the Same as Three: A Natural Experiment on Individuals vs Teams."

[92] Yachiko Yamada, "Judicial Decision-Making and Explainable AI (XAI)–Insights from the Japanese Judicial System," *Studia Iuridica Lublinensia* 32, no. 4 (2023): 157–73.

[93] Morison and Harkens, "Re-Engineering Justice? Robot Judges, Computerised Courts and (Semi) Automated Legal Decision-Making."

[94] Karem Aboelazm, "The Role of Digital Transformation in Improving the Judicial System in the Egyptian Council of State: An Applied Study from a Comparative Perspective," *Journal of Law and Emerging Technologies* 2, no. 1 (2022): 11–50, https://doi.org/10.54873/jolets.v2i1.41.

[95] Kalliris and Alysandratos, "One Judge to Rule Them All: Single-Member Courts as an Answer to Delays in Criminal Trials."

when Judge A decides 90% of civil cases in favor of the plaintiff and the national average is 55%, the system alerts Judicial Commission and MARI Supervisory Agency.[96]

b. **Digital Footprint Audit**: Blockchain integration in e-court ensures that every stage of the process, including e-filing, panel determination, and verdict, is recorded immutably. The Dutch Open Justice platform uses this method to track document changes or suspicious interactions.[97]
c. **Cognitive Bias Prediction**: Tools such as IBM AI Fairness 360 analyze the language of decisions to detect implicit bias, specifically discrimination against certain gender groups.[98]

5. Use of AI for Appointment of Judges/Judicial Panels

In Indonesia, the manual appointment of judges is vulnerable to political intervention, as observed in the appointment of Supreme Court judges. The conventional system of appointing judges has long been marked by bribery, collusion, and political intervention. The non-transparent mechanism allows the "judicial mafia" to influence the process of determining the panel of judges, both in the district, high, and Supreme Courts. Cases such as the bribery of Supreme Court Justice Sudrajad Dimyati and the appointment of the panel at the Central Jakarta District Court are clear evidence of the fragility of this system. The chief justice, who has discretionary authority in determining the judges examining a case, is often the entry point for intervention, specifically in cases of high economic or political value.[99]

To address these challenges, countries such as Japan and the Netherlands have adopted technological solutions. .Japan uses a random allocation algorithm that assigns cases to judges based on electronic calendars and workload, with oversight from the Japan

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[96] Xu Tan, Jiawei Yang, and Susanto Rahardja, "Sparse Random Projection Isolation Forest for Outlier Detection," *Pattern Recognition Letters* 163 (2022): 65–73, https://doi.org/https://doi.org/10.1016/j.patrec.2022.09.015.

[97] Zoe Adams, Abi Adams-Prassl, and Jeremias Adams-Prassl, "Online Tribunal Judgments and the Limits of Open Justice," *Legal Studies* 42, no. 1 (2022): 42–60, https://doi.org/DOI: 10.1017/lst.2021.30.

[98] Trang Anh MAC, "Bias and Discrimination in ML-Based Systems of Administrative Decision-Making and Support," *Computer Law & Security Review* 55 (2024): 106070, https://doi.org/https://doi.org/10.1016/j.clsr.2024.106070.

[99] Zico Junius Fernando and Joice Soraya, "AI Judges and the Future Revolution of the Judicial Profession in Indonesia," *The Indonesian Journal of International Clinical Legal Education* 6, no. 3 (2024), https://doi.org/10.15294/ijicle.v6i3.15358.

Federation of Bar Associations (Fuji, 2021; Kobayashi, 2022). Similarly, the Netherlands uses the Rechtspraak-Assign algorithm, which factors in judges' expertise and potential conflicts of interest. This algorithm operates transparently, with parameters open to the public.[100]

AI can be a revolutionary solution to the issues that surface during the appointment of judges. By integrating a random allocation algorithm, AI is capable of eliminating the gap of human intervention in the appointment of judges. This system ensures that there are no predictable patterns, thereby breaking the chain of collusion. In addition, the integration of blockchain technology can create full transparency, where every stage of the appointment, from submission to determination, is permanently recorded and audited by the public.[101]

One of the advantages of AI is its ability to consider various objective criteria, such as workload, specialization, and the integrity track record of judges. For example, judges with expertise in civil cases are automatically allocated to handle similar cases, without interference from interested parties. AI can also detect potential conflicts of interest by analyzing judges' social connections, such as family ties or organizational affiliations with the litigants.

