Evaluating ICT Adoption in the Indian Judiciary: Challenges, Opportunities, and the Impact of the E-Courts Project

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Abstract

Over recent decades, the integration of Information and Communication Technology (ICT) across various industries has significantly boosted human effort and creativity. The legal sector, particularly the Indian Judiciary, is no exception to this trend. In response, the Supreme Court of India implemented the National Policy and Action Plan for ICT deployment in the Indian Judiciary (Action Plan 2005) via the e-Courts Project in 2005. This paper critically examines the Indian government's and Supreme Court's efforts to integrate ICT within Indian courts. It assesses the e-Courts Project's successes and challenges during its initial two phases, focusing on the objectives outlined in Action Plan 2005. The analysis revolves around three primary goals: reducing the backlog of pending cases and judicial workload, cutting down litigation costs and complexities, and improving transparency and legal literacy in judicial processes. By exploring progress in these areas, the paper offers insights into whether a strategic reorientation is needed for the upcoming third phase of the e-Courts Project.

Keywords: *Supreme Court of India, National Judicial Data Grid, e-Courts, Court Management Systems, AI Integration in Judicial Decision-Making.*

I.   Introduction

Over the past few decades, various industries have increasingly adopted Information and Communication Technology (ICT) to boost human efficiency and creativity. This technological revolution has profoundly transformed sectors

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such as pharmacology, education, transportation, finance, and logistics, with each industry tailoring the integration of ICT to meet its unique challenges and opportunities. The legal field is no exception. It faces a distinct set of challenges and opportunities in adopting ICT. The integration of new technologies to streamline legal processes has been an ongoing evolution for decades[3]. For instance, innovative tools such as film material and simultaneous translation were utilised in the war crimes tribunals following World War II.[4] Today, IT systems are extensively employed in courts across several countries. These systems include video and audio recording, electronic court reporting, electronic files, and videoconferencing. Globally, many courts, administrative tribunals, and arbitrators publish their procedures and decisions online[5], making information more accessible to interested and involved parties. Additionally, a few countries have begun integrating machine learning and artificial intelligence (AI) into judicial processes[6]. India has also shown keen interest in adopting ICT in its courts.

The Supreme Court of India (SCI) launched the National Policy and Action Plan for Implementing Information and Communication Technology in the Indian Judiciary (hereafter referred to as Action Plan 2005) on August 1, 2005. This initiative, known as the eCourt Project, aimed to outline the adoption of ICT. The Action Plan's goals were to make the Indian Judiciary affordable, accessible,

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[3] Karen Etlis, The Judicial System in the Digital Age: Revisiting the Relationship Between Privacy and Accessibility in the Cyber Context, 56 McGill Law Journal 289 291 (2011); Dory Reiling, Courts and Artificial Intelligence, 2 International Journal for Court Administration 8 (2020)

[4] Viviane E Dittrich and Jolana Makraiová, Towards a Fuller Appreciation of the Tokyo Tribunal, 5 The Tokyo Tribunal: Perspective on Law, History and Memory 1 (2020); David M Crowe, 'The Tokyo and Nuremberg International Military Tribunal Trials: A Comparative Study, 5 The Tokyo Tribunal: Perspectives on Law, History and Memory 42 (2020)

[5] Laney Zhang, China: Supreme People's Court Issues Online Litigation Rules, Addressing Review of Blockchain Evidence, Library of Congress (July 21, 2021), https://www.loc.gov/item/global-legal-monitor/2021-07-21/china-supreme-peoples-court-issues-online-litigation-rules-addressing-review-of-blockchain-evidence.

[6] Unesco, AI and the Rule of Law: Capacity Building for Judicial Systems, UNESCO (Aug. 2, 2023), https://www.unesco.org/en/artificial-intelligence/rule-law/mooc-judges

cost-effective, transparent, and accountable[7]. This initiative was crucial due to the vital role the Indian Judiciary plays in the framework of Indian Democracy. The public's trust in the fairness of the judiciary is intrinsically linked to the subjective well-being and perceived prosperity of the average Indian citizen[8]. The Action Plan was introduced at a time when the Indian Judiciary faced challenges in delivering speedy and effective justice, popularising Alternate Dispute Resolution (ADR), providing access to justice, and ensuring the credibility of courts[9].

