



The Impact of Technology on Judicial Process: E-Courts and Virtual Hearings in India

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ABSTRACT

The judicial process in India has long been characterized by its procedural complexities, delay in case disposal, and limited accessibility to justice for marginalized communities. The integration of technology, particularly through e-courts and virtual hearings, has transformed the landscape of the justice delivery system. This research paper critically examines the evolution of judicial technology in India, the framework and implementation of the e-court project, and the paradigm shift brought about by virtual hearings. It explores the benefits, challenges, and comparative perspectives from other jurisdictions, while analyzing judicial pronouncements on the subject. The study concludes with policy recommendations for strengthening the technological infrastructure of Indian courts, ensuring procedural fairness, and embracing innovations such as artificial intelligence and blockchain for the future of judicial process.

1. Introduction

The Indian judiciary, one of the world's largest, plays a pivotal role in upholding the rule of law and safeguarding constitutional rights. However, it has historically faced several challenges, including backlog of cases, delays in adjudication, and limited accessibility for rural and marginalized communities. According to the National Judicial Data Grid (NJDG), as of 2024, more than 5 crore cases were pending before Indian courts. These structural issues demand urgent reforms to ensure timely and effective justice delivery.

Technology has emerged as a transformative tool in modernizing the judicial process. From digitization of records to the use of artificial intelligence for case management, technological innovations are reshaping how justice is administered. Among these, e-courts and virtual hearings have become the most significant reforms, particularly after the COVID-19 pandemic.

The introduction of e-courts under the National e-Governance Plan (NeGP) aimed to provide efficient, transparent, and affordable access to justice. The COVID-19 pandemic accelerated the adoption of virtual hearings, compelling courts to shift from traditional in-person proceedings to online platforms. This transition, though initially challenging, has demonstrated the potential of technology in ensuring continuity of judicial process in times of crisis.

This paper seeks to explore the impact of technology on the judicial process in India, focusing on the e-court project and virtual hearings. It examines their evolution, benefits, challenges, judicial interpretations, and future prospects, while also drawing comparisons with international practices.

2. Evolution of Judicial Technology in India

The integration of technology into the Indian judicial system did not occur overnight. It has been a gradual process marked by several initiatives.

2.1 Early Reforms

The earliest attempts at judicial computerization began in the 1990s, when the Supreme Court and High Courts initiated digitization of cause lists and judgments. By the early 2000s, e-filing of cases in some High Courts was introduced on an experimental basis.

2.2 National Policy and Action Plan (2005)

The turning point came with the National Policy and Action Plan for Implementation of Information and Communication Technology (ICT) in the Indian Judiciary (2005), prepared by the e-Committee of the Supreme Court of India. The policy emphasized ICT as a means to enhance efficiency, transparency, and accessibility in courts.

2.3 National e-Governance Plan (2006)

Under the National e-Governance Plan, the **e-Courts Mission Mode Project** was launched to computerize and digitize judicial processes across district and subordinate courts. This initiative laid the foundation for online case status, automated case flow management, and the development of the National Judicial Data Grid (NJDG).

2.4 e-Courts Project Phases

- **Phase I (2007–2015):** Focused on computerization of district and subordinate courts, providing ICT infrastructure, and digitizing case records.
- **Phase II (2015–2023):** Expanded objectives to include e-filing, e-payment, video conferencing facilities, and integration with police and prisons.
- **Phase III (2023–onwards):** Emphasizes virtual courts, AI-driven judicial systems, interoperability, and paperless functioning.

3. E-Courts in India: Framework and Implementation

The e-Courts project is one of the most ambitious initiatives of the Indian judiciary. It is funded by the Government of India and monitored by the Supreme Court's e-Committee.

3.1 Objectives of e-Courts

1. To provide litigants access to case information anytime, anywhere.
2. To ensure transparency and efficiency in judicial functioning.
3. To reduce delays and pendency.
4. To introduce paperless and eco-friendly procedures.
5. To integrate various stakeholders like police, prisons, and prosecution agencies.