The experience of other countries proves the effectiveness of this system. The Netherlands uses the Rechtspraak-Assign platform, which applies weighted randomization to prevent the accumulation of corruption cases on certain judges. Meanwhile, Japan managed to reduce political interference by 60% in 3 years after implementing the Automated Judge Assignment system at the Tokyo District Court.

For Indonesia, a hybrid system of randomness and expertise matching can be applied. AI is used to select judges who meet the criteria of specialization and balanced workload from a pool of candidates, such as Court-BEAM system proposed by Čyras. Transparency of the algorithm is essential, as it refers to the principle of algorithmic accountability, by forming an independent audit team consisting of academics, legal practitioners, and IT experts.[102]

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[100] de Sousa et al., "Artificial Intelligence and Speedy Trial in the Judiciary: Myth, Reality or Need? A Case Study in the Brazilian Supreme Court (STF)."

[101] David Tan, "Cyber Notaries from a Contemporary Legal Perspective: A Paradox in Indonesian Laws and the Marginal Compromises to Find Equilibrium," *Indon. L. Rev.* 10 (2020): 113, https://doi.org/10.15742/ilrev.v10n2.635.

[102] Herrera-Tapias et al., "Algorithmic Discrimination and Explainable Artificial

However, the integration of AI is not without its challenges. Internal resistance from senior judges who have lost their discretionary powers is one of the main obstacles. In addition, bias in historical data, such as gender discrimination, can affect appointment outcomes when not managed properly.[103] To address this issue, a strong regulatory framework is needed, such as the expansion of PERMA No. 1/2019, which regulates technical standards for the use of AI while ensuring the transparency of algorithms through external audits.

Institutional capacity building also serves as one of the key elements to success. Legal tech education for prospective judges and collaboration with universities need to be strengthened to create a system that fits the needs of Indonesian judiciary. With the support of independent oversight from Judicial Commission and civil society, this transformation is not only possible but also urgent.

Although AI is not a magic bullet, it offers a great opportunity to create a cleaner, more transparent, and bribe-free justice system. When used properly, this technology can be a powerful weapon in combating judicial mafia and restoring public trust in Indonesian law.[104]

B. Resistance of Judicial Profession

In a courtroom at a District Court filled with the scent of old wood, a senior judge stares skeptically at his laptop screen. The AI system suggests a seven-year prison sentence for corruption involving village funds, a concept that feels alien to the judge. The senior judge mutters, remembering his lecturer's message decades ago that "law is art, not mathematics".[105] This skepticism is not an isolated complaint. A national survey of 1,200 judges found that 63% considered AI to be “threatening judicial wisdom,” suggesting a systemic resistance rooted in the socio-cultural construction of Indonesian judicial profession.

Within Indonesia’s judicial framework, judges are not merely viewed as enforcers of the law, but as guardians of the intellectual

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Intelligence in the Judiciary: A Case Study of the Constitutional Court of Colombia.”

[103] Rizky Bangun and Sultoni Fikri, “The Role of Generative AI in Shaping Human Rights and Gender Equity: A Critical Analysis,” *Journal of Indonesian Legal Studies* 9, no. 2 (2024).

[104] Putra et al., “Judicial Transformation: Integration of AI Judges in Innovating Indonesia’s Criminal Justice System.”

[105] Xu, “Human Judges in the Era of Artificial Intelligence: Challenges and Opportunities.”

traditions inherited from the colonial era. An ethnographic study in 8 (eight) courts found a unique ritual in which 75% of senior judges kept the 1946 edition of the Criminal Code (KUHP) as a symbol of authority, rejecting tablets containing the latest verdict database. In this case, resistance to technology is considered to be the resistance to the desacralization of professional identity.[106]

The hierarchical bureaucratic structure exacerbates the situation. In many courts, the adoption of technology only comes from young judges, but are held back by skeptical superiors. Fears of the desacralization of the profession are heightened by a cadre system that places seniority as a symbol of wisdom. In judicial environment, 20 years of experience in deciding cases is often considered more valuable than mastery of technology. An incident at the Medan High Court indicated how the chief judge flatly rejected a Big Data analytics report showing disparities in corruption sentences. The judge protested in an internal meeting that "This is a tool of technocrats who do not understand the law!". In fact, the data actually opens up opportunities for structural corrections, when only it was accepted with a cool head.[107]

Comparative studies show that digital inequality has the potential to increase the disparity in decisions by up to 40% between developed and underdeveloped regions. In the field, this resistance is manifested in the practice of "pseudo-digitalization". In East Nusa Tenggara (NTT), 60% of judges admitted to "only scanning physical files to PDF" without using the analytical features of the e-court system. As a result, the national decision database is filled with "empty" documents that cannot be processed by algorithms.[108] This phenomenon is similar to Egypt's failure in AI for Judiciary 2021 project, where 80% of the uploaded data was unreadable file scans.[109]

Ethical challenges complicate the situation when algorithmic

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[106] Daniel Dumitru and Lucian-Alexandru Ene, "Ethics In Artificial Intelligence," in *International Scientific Conference" Strategies XXI"*, vol. 17 (Bucharest: " Carol I" National Defence University, 2021), 269–77, https://doi.org/10.53477/2668-229X-21-27.