This paper analyses the effectiveness and underlying rationale behind the initiatives undertaken by the Indian government and the Supreme Court to integrate ICT into the nation's judiciary. It focuses on the successes and challenges of the eCourt Project's first two phases, evaluating how effectively the goals of Action Plan 2005 have been met. This study provides a detailed review of the eCourt Project's 16-year journey, starting with Phase 1 in 2007, and primarily concentrates on progress in three critical objectives: reducing the excessive backlog of judicial cases, decreasing the volume of pending cases, and facilitating timely justice administration. Additionally, the paper explores efforts to streamline costs and procedural complexities for legal professionals and litigants, as well as the project's commitment to enhancing transparency in legal proceedings and improving public legal literacy. By assessing the progress against these established goals, the paper delivers a qualitative evaluation of the preliminary framework for the eCourt Project's impending third phase, pinpointing potential areas for strategic refinement to effectively realise the initial objectives.

II.   Challenges Faced by the Indian Judiciary

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[7] E-Committee, Supreme Court of India, 'National Policy and Action Plan for Implementation of Information and Communication Technology in the Indian Judiciary' (2005)

[8] Vani S Kulkarni, Change in Subjective Well-Being, Affluence And Trust in Judiciary in India, Scholarly Commons (Dec. 5, 2022), https://repository.upenn.edu/handle/20.500.14332/44296

[9] Justice R.V Raveendran, Justice Delivery- Some Challenges and Solutions, SCC (Oct. 15, 2022), https://www.scconline.com/blog/post/2022/10/15/justice-delivery-some-challenges-and-solutions/

In India's constitutional democracy, the judiciary is an essential component alongside the legislative and executive branches. It plays a pivotal role in resolving disputes and maintaining the balance of power through judicial review. This review involves delineating and, at times, curtailing the influence of its democratic counterparts. At its core, the judiciary acts as a testament to the state's legitimacy, embodying the sovereign mandate to allocate rights and responsibilities among its citizens equitably. This intricate system bears the dual burden of fulfilling the aspirations of both the state and its citizens. The judiciary faces numerous challenges, including the complexities encountered by average citizens in achieving legal ends, the efforts of the legal community and judicial officials to facilitate these legal processes and the judiciary's commitment to delivering fair and equitable judgments. Due to the scope of this paper, a comprehensive examination of every challenge the Indian Judiciary faces is beyond our means. Therefore, our discussion will focus on the most pressing challenges, particularly those that can be or have been alleviated by technological advancements in the judicial system.

A. High number of cases – Pending Cases

An analysis of data from the National Judicial Data Grid of India allows us to chart the annual trends in case filings and dispositions. This examination aids in understanding the scale of pending cases, offering insights into the workload challenges faced by the judiciary, and assessing the potential efficacy of measures taken to address the case backlog.
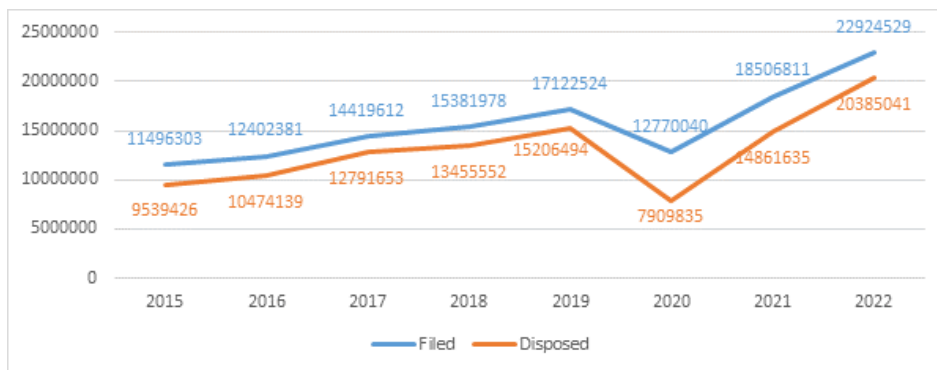
Figure 1: Number of cases filed across District and Taluka courts in India annually
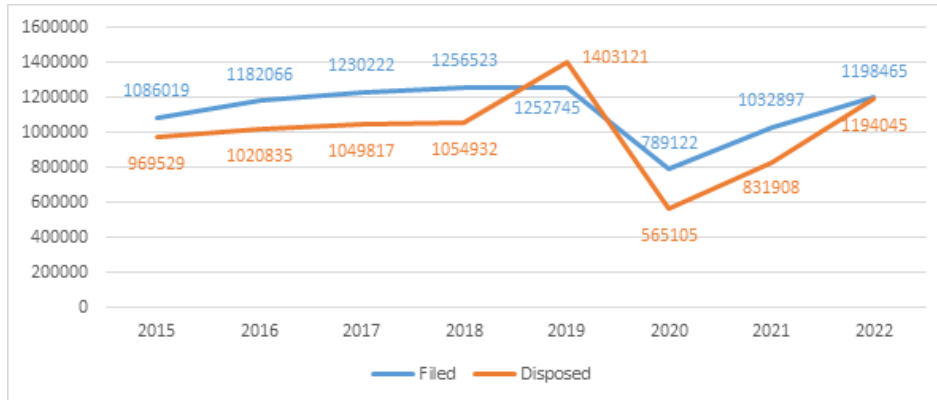