3.2 Achievements of e-Courts

- Over 18,000 district and subordinate courts have been computerised.



- e-filing systems have been operational in several High Courts and tribunals.
- Virtual Courts for petty traffic challan cases have been set up in Delhi, Haryana, and Maharashtra.
- The National Judicial Data Grid (NJDG) provides real-time data on pendency and disposal of cases.
- SMS and email services notify litigants about case status.

3.3 Challenges in Implementation

- Lack of uniformity across states.
- Poor internet connectivity in rural areas.
- Limited technical training for judges and court staff.
- Resistance to change among legal practitioners.

4. Virtual Hearings: A Paradigm Shift

Virtual hearings refer to court proceedings conducted via online platforms like Zoom, Cisco Webex, and Jitsi Meet.

4.1 Rise of Virtual Hearings

The COVID-19 pandemic compelled courts to adopt virtual hearings to ensure continuity of judicial functions. The Supreme Court, for the first time in history, conducted proceedings entirely online in March 2020.

4.2 Practices in Indian Courts

- The Supreme Court and High Courts conducted thousands of hearings virtually during the pandemic.
- District courts, though less equipped, also adopted hybrid models.
- Certain High Courts, like Delhi and Karnataka, have retained hybrid hearings even post-pandemic.

4.3 Landmark Cases Conducted Virtually

- **Maratha Reservation Case (2021):** Heard virtually by a Constitution Bench.
- **Farm Laws Repeal Case (2021):** Proceedings conducted through video conferencing.



- **Bail applications and urgent matters** were efficiently disposed of via virtual platforms.

5. Benefits of Technology in Judicial Process

1. **Speed and Efficiency:** E-filing and digital records reduce procedural delays.
2. **Transparency:** Online access to case status curbs corruption and enhances accountability.
3. **Accessibility:** Litigants from remote areas can attend hearings virtually, reducing travel and costs.
4. **Continuity:** Technology ensured uninterrupted judicial functioning during the pandemic.
5. **Integration:** Stakeholders like police, prisons, and prosecution agencies are connected digitally.

6. Challenges of Technology in Judiciary

Despite its advantages, technology in judicial process poses several challenges:

1. **Digital Divide:** Large sections of the rural population lack access to stable internet and devices.
2. **Cybersecurity Concerns:** Risk of hacking, data breaches, and misuse of sensitive case files.
3. **Procedural Fairness:** Questions about cross-examination, authenticity of digital evidence, and witness credibility remain unresolved.
4. **Training Gaps:** Judges, lawyers, and court staff often lack technical skills to adapt effectively.
5. **Overburdened Infrastructure:** Many courts still lack sufficient bandwidth and digital infrastructure.

7. Comparative Study: Global Practices

7.1 United States

The US judiciary adopted **Electronic Case Filing (ECF)** systems long ago, and video hearings became common during COVID-19. The US Supreme Court held remote oral arguments in 2020.

7.2 United Kingdom

The UK courts introduced **Cloud Video Platform (CVP)** for remote hearings. The judiciary has also integrated digital evidence systems.

7.3 Singapore

Singapore is a global leader in judicial technology, using **AI-powered case management systems** and **paperless courts**.

7.4 Lessons for India

- India can adopt Singapore's AI-based case management.
- UK's emphasis on user-friendly video platforms can be replicated.
- The US experience with electronic case filing can guide India's expansion of e-filing.

8. Judicial Pronouncements on Technology in Courts

The Supreme Court of India has consistently supported technological integration.

- **State of Maharashtra v. Dr. Praful Desai (2003):** Recognized video conferencing as a valid form of testimony.
- **Swapnil Tripathi v. Supreme Court of India (2018):** Allowed live streaming of court proceedings in constitutional matters.
- **Supreme Court Suo Motu Writ (2020):** Permitted use of video conferencing for hearings during COVID-19.