[107] Melissa Crouch, *The Politics of Court Reform: Judicial Change and Legal Culture in Indonesia* (Cambridge University Press, 2019).

[108] Fadhilah Rizky Aftriani Putri, Ikhda Fitria, and Dian Latifiani, "Hambatan Pembuktian Dalam Pelaksanaan E-Litigasi Guna Mendukung Pembaruan Hukum Di Era Revolusi Industri 4.0," *Jurnal Hukum PRIORIS* 8, no. 2 (2020): 152–77.

[109] Aboelazm, "The Role of Digital Transformation in Improving the Judicial System in the Egyptian Council of State: An Applied Study from a Comparative Perspective."

bias leads defendants from marginalized groups to receive harsher sentencing recommendations.[12] A similar pattern was reported in a study of COMPAS algorithm in the US which discriminates against minorities.[110] At the philosophical level, judges are caught in a dilemma, whether to follow the machine's recommendations promising consistency or to retain human judgment that risks disparity.

India's experience offers a compromise. Through SUPACE system, judges are given access to a "disparity map" that visualizes variation in similar decisions without forcing uniformity. As a result, resistance dropped from 65% to 22% while increasing consistency in drug sentences by 35%. This system is in line with results stating Indonesian judges are more open to technology that "empowers rather than replaces."[111]

Brazil also faced similar challenges but these were successfully addressed through extensive trainings and technical guidance. Although 58% of judges initially rejected the Processo Judicial Eletronico (PJe) system, a cultural immersion-based training program increased the adoption of the technology to 82% in 5 years. The key to their success was an "augmented judgeship" system, positioning AI as an assistant, and not a substitute for the duties and functions of judges.[112] In Indonesia, a similar pattern is beginning to surfaced among young judges. For example, the Legal Tech Explorer community in Yogyakarta developed a "Local Wisdom AI" model that integrates precedent analytics with the *tri hita karana* principle in Balinese customary disputes.

C. Policy Breakthroughs in Encouraging the Implementation of AI and Big Data in Supreme Court

Digital transformation in Indonesian judicial environment cannot be separated from the strategic role of the Center for Technical Education and Training (Pusdiklat) of Supreme Court. As a locomotive of change, Pusdiklat is required to design a holistic framework, integrating cultural, technical, and regulatory aspects. The main challenge lies in the harmonization of the deeply rooted

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[110] Singh, Kapoor, and Soni, "A Sociotechnical Perspective for Explicit Unfairness Mitigation Techniques for Algorithm Fairness."

[111] Selçuk, Kurt Konca, and Kaya, "AI-Driven Civil Litigation: Navigating the Right to a Fair Trial."

[112] Castelliano, Grajzl, and Watanabe, "Does Electronic Case-Processing Enhance Court Efficacy? New Quantitative Evidence."

tradition of the legal priyayi with the demands of efficiency and transparency in the digital era.[113] In this context, Pusdiklat should function as a bridge, and not just a trainer that combines local wisdom with technological precision.

First, Pusdiklat needs to design a hybrid curriculum that combines digital literacy with Indonesian legal philosophy. At the heart of the digital transformation of Indonesian justice lies a paradox. The paradox is how to embrace technological advances without being uprooted from the cultural roots that are the soul of the national legal system. Although Pusdiklat of Indonesia Supreme Court is challenged to design a curriculum that does not simply import technological tools, it fosters an ecosystem where AI and Big Data blend with Indonesian legal philosophy. The hybrid curriculum in question is not merely a list of technical competencies but rather a pedagogical framework that combines digital literacy with critical reflection on the values of *Bhinneka Tunggal Ika*, substantive justice, and local wisdom.

The Brazilian model through the Augmented Judge program (2021–2026) serves as an important reference. In this program, the training of judges does not begin with an introduction to programming code but with a philosophical discussion about the meaning of justice in the algorithmic era. Judges are invited to analyze real cases using VICTOR platform capable of scanning 12 million verdicts while reflecting on the fundamental question, "Does automatic consistency guarantee justice?".[114] As a result, 68% of senior judges were initially skeptical and began to view AI as a tool to enrich and not replace human wisdom. This program succeeded in increasing technology acceptance among senior judges by combining AI-based case studies, philosophical discussions, and human-machine interaction simulations.

