

RESEARCH ARTICLE | NOVEMBER 28 2023

Role of ICT in overcoming the contemporary challenges in legal education and judicial process: An analysis through the lens of crisis situation **FREE**

Adya Surbhi ✉; Sandeep Singh; Aditya Kashyap



AIP Conf. Proc. 2909, 120007 (2023)

<https://doi.org/10.1063/5.0183316>



CrossMark

AIP Advances

Why Publish With Us?

- 25 DAYS**
average time to 1st decision
- 740+ DOWNLOADS**
average per article
- INCLUSIVE**
scope

[Learn More](#)

Role of ICT in overcoming the contemporary challenges in Legal Education and Judicial Process: An Analysis through the lens of crisis situation

Adya Surbhi^{1, a)}, Sandeep Singh^{2, b)} Aditya Kashyap^{3, c)}

¹Jindal Global Law School, O P Jindal Global University, Sonapat, Haryana, India. -131001

²Jindal Global Business School, O P Jindal Global University, Sonapat, Haryana, India. -131001

³Symbiosis Law School, Pune Symbiosis Law School Rd, Pune, Maharashtra, India. – 411014

^{a)} Corresponding author: asurbhi@jgu.edu.in

^{b)} sandeepsingh@jgu.edu.in

^{c)} adityakashyap1609@gmail.com

Abstract. The global COVID-19 pandemic had a severe impact on various services across the world. This paper analyzes the barriers and challenges in the integration of Information and communication technology (ICT) in the legal education and justice delivery system. The recent pandemic highlighted the lacunae in the traditional legal education sector and court proceedings. Thus, this paper extensively explores and scrutinizes how ICT can be seamlessly integrated in the legal education and judicial processes, such as virtual courts, e-filing systems, digital tools etc. It analyzes the various risks posed by the use of ICT including data and security concerns, algorithmic biases, access issues for marginalized and rural communities. Thus, the paper underscores the need for ICT-based solutions and aims to act as a catalyst in this transition from the traditional systems, by analyzing the different dimensions related to ICT and Artificial Intelligence.

Keywords: Legal Education; ICT, Judicial Process, Justice delivery system, Crisis situations, Artificial Intelligence, Barriers

INTRODUCTION

Information and Communication Technology (hereinafter ICT), Artificial Intelligence (hereinafter AI) and Machine Learning (hereinafter ML) have become an integral part of the growth journey in varied fields, including the justice delivery system and legal education. The recent crisis, caused by COVID-19 pandemic, has emphasized the significance and potential of AI and ML learning in the future of education and justice delivery. Several legal systems worldwide use AI to aid investigations and automate judicial decision-making. (Chen, 2019). AI's potential to change daily life has received unfettered attention. However, it is pertinent to consider the extent to which ICT can be used responsibly and effectively to achieve the desired outcome. The article analyses ICT implementation and integration differentials and barriers to use its transformative capacity to improve the judicial process and legal education.

AI is defined as “any device that perceives its environment and takes actions that maximize its chance of success at some goal.” Thus, AI and ML need not replace human judgement in the justice system. AI and machine learning can boost judicial productivity and efficiency. Justice is not a conception with monolithic meaning; rather it contains within itself multiple layers of meanings having varied interpretations in different contexts. Justice, therefore, is not restricted to the right judgment in a judicial decision. Justice theories suggest a broader meaning. AI and ML algorithms can increase judicial productivity and efficiency by automating routine operations and procedures and providing data-driven insights to legal professionals. By leveraging these analytical tools, legal professionals can make more informed decisions based on factual evidence, as opposed to relying solely on their own cognitive processes.