These judgments reflect judicial endorsement of technology as a facilitator of justice.

9. Future of Judicial Technology in India

The future of the judicial process in India lies in embracing deeper and more sophisticated technological integration. With the growing reliance on digital tools and platforms, courts must not only modernize existing systems but also prepare for disruptive innovations that have the potential to redefine how justice is delivered. Among the most promising avenues for the future are artificial intelligence, blockchain, smart contracts, hybrid courts, and capacity building initiatives.

9.1. Artificial Intelligence (AI)

Artificial Intelligence is emerging as a powerful tool for transforming judicial administration. In the Indian context, AI can be harnessed to support judges and lawyers in a wide range of tasks such as legal research, case management, and even predictive analysis of outcomes. AI-driven platforms can analyze vast databases of judgments, statutes, and precedents to provide quick and relevant references, thereby reducing the time spent on legal research. Similarly, AI can streamline case management by automatically

categorizing cases based on urgency, subject matter, and legal complexity, which can significantly improve the allocation of judicial resources. While predictive justice—where AI suggests probable outcomes based on past judgments—may not replace judicial reasoning, it can guide litigants and lawyers in assessing the strength of their cases. However, the ethical challenges of algorithmic bias and the importance of human discretion in justice delivery must remain central to any adoption strategy.

9.2. Blockchain Technology

Blockchain, a decentralized and tamper-proof ledger system, offers immense potential for strengthening judicial processes. Courts often struggle with issues of record tampering, missing files, or manipulation of evidence. Blockchain can ensure that court records, judgments, and digital evidence are stored in a secure, immutable format that cannot be altered without authorization. This would greatly enhance transparency and accountability. Moreover, blockchain can be particularly effective in the management of land records, intellectual property rights, and financial transactions, where authenticity of documents is critical. For example, once a judicial decision is stored on a blockchain, it becomes permanently verifiable and immune to alteration, thus reducing corruption and enhancing trust in the justice system.

9.3. Smart Contracts

Another futuristic application lies in the use of smart contracts, which are self-executing agreements coded with predefined conditions. These can be particularly useful in the realm of commercial law, where parties can automate enforcement of obligations without requiring prolonged litigation. For instance, in a supply chain agreement, if goods are delivered as per the contract terms, the smart contract could automatically trigger the release of payment. This reduces the need for judicial intervention in routine disputes and frees up courts to focus on more complex matters. While their application in India is still in the experimental stage, smart contracts hold promise for revolutionizing dispute resolution, especially in commercial transactions, arbitration, and consumer rights.

9.4. Hybrid Courts

The concept of hybrid courts, combining both physical and virtual hearings, is likely to become a permanent feature of the Indian judiciary. The COVID-19 pandemic demonstrated that virtual hearings can ensure continuity of judicial functions, but it also highlighted that certain cases—especially those involving detailed evidence, witness credibility, or cross-examination—require in-person adjudication. A hybrid model provides flexibility by allowing litigants and lawyers to participate virtually in routine matters such as adjournments, bail hearings, and interim orders, while reserving physical hearings for



complex cases. This not only reduces crowding in courts but also cuts down litigation costs and improves accessibility for people from remote areas. Hybrid courts thus represent a balanced approach, blending the efficiency of technology with the integrity of traditional judicial procedures.

9.5 Capacity Building and Digital Literacy

No technological reform can succeed without adequate human capacity to use and manage it. A major challenge in the Indian judiciary has been the limited technical knowledge among judges, lawyers, and court staff. To address this, mandatory digital literacy and capacity-building programs are essential. Judges must be trained in using e-filing systems, video conferencing platforms, and AI-driven legal research tools, while lawyers need exposure to digital advocacy skills. Furthermore, law schools and bar councils should integrate courses on technology and law to prepare future legal professionals for a digital courtroom environment. Capacity building will not only improve efficiency but also help overcome resistance to technological change, ensuring smoother adaptation across the judiciary.