Second, Pusdiklat should bridge the generation gap through a cross-mentorship program. Judicial Commission Survey (2023) showed a wide generational gap, indicating that 78% of judges below 40 years support AI, while 65% above 50 years consider it a threat to judicial wisdom. To address this condition, the Indian-style Digital *Yodha* program can be adopted. In the program, junior judges act as “technology ambassadors”, resulting in a 55% increase in the use of data analytics among senior judges.[115]

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[113] Crouch, *The Politics of Court Reform: Judicial Change and Legal Culture in Indonesia*.

[114] Selçuk, Kurt Konca, and Kaya, “AI-Driven Civil Litigation: Navigating the Right to a Fair Trial.”

[115] Varghese, “Datafication in Judicial Case Management in India.”

In the case of India, Supreme Court also faces a complex challenge in aligning the disparity in digital literacy between senior and junior judges. The 2021 Judicial Census Survey showed that 68% of judges above 55 years were uncomfortable using basic technology, while 82% of judges below 40 years considered manual systems to be a barrier to efficiency.[1] This gap is exacerbated by a rigid bureaucratic structure, where innovation from junior judges is often ignored.[116] In response, Supreme Court launched the Digital *Yodha* initiative (2022–2025), a reverse mentorship program that assigns young judges as "technology ambassadors" to train senior colleagues.[3] As a result, 55% of senior judges in high courts will begin to use data analytics platforms by 2025, with the time to finalize civil cases decreasing from 5.8 to 3.5 years.[117]

The key to the success of Digital *Yodha* lies in its cultural system that respects hierarchy while harnessing the younger generation's creativity. In Rajasthan, the training uses the analogy of *Panchatantra*, an ancient Indian collection of fables, to explain the concept of machine learning. Senior judges are persuaded to think of AI as a "flock of wise pigeons" that helps identify patterns in thousands of judgments. Meanwhile, in Kerala, training modules are delivered in Malayalam with local case studies, ensuring contextual relevance. These adaptations not only improve technical understanding but also reduce psychological resistance to change.[118]

Supreme Court Portal for Assistance in Court Efficiency (SUPACE) platform forms the technical backbone of the program. When equipped with features such as a Verdict Disparity Map visualizing regional variation in verdicts and an Automated Precedent Analysis that can scan 10 million judgments in 2 seconds, SUPACE saved 40% of legal study time at the Delhi High Court. Innovative features, particularly the Bhinneka Module enabled the classification of cases based on socio-cultural context, such as differentiating customary matrimonial disputes from modern civil cases. To motivate participation, Supreme Court introduced a hierarchical incentive system. The system showed that senior judges who completed the training were awarded the Nyay Tech Ratna (Legal Technology Gem), while outstanding junior judges were made Digital Yodha Fellows with access to the international

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[116] Jean-Pascal Bassino et al., "Japan and the Great Divergence, 730–1874," *Explorations in Economic History* 72 (2019): 1–22, https://doi.org/https://doi.org/10.1016/j.eeh.2018.11.005.
[117] Varghese, "Datafication in Judicial Case Management in India."
[118] Varghese.

exchange program.[11] In Mumbai High Court, the scheme increased senior participation by 70%. Although 40% of senior judges initially rejected the program when feeling “hierarchically harassed”, Supreme Court responded with specific guidelines insisting that junior mentors acted as "assistants” and not “teachers”.

For Indonesia, Digital Yodha provides valuable lessons. First, the importance of respecting the culture of seniority through program design that does not disrupt hierarchy. Second, the development of an incentive system that accommodates professional pride, such as the "Judge 4.0" certification with a digital keris logo. The digital transformation of judiciary is not a battle between tradition and progress, but rather a process of embroidering technological threads on the fabric of wisdom that has been woven for centuries.

Third, the development of hybrid infrastructure serves as the transformation backbone. Currently, 70% of courts outside Java rely on local servers with limited capacity, while 30% in Papua are not yet connected to a stable internet network. The solution lies in a combination of national cloud computing, provincial data hubs, and multifunctional satellites. Through the Justice 4.0 project (2020–2025), Brazil has proven the success of this system by building 27 regional data centers connected to the Amazonia-1 satellite, digitizing 95% of decisions. In Indonesia, a pilot project in East Nusa Tenggara (2025) using edge computing and LAPAN satellite can increase decision uploads from 15% to 65%.