AI and ML algorithms can help allocate resources and prevent criminal activity by anticipating specific events, such as a defendant committing another offence or a crime occurring in a specific location. It can also enhance access to justice by curtailing the expenses and time entailed in legal proceedings. This was evident during COVID-19 when the Legal Systems used e-filing and virtual courtrooms to expediate the justice delivery process. Countries across the world are utilizing ICT for the purposes of case prediction, analysis of legal documents, judicial analytics, e-filing,

chatbots to guide the lawyers and litigants, virtual court rooms etc. Therefore, it is apparent that ICT can improve justice delivery by increasing efficiency, precision, and access while reducing partiality and discrimination. It is crucial to use these technologies responsibly to avoid perpetuating prejudices or unintended consequences. Therefore, the deployment of AI in the justice system must be considered carefully and responsibly. It is, therefore, important to responsibly consider the deployment of ICT and AI in the justice system.

LITERATURE REVIEW

AI has become increasingly prevalent in various fields, but its adoption in the legal sector, particularly in judicial decision-making, has been slow due to several barriers. This paper aims to study the barriers that exist in the integration of ICT in legal justice system and legal education field. The infrastructure of legal systems can also pose challenges to the adoption of AI. For example, legal systems may not have the necessary technological infrastructure to support AI, such as access to high-quality data and computing power. (Van Noordt & Misuraca, 2022) In addition, there may be concerns about the cost of implementing AI systems and the need for significant investments in infrastructure and personnel training, especially in developing countries. (Pedro et al., 2019). The cost of implementing AI systems and the lack of infrastructure to support their adoption have been identified as barriers to AI adoption in decision-making (Pedro et al., 2019). Mill states that the high cost of implementing AI in the legal system may deter its adoption in some jurisdictions.

Another barrier is the lack of transparency and interpretability of AI algorithms. The opacity of AI models makes it difficult to understand how decisions are reached, which is crucial in legal contexts where accountability and justifiability are necessary (Deeks, 2019; Webley, 2019; Yu and Spina Ali 2019; Busuioc, 2021; von Eschenbach, 2021; Fraser, Simcock, & Snoswell, 2022). In addition, lack of standardization and interoperability among AI systems pose as hurdles. This lack of standardization makes it difficult to compare different AI systems and to ensure their compatibility with existing legal systems. Psychological barriers may also impede the adoption of AI in judicial decision making. Judges and other legal professionals may be resistant to change and may have concerns about the reliability and accuracy of AI systems (Yu and Spina Ali 2019). Legal professionals, including judges, professors and lawyers, may not fully understand how AI works, leading to skepticism and resistance to its implementation (Sanusi, Oyelere, & Omidiora, 2022). Judges who lack an understanding of AI's intricacies may be hesitant to adopt it, even if it has the potential to improve decision-making. Legal professionals also lack the expertise and knowledge required to effectively implement and use AI systems, which leads to this mental block (Kluttz, Mulligan, 2019).

One of the main concerns is the risk of unauthorized access and misuse of data. Data privacy and security are significant concerns when it comes to the adoption of AI in legal decision-making. The use of AI requires access to large amounts of data, including personal and sensitive information. This data is often obtained from various sources, including public records and private databases, which may be vulnerable to security breaches and cyber-attacks (Yamin et al., 2021). This can result in privacy breaches and the exposure of confidential information. The use of blockchain technology can address data privacy concerns and ensure that sensitive information is protected from unauthorized access or tampering. (Baracaldo et al., 2017; Hasib et al., 2022). Moreover, the use of AI may raise questions about the ownership and control of data (Berendt et al., 2020; Holmes et al., 2021). The data used to train AI models may come from various sources, and it may not always be clear who owns the data and has the right to control its use. This can lead to conflicts over data ownership and access, particularly in situations where personal and sensitive information is involved (Wu, 1997; Abbott, 2020). A further concern is the potential for biased decisions as a result of biased data. AI models are only as unbiased as the data they are trained on. If the data used to train an AI model contains bias or discrimination, the model's output will also be biased and discriminatory. (Kordzadeh & Ghasemaghaei, 2022) This can lead to unfair decisions that disproportionately affect certain groups of people, leading to significant ethical concerns. The lack of transparency in AI algorithms may also contribute to biased outcomes. In the legal sector, biased decisions can have severe consequences, such as perpetuating discrimination and violating human rights (Yu, Spina Ali 2019; McKay, 2020; Cofone, 2021). The lack of human expertise in AI is also a significant barrier to adoption of AI in judicial decision-making. AI systems can only learn from the data they are trained on, and they may not consider important legal factors that human experts would recognize (Ashley, 2019). Additionally, ethical concerns, such as the potential for AI to replace human judgment and the need for human accountability, have been identified as barriers to AI adoption in the legal sector (Doshi-Velez et al., 2017). The use of AI in decision-making can also raise questions about its impact on human dignity and social values, as AI might not be able to consider the psychological and emotional aspects of its decisions.