10. Conclusion & Suggestions

Technology has undoubtedly revolutionized the judicial process in India, marking a significant shift from traditional methods of justice delivery to more modern, efficient, and accessible practices. The adoption of e-courts and virtual hearings has played a central role in this transformation. By digitizing case records, introducing e-filing, and enabling hearings through video conferencing, the judiciary has moved closer to its constitutional promise of ensuring justice that is speedy, affordable, and accessible to all.

One of the most striking benefits of technological adoption is enhanced accessibility. Earlier, litigants residing in rural or remote areas faced immense difficulties in traveling long distances to appear before courts. Virtual hearings have mitigated this challenge by allowing participation through online platforms, thereby reducing financial and logistical burdens. Similarly, the establishment of online portals such as the National Judicial Data Grid (NJDG) provides real-time information on case status, pendency, and judgments. This not only empowers litigants with information but also reduces dependence on middlemen, thereby curbing corruption and promoting transparency.

Another critical contribution of technology lies in efficiency and speed. E-filing has simplified procedural requirements by enabling lawyers to file petitions online without physically visiting court premises. Case management systems help prioritize urgent matters, and video conferencing reduces unnecessary adjournments, especially in cases where physical presence is not mandatory. For example, bail applications and interim relief matters are now disposed of more quickly, which directly contributes to



reducing judicial backlog. Moreover, virtual courts for traffic challans and petty offences have successfully demonstrated how minor cases can be resolved without burdening regular courtrooms. Equally important is the transparency brought about by technological integration. When case data, cause lists, and orders are made publicly available online, it strengthens accountability and reduces the possibility of manipulation. Citizens can track the progress of their cases independently, which enhances trust in the judicial system. Additionally, the live-streaming of important hearings, as allowed by the Supreme Court in certain matters, has opened a new era of public engagement with the judiciary, making the process more participatory and democratic.

However, despite these remarkable advances, challenges remain pressing. The most significant among them is the digital divide. Large sections of the population, especially in rural India, still lack access to stable internet connections, smartphones, or computers. This inequality creates a situation where technology, instead of democratizing access, risks widening the gap between privileged and marginalized litigants. Access to justice, a fundamental constitutional guarantee, cannot be fully realized unless digital infrastructure reaches the grassroots. Another concern is cybersecurity and data protection. Judicial records and case files often contain sensitive personal and financial information. The shift to digital platforms makes them vulnerable to hacking, unauthorized access, and data breaches. Without robust cybersecurity measures and data protection laws, the credibility of the judicial system could be undermined.

Procedural fairness is also a contentious issue. In traditional hearings, the physical presence of witnesses and lawyers allows judges to assess credibility through demeanor and body language. In virtual hearings, such observations are often limited, raising concerns about the fairness of cross-examinations and the authenticity of digital evidence. Similarly, unequal access to technological resources among lawyers—particularly junior advocates—may affect the quality of representation, thereby impacting justice outcomes. In conclusion, while technology has undeniably enhanced accessibility, efficiency, and transparency in India's judicial process, it is not a panacea. Unless issues such as the digital divide, cybersecurity risks, and procedural fairness are systematically addressed, the full potential of e-courts and virtual hearings cannot be realized. The path forward lies in adopting a balanced approach—leveraging the benefits of technology while ensuring inclusivity, security, and fairness. The judiciary must remain vigilant in ensuring that technological advancements serve the ultimate goal of justice, rather than creating new barriers in its path.

Suggestions:



1. Expand internet infrastructure to rural areas.
2. Introduce uniform e-filing systems across all courts.
3. Conduct regular training workshops for judges, lawyers, and staff.
4. Strengthen cybersecurity protocols for court data.
5. Promote hybrid hearings for greater inclusivity.
6. Encourage AI and blockchain integration in judicial administration.

The judicial process in India is at the cusp of transformation. If technology is harnessed effectively, it can ensure that justice is not only delivered but also delivered timely, transparently, and to all sections of society.

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