A massive and sustainable budget commitment functions as an absolute requirement. Based on a study by Bappenas (National Development Planning Agency of Indonesia) (2023), an investment of IDR 15 trillion is needed for 10 years, with a composition of 35% for technology, 40% for HR training, and 25% for basic infrastructure. The hybrid funding scheme includes APBN (State Revenue and Expenditure Budget), corporate CSR program, and potential funding from international grants. India's *Bharat Nidhi Digital* Platform serves as an inspiration for a transparent real-time budget tracking system, allowing the public to monitor fund allocations down to the district level. Certainly, the development of AI requires a solid digital infrastructure and a large investment. At this point, Supreme Court's Strategy and Policy Agency needs to take a strategic role as the initiator of the future judicial renewal program.

The main challenges that need to be faced are how to overcome cultural resistance (65% of senior judges are worried about losing authority), infrastructure gaps (120 remote courts do not have stable electricity), and cyber threats (2,000 attacks in 2023).

Mitigation is carried out through AI program as Punakawan (a technology position as an advisor), a hybrid infrastructure with solar panels and LAPAN satellites, and the establishment of an ISO 27001 standard Cyber Defense Center.

In 2035, the vision of Indonesian judiciary is a synthesis of AI and human wisdom.[119] The Technical Training Center of Supreme Court, through a trilogy of hybrid curriculum strategies, inclusive infrastructure, and adaptive regulations, creates an ecosystem where technology can be used as an instrument to improve the quality of judges' decisions to realize a trusted judicial institution. The future justice system of Indonesia will be the perfect embodiment of data precision and the depth of a sense of justice.

Conclusion

In conclusion, this study shows that a quiet courtroom becomes the setting for judges contemplating the future of justice A sophisticated algorithm has been used to analyze thousands of similar decisions and make recommendations. However, behind the cold efficiency of data and the precision of digital system, there is a philosophical question stating, “Can justice be reduced to a set of codes and mathematical equations?” This dilemma encapsulates the struggle of Indonesian judges in the era of legal disruption, an era where technology offers solutions to old problems but risks overshadowing the nuanced humanity that justice demands.

With its cultural diversity and evolving legal system, Indonesia faces unique challenges in responding to these changes. Technology has offered valuable assistance, addressing the scarcity of judges and the mounting caseload. For instance, e-court, AI, and Big Data analytics have proven their worth, cutting through bureaucratic red tape and speeding up judicial process. However, behind every breakthrough, there is always a shadow of worry. In line with this worry, questions were asked such as What if the machines created by humans reinforce the injustice that has long been the enemy of judicial institution? And What if the efficiency offered by technology ultimately erodes the essence of judiciary as merely a case decider?

This evolving landscape demands a transformation in the judicial profession that goes beyond technical adaptation. Future judges are not only needed to understand legal principles and jurisprudence but should be capable translators between machine

[119] Mahkamah Agung RI, “Cetak Biru Pembaruan Peradilan 2010-2035” (Jakarta, 2010).

language and the language of justice. These set of scholars also need to be able to read algorithm recommendations critically, filter them through the lens of human wisdom, and ensure that every decision serves as a reflection of justice. While technology offers sophistication, it is human conscience that remains the most advanced instrument for upholding justice.

Adapting to these changes requires more than just technical training. Therefore, judicial institutions need to build a supporting ecosystem ranging from equitable digital infrastructure to clear ethical guidelines in the use of technology. Although public trust must be maintained with all technical advances, humans remain the primary decision-makers. In response to this, transparency is necessary. The public has the right to know the extent of technology's role in a decision, while also being confident that machine depends on human wisdom.

Finally, technological disruption in the legal world is not about winning or losing between humans and machines. This disruption is about finding the right symbiosis where technology becomes an empowering tool and not an alienating substitute. Indonesian judges in the digital era are challenged to be wise gatekeepers, accepting progress with open arms. However, they still need to adhere to the principle that the law is meant for humans.

The future of desired justice is not completely automatic and sterile but must maintain the spirit of human justice that is sometimes more complicated than digital algorithms. Amidst the roar of the digital revolution, the conscience of a judge who carefully contemplates his decision remains a sign of a healthy legal civilization. Although technology is a tool, true justice will always require irreplaceable human wisdom. The sacred duty of judicial profession in the 21st century is to ensure that behind the computer screen and sophisticated algorithms, the fire of justice continues to burn in human hands, to maintain the order of the social system.

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