The literature review provided valuable insights in role of ICT in legal system and associated barriers in the integration of ICT in justice system and legal education. However, there is still a gap in comprehensive and holistic

research on all the barriers and challenges of integrating ICT and AI in the field of justice delivery system and legal education. This research studies the interdependence of these barriers to achieve seamless utilization of ICT in the legal system.

METHODOLOGY

A list of twelve barriers has been compiled that hinder the adoption of ICT and AI in the legal system and legal education through the literature review and expert consultations, especially in light of crisis situations. To determine the most critical barrier that needs to be addressed for the adoption of ICT and AI in legal education and the judicial process, contextual relationships between the barriers need to be established. This can be accomplished through Interpretive Structural Modelling (ISM), which enables the identification of contextual relationships and interdependencies among variables. (Singh & Srivastava, 2021). Therefore, the ISM approach was adopted to analyse the interrelationship and determine the impact of the barriers. ISM can be used to model the barriers themselves and their impact on other aspects of the legal system. The following is a succinct overview of the procedural steps implicated in formulating the ISM models:

1. **Structural Self-Interaction Matrix (SSIM):** The primary step in the ISM approach involves the development of SSIM. This matrix represents the pairwise comparison of two variables, while simultaneously holding all other variables constant. The methodology is based on the opinions provided by the experts on subject matter. Hence, three groups of experts were formed consisting of law practitioners, academicians, and law students. Six respondents per group and eighteen experts in total were contacted for the input data. The matrix signifies the pairwise relationships of driving forces and dependencies among the variables.
2. **Reachability Matrix:** represented the direct influence of one barrier or component on another within a system. It was used to show the strength and direction of the relationship between different barriers in a system. The matrix contains binary values, where a "1" indicates that the component in the row has a direct influence on the component in the column, while a "0" indicates that there is no direct influence. '0' represents no relationships while '1' represents there is some kind of relationship. The sum of the '1' in a row gives the driving power of the barrier and the column gives the dependence of the barrier. The final reachability matrix formed after combining the data of three groups is presented in table 1.

Table 1: Reachability Matrix data for developing the ISM model.

3.

| S.No | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | Name of the Barrier |
|------|---|---|---|---|---|---|---|---|---|----|----|----|---|
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | Infrastructural Barrier |
| 2 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | Psychological Barrier |
| 3 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | Lacking Expertise in the Legal Fraternity |
| 4 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | Threat to Data Privacy and Security |
| 5 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | Resistance to Adopt Technology |
| 6 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | Cultural Barrier |
| 7 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | Inadequate Training |
| 8 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | Lack of Accessibility |
| 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | Lack of Standardization |
| 10 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | Lack of Ecosystem Readiness |
| 11 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | Lack of Regulatory Compliance |
| 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | Negative Attitude Towards the Adoption of ICT |

3. **Level partitioning:** This involved analysing the reachability matrix and identifying those barriers that have the most direct influence on the other barriers. The next step is to create the reachability sets and antecedent sets. The reachability set represents the set of variables derived from the corresponding variable in a row (set of all '1's in a row). Antecedent sets give the dependence of a particular barrier on others. In the subsequent stage, an identification of the interaction between the antecedent and reachability sets is carried out, and levels are

attributed to the barriers. This iterative process is continued until all the barriers are appropriately ranked with their respective levels.