Figure 2: Number of cases filed across High Courts in India annually

A longitudinal analysis of annual case filings reveals a continuous upward trend. The data indicates an average annual increase of 1.29% in filings at the High Court level and a more substantial 12.45% increase at the District and Taluk Courts level. This persistent rise in new cases highlights a critical issue. Despite efforts to boost the number of cases resolved each year, such initiatives have not kept pace with the incoming caseload. Since 2015, there has been a consistent shortfall in the judiciary's capacity, with more cases being filed than disposed of each year.
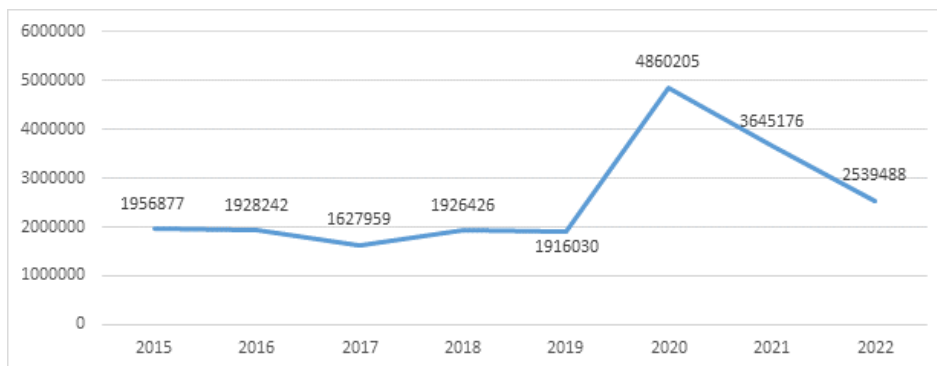
Figure 3: Difference between the number of filed and disposed cases annually at the District and Taluk Courts in India
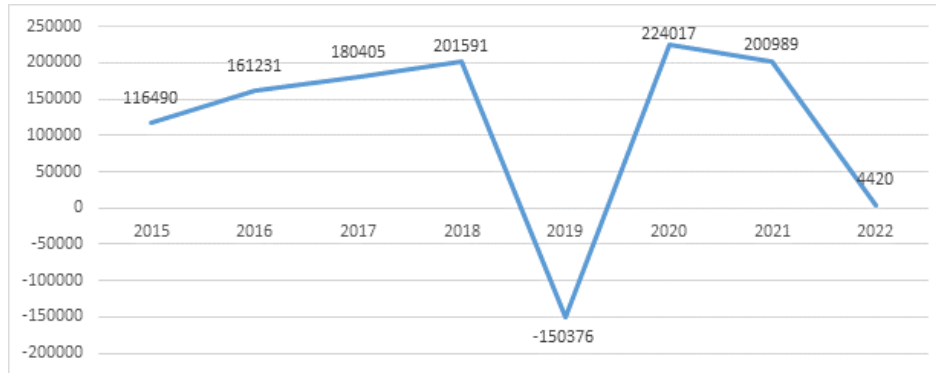