4. Developing the Structural hierarchy: The final step in the ISM approach involves the development of a hierarchy among the identified barriers. This is done by using the levels assigned in step three to create a hierarchy model.

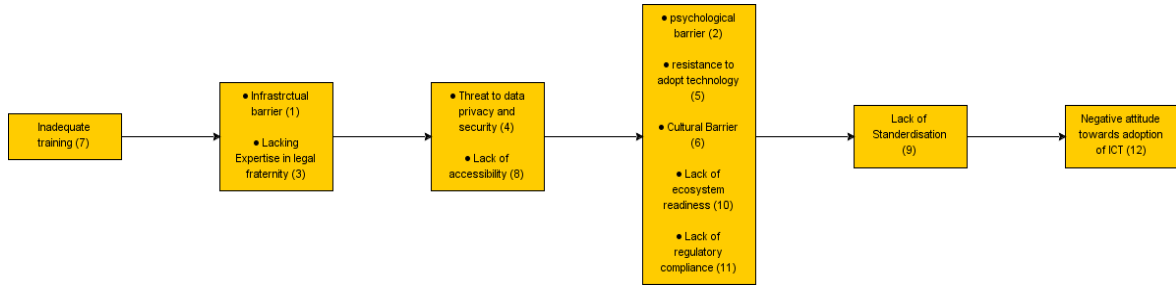


Figure 1: Represents the hierarchical model as an output of ISM methodology.

RESULTS AND DISCUSSIONS

The final ISM model, which illustrates the driving and dependent barriers in adoption of ICT in legal education and the judicial process, is presented in Figure 1. The barriers on the left side of the figure are the driving barriers, while those on the right side are the dependent barriers.

The driving barriers, including inadequate training, infrastructural barriers, and lacking expertise in the legal fraternity, have a high driving effect, and overcoming these barriers can eliminate the effect of dependent barriers. Conversely, barriers such as "negative attitude towards adoption of ICT" and "lack of standardization" are highly dependent on the other barriers in the system. Efficient usage of ICT and AI tools during the crisis time requires systems to focus on changing the perceptions and attitudes of all stakeholders towards these technologies. The barriers that serve as linkages between the driving and dependent barriers, such as 'threat to data privacy and security', 'lack of accessibility', 'psychological barrier', 'resistance to adopt the technology', 'cultural barrier', 'lack of ecosystem readiness' and 'lack of regulatory compliance', have both high driving power and high dependence. Addressing these linkages can facilitate the successful adoption of ICT in the legal education and judicial process.

IMPLICATIONS

This study provides a roadmap to build the trust and acceptability of ICT and AI tools in legal education and judicial process. Most of the legal institutions and judiciary system struggling to bring standardisation in the procedures and lack of standards in adopting the ICT into it which in turn increasing the time to complete the tasks and creating the negative attitude towards the ICT. However, it is hard to work on standardisation and eliminating the negative attitude among the stakeholders. (Casey, 2021). The presented ISM model offers an understanding of the root causes of the challenges faced by ICT and AI adoption in legal education and judicial processes. It highlights the barriers that require immediate attention to eliminate these challenges from the system. According to the model, if the system prioritizes addressing the inadequacies in training, infrastructure, and expertise in using ICT in the legal fraternity, it can effectively eliminate the threats to data privacy and security, as well as the lack of accessibility tools. This will ultimately result in an improvement in standards and the elimination of negative attitudes towards the adoption of ICT and AI in the legal systems.

CONCLUSION

The adoption of ICT and AI in legal systems has been hindered by various barriers, including inadequate training, infrastructural challenges, and lack of expertise in the legal fraternity. The study suggests that these driving barriers should be addressed to facilitate the adoption of ICT in legal education and judiciary procedures, which will ensure

uninterrupted delivery of justice to the common people and education to the students, especially during crisis situations like the COVID-19 pandemic. While the implementation of ICT and AI in the legal sector offers numerous benefits, including efficiency and accuracy in legal decision-making, there are data privacy and security concerns that need to be addressed. Biased decisions due to biased data is another major challenge in the field of AI, and it requires careful consideration and strategies to mitigate its impact in the legal sector. To address these concerns, measures such as data encryption, access controls, regular security audits, and robust data cleaning and monitoring processes can be implemented to mitigate the risks of unauthorized access and misuse of data. Promoting transparency and interpretability in AI models can also help to increase accountability and build trust in the technology, which is essential for its widespread adoption.

It is important to note that while the list of barriers identified in this study is not exhaustive, addressing the driving barriers and data privacy and security concerns is a crucial step towards the successful adoption of ICT and AI in legal decision-making. By overcoming these barriers and implementing necessary strategies, legal systems can leverage the benefits of ICT and AI to ensure efficient and effective legal services to society.

REFERENCES

1. A. D. (Dory) Reiling, "Courts and Artificial Intelligence," 11 *IJCA* 1 (2020).
2. Abbott, Ryan. "Artificial intelligence, big data and intellectual property: protecting computer generated works in the United Kingdom." In *Research handbook on intellectual property and digital technologies* (Edward Elgar Publishing, 2020).
3. Akhter Md Hasib, Kazi Tamzid, Ixion Chowdhury, Saadman Sakib, Mohammad Monirujjaman Khan, Nawal Alsufyani, Abdulmajeed Alsufyani, and Sami Bourouis. "Electronic health record monitoring system and data security using blockchain technology." *Security and Communication Networks*, 1-15 (2022).
4. Ashley, Kevin D. "A brief history of the changing roles of case prediction in AI and law." *Law Context: A Socio-Legal Journal* 36 (1) (2019).
5. Baracaldo, Nathalie, Luis Angel D. Bathen, Roqeeb O. Ozugha, Robert Engel, Samir Tata, and Heiko Ludwig. "Securing data provenance in internet of things (IoT) systems." In *Service-Oriented Computing–ICSOC 2016 Workshops: ASOCA, ISyCC, BSCI, and Satellite Events, Banff, AB, Canada, October 10–13, 2016, Revised Selected Papers 14*, (Springer International Publishing, 2017) pp. 92-98.
6. Berendt, Bettina, Allison Littlejohn, and Mike Blakemore. "AI in education: learner choice and fundamental rights." *Learning, Media and Technology* 45 (3) 312-324 (2020).
7. Busuicoc, Madalina. "Accountable artificial intelligence: Holding algorithms to account." *Public Administration Review* 81 (5), 825-836 (2021).
8. Cofone, Ignacio. "AI and judicial decision-making." *Artificial Intelligence and the Law in Canada* (Toronto: LexisNexis Canada 2021).
9. D. Reiling, "Technology for Justice: How Information Technology Can Support Judicial Reform" (Amsterdam University Press 2010).
10. Daniel. L. Chen, "Machine Learning and the Rule of Law" in Michael A Livermore and Daniel N Rockmore (eds), *Law as Data* (Paperback, SFI Press 2019).
11. Deeks, Ashley. "The judicial demand for explainable artificial intelligence." *Columbia Law Review* 119 (7), 1829-1850 (2019).
12. Doshi-Velez, Finale, Mason Kortz, Ryan Budish, Chris Bavitz, Sam Gershman, David O'Brien, Kate Scott et al. "Accountability of AI under the law: The role of explanation." Cornell University [arXiv:1711.01134](https://arxiv.org/abs/1711.01134) (2017).
13. Fraser, Henry, Rhyle Simcock, and Aaron J. Snoswell. "AI Opacity and Explainability in Tort Litigation." *ACM Conference on Fairness, Accountability, and Transparency*, 185-196 (2022).
14. Holmes, Wayne, Kaska Porayska-Pomsta, Ken Holstein, Emma Sutherland, Toby Baker, Simon Buckingham Shum, Olga C. Santos et al, "Ethics of AI in education: Towards a community-wide framework." *International Journal of Artificial Intelligence in Education*, 1-23 (2021).
15. J. Griffiths, "What Is Legal Pluralism?" *The Journal of Legal Pluralism and Unofficial Law* 18(1) (1986).
16. K. Nakamura and K. B. Bucklen, "Recidivism, Redemption, and Desistance: Understanding Continuity and Change in Criminal Offending and Implications for Interventions," 8 *Sociology Compass* 384 (2014).
17. Kluttz, Daniel N., and Deirdre K. Mulligan. "Automated decision support technologies and the legal profession." *Berkeley Technology Law Journal* 34 (3), 853-890 (2019).
18. Kordzadeh, Nima, and Maryam Ghasemaghahi. "Algorithmic bias: review, synthesis, and future research directions." *European Journal of Information Systems* 31 (3), 388-409 (2022).