Figure 9: Difference between the number of filed and disposed cases annually at the High Courts in India

Due to the consistent annual excess of filed cases over those disposed of, the backlog of pending cases has escalated yearly. As of the latest available data, the number of cases awaiting resolution in the District and Taluk courts of India has reached 44,154,803, with the High Court's grappling with 6,062,871 pending cases. Meanwhile, the Supreme Court of India is dealing with a backlog of 69,766 cases.[10]

B. High number of cases – Judicial Workload

The Indian judicial system assigns judge a combination of judicial and administrative duties. A judge's role primarily involves hearing cases, rendering decisions, and issuing judgments. These core judicial functions are supplemented by court administration and personnel management responsibilities. However, a disconcerting discrepancy emerges when comparing the optimal time allocated for these judicial duties against the actual time judges can devote. This imbalance significantly contributes to the growing gap between the number of cases filed

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[10] Supreme Court of India, Pending Dashboard, At Glance, National Judicial Data Grid (Nov. 7, 2023), https://njdg.ecourts.gov.in/scnjdg/

and those conclusively resolved, exacerbating the challenge of addressing the burgeoning backlog.

In a seminal study by Hemrajani and Agarwal[11], the researchers developed a tool to extract data from the digital case-update boards of the Supreme Court of India from 2013 to 2015. Their temporal analysis of this data revealed the time allocation across various cases in a judge's docket. On average, a judge dedicated approximately 35 minutes of their working day to the disposal of a single case. Intriguingly, the median duration for most case hearings was under 5 minutes. The analysis further showed that Supreme Court judges spend 87.79% of their time on hearings, rendering judgments, and disposing of cases, leaving only 12.21% for essential tasks such as research, court administration, and judgment drafting. The study concluded that even if judges dedicated all their working hours solely to hearing and resolving cases, it would still take around two decades to clear the backlog accumulated by 2017, assuming a constant influx of new cases.[12]

Furthermore, with approximately 21.03 judges per million citizens in India[13], the demographic distribution results in a heavy caseload of judges, potentially affecting their psychological well-being. Persistent, overwhelming workloads might compromise the quality of judicial decisions. Judges consistently facing an influx of cases are more prone to secondary traumatic stress[14]. Regular exposure to graphic content, malevolent behaviours of offenders, and harrowing accounts, combined with inadequate personal downtime, can lead to 'empathy fatigue,' potentially causing seasoned judges to issue more stringent rulings.

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[11] Rahul Hemrajani & Himanshu Agarwal, A Temporal Analysis of the Supreme Court of India's Workload, 3 *Indian Law Review* 125 (2018).

[12] *Id. at* 165.

[13] Ministry of Law, Inadequate Fast Track Courts and Vacancies in Courts, Press Information Bureau (Oct. 2, 2022), https://pib.gov.in/Pressreleaseshare.aspx?PRID=1797201

[14] Charles P Edwards & Monica K Miller, An Assessment of Judges' Self-Reported Experiences of Secondary Traumatic Stress, 70 *Juvenile and Family Court Journal* 18 (2019)

i.   Legal Literacy among Indian citizens

In the Indian Judiciary, English is the predominant medium for official discourse and adjudication, inadvertently marginalising significant portions of the population. Those affected by this language barrier must rely entirely on legal representation to navigate procedural and substantive legal matters. This linguistic challenge was formally acknowledged during the 75th Independence Day celebrations with the launch of the Pan India Legal Literacy and Legal Awareness Scheme by the Government of India. At the 17th All India Meeting of the National Legal Services Authority (NALSA), then Chief Justice of India, Justice Gogoi, emphasised that the primary barrier to a widespread 'legal aid revolution' and increased legal literacy is the low awareness of fundamental duties and rights among Indian citizens.

The complexity of legal jurisprudence and the need for ongoing education in this field put the average Indian at a disadvantage in fully utilising the transparent nature of the Indian Judicial System. Although historical case law and judgments are made available to the public to establish legal precedents and support informed decision-making, it is noted that these resources predominantly serve the needs and interests of the legal profession rather than the general public.

ii.   Access to Justice

According to the Open Society Foundations, 'Access to Justice' refers to an individual's capacity to obtain legal remedies and uphold their rights in line with established human rights standards. This concept emphasises the importance of both formal and informal judicial institutions being accessible and competent in delivering justice and providing necessary legal support. Building upon this idea, the United Nations Development Programme (UNDP), in its Access to Justice report, contends that the perception of the legal system as sceptical, alien, or financially, jurisprudentially, or informationally inaccessible — along with systemic flaws or inherent biases — significantly hinders actual access to justice.[15]

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[15]   UNDP, Access to Justice, UNDP, (Sep. 3, 2004), https://www.undp.org/sites/g/files/zskgke326/files/publications/Justice_PN_En.pdf

India follows a hierarchical system of courts. Cases are first heard in the Taluk and District courts and then subsequently raised to High Courts, and finally, only a few cases are moved to the Supreme Court due to their gravity. Higher courts are present in urban areas. Thus, access to these courts becomes challenging for rural residents. As tele-density in rural areas remains at a meagre 55.85%, and access to email facilities is also scarce, most rural residents make the journey multiple times apart from those of court hearings.

Research by Andre Lapkin in Ukraine on "Problems to access justice in rural areas" lists territorial, economic and organisational problems as the main causes[16]. Similar conditions exist in Indian rural regions. India has a total of 597,608 inhabited villages and 7,933 towns[17] with a total of 3487 court establishments[18]. That means one court complex for every 173.65 towns and villages. The economic factors also play a role; the per capita net value added for rural areas is less than half of that of the urban areas at just 40,925 INR[19]. Due to the economic and knowledge problems, there is a lack of legal organisation in the rural areas. Apart from a few notable NGOs working on the grassroots level, most knowledge comes from the personal experience of village elders.

The Law Commissions of India[20] highlights that there are six expenses in litigation:

> (l) advocate fees, including the fees for serving notice wherever it is necessary.
> (2) court fees and process fees.
> (3) travelling expenses, etc., of litigants and witnesses.

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[16] Andrii Lapkinn, The Problems of Access to Justice in Rural Areas (On the Example of Ukraine), 68 SHS Web Conference 5 (2019).

[17] National Judicial Data Grid, Summary Report of Courts on Date: 24-11-2023, NJDG, e-courts (Nov. 24, 2023), https://njdg.ecourts.gov.in/njdgnew/?p=disposed_dashboard/info_mang

[18] National Judicial Data Grid, Summary Report on Courts on Date: 08-11-2023, NJDG, e-courts (Dec. 31 2020) <https://njdg.ecourts.gov.in/njdgnew/?p=disposed_dashboard/info_mang>

[19] Ministry of Statistics & Program Implementation, Per Capita Income in Rural and Urban Areas, Press Information Bureau (Apr. 3, 2023), https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1913325

[20] Law Commission of India, 'Cost of Litigants, One Twenty Eighth Report,' (1988)

(4) costs for obtaining copies of documents, typing and other miscellaneous expenses;

(5) costs on account of adjournments, and (6) costs payable by the vanquished party to the successful party.

The commission also states that due to these costs, the threats of petty litigation by privileged sections in rural India threaten to create a formidable barrier to justice. The multi-faceted costs also limit the success of free legal aid guaranteed by Article 39A[21] of the Indian Constitution for the financially ailing.

According to an access to justice survey done in 2015-16 for 9,000 responders, only 15.1% of those surveyed were male; this is consistent with the data in the National Judicial Data Grid, where only 14% of litigants in India are female. Beyond the gender disparity in access to justice, 89.6% and 89.9% of responders felt that their cases were delayed despite 15.7% of them travelling more than 50km to reach the court. Calculating on the raw data presented in the report, those with the least income were expected to spend the highest ratio of their income at least 10%. In contrast, the richest group of respondents were expected to part with a maximum of 5% of their annual income[22]. 44% of the litigants did not intend to pursue the matter in a higher court due to financial reasons, with respondents losing an average of 1,039 INR per day as cost and 1,746 INR as loss of business. All these serve as powerful deterrents to access to justice and contribute to India's rank of 79 out of 139 countries in the World Justice Project (WJP) Rule of Law Index 2021.