19. McKay, Carolyn. "Predicting risk in criminal procedure: actuarial tools, algorithms, AI and judicial decision-making." [Current Issues in Criminal Justice](#) 32 (1), 22-39 (2020).
20. Mills. M., 'Artificial Intelligence in Law: The State of Play' (Brookings Institution, 2018)
21. Pastaltzidis, Ioannis, Nikolaos Dimitriou, Katherine Quezada-Tavarez, Stergios Aidinlis, Thomas Marquenie, Agata Gurzawska, and Dimitrios Tzovaras, "Data augmentation for fairness-aware machine learning: Preventing algorithmic bias in law enforcement systems." [ACM Conference on Fairness, Accountability, and Transparency](#), 2302-2314 (2022).
22. R. Sil, A. Roy, B. Bhushan and A. K. Mazumdar, "Artificial Intelligence and Machine Learning based Legal Application: The State-of-the-Art and Future Research Trends," International Conference on Computing, Communication, and Intelligent Systems (ICCCIS), 57-62 (2019).
23. Report: Functioning of virtual courts, Standing Committee Report Summary available at <<https://prsindia.org/policy/report-summaries/functioning-of-virtual-courts>> (30 September 2020).
24. Shrestha, Yash Raj, Shiko M. Ben-Menahem, and Georg Von Krogh, "Organizational decision-making structures in the age of artificial intelligence." [California Management Review](#) 61(4),66-83 (2019).
25. SIYATON, <https://siyaton.com/hanaservices/artificial> (2018).
26. T. Sourdin, B. Li and D. M. McNamara, "Court Innovations and Access to Justice in Times of Crisis," 9 The COVID-19 pandemic: Global health policy and technology responses in the making, 447 (2020).
27. Van Noordt, Colin, and Gianluca Misuraca, "Exploratory insights on artificial intelligence for government in Europe." [Social Science Computer Review](#) 40(2) 426-444 (2022).
28. Von Eschenbach, Warren J, "Transparency and the black box problem: Why we do not trust AI." [Philosophy & Technology](#) 34(4) 1607-1622 (2021).
29. Wu, Andrew J. "From video games to artificial intelligence: assigning copyright ownership to works generated by increasingly sophisticated computer programs." [AIPLA QJ](#) 25 (1997).
30. Yamin, Muhammad Mudassar, Mohib Ullah, Habib Ullah, and Basel Katt, "Weaponized AI for cyber-attacks." [Journal of Information Security and Applications](#) 57 (2021). Yu, Ronald, and Gabriele Spina Ali. "What's inside the black box? AI challenges for lawyers and researchers." [Legal Information Management](#) 19(1) (2019).