III. Legal Tech in India: A Historical and Contextual Overview

In the legal domain, various terminologies describe the integration of technology. Among these, 'Legal Informatics' is defined as the scholarly study of the structure and characteristics of legal information. This field encompasses both theoretical and practical aspects of organising, maintaining, retrieving, and disseminating legal datasets through technological means. In contrast, 'Legal Technology' refers

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[21] INDIA CONST. art. 39, cl. A.

[22] The upper ceiling of earnings is used in the calculation of lower income groups, thus arriving at the least amount. The lower ceiling of earning is used to calculate the higher income group, hence the maximum the group will expect to incur as litigation expense.

to the strategic application of technological tools and software to support the inherently cautious legal industry. It signifies the implementation of technological solutions to enhance legal processes and services.

Within the scope of this research, the term 'legal tech' not only captures the Indian Judiciary's integration of Information and Communication Technology (ICT) but also includes the efforts of other corporate entities striving to optimise judicial procedures. Essentially, 'legal tech' represents a spectrum of technological innovations designed to refine, expand, or democratise access to judicial mechanisms. This concept aligns closely with Whalen's[23] explanation, which posits that 'legal tech' includes devices that interface directly with the core principles of jurisprudence. It provides users with the necessary knowledge and methods for effective legal engagement.

A. Classification

Whalen's conceptual framework offers a systematic classification of legal technologies, sorting them by their relevance and direct impact on legal structures.[24] Technologies designed to improve the efficiency, clarity, and effectiveness of the legal system are central to the integration of Information and Communication Technology (ICT) in Indian courts. Due to their functional requirements, these technological solutions establish a strong connection with the nation's judicial and evidentiary processes. Thus, when a particular technological innovation demonstrates a significant degree of relevance by addressing legal complexities and providing immediate, structured engagement with the legal system, it is categorised as Deep Legal Tech. These technologies, characterised by their targeted specificity and prompt applicability, are defined as those that facilitate direct, rule-based interaction with the legal framework. Accordingly, the technologies developed for ICT integration within the Indian Judiciary are primarily identified within the framework of Deep Legal Tech infrastructures.

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[23] Ryan Whalen, Defining Legal Technology and Its Implication, 30 International Journal of Law and Information Technology 55 (Apr. 05 2022).
[24] *Id.*

The momentum to contemporise judicial institutions via ICT infusion has been discerned globally post the millennium's inception. Different jurisdictions have coined terminologies such as smart courts (as seen in China)[25], justice Tech (in the USA)[26], e-courts (in India), and court automation to encapsulate their respective ventures. These efforts are focused on a specialised range of technological innovations aimed at digitising, educating, streamlining, and making the legal process more efficient and cost-effective. With a particular focus on the Indian judicial landscape, we refer to the forefront of the ICT movement as "e-courts" and the implemented technologies as "deep legal tech".

The Supreme Court of India, in collaboration with various High Courts across the country and the National Informatics Centre (NIC), has developed a comprehensive array of systems, tools, and facilities to lead this transformation. Official documents, including scholarly articles, instructional guides, and communications from the aforementioned institutions, collectively refer to these initiatives as the "eCourt Project." Originating from the Action Plan of 2005, the eCommittee of the Supreme Court of India has been pivotal in overseeing this project. In the next section, we will delve into the key initiatives and milestones that have marked the evolution of e-courts in India. We aim to elucidate the strategies adopted, the obstacles encountered, and the advancements made in realising a more effective and modernised judiciary.

B. History of ICT Adoption in Indian Courts

The integration of ICT in Indian courts began in the early 1990s when the judiciary initiated efforts to incorporate computer technologies to address administrative complexities. A comprehensive empirical study of 1997, including data from both District and High Courts, showed that forward-thinking judiciary members had attempted to revolutionise the work culture with

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[25]Junlin Peng & Wen Xiang, The Rise of Smart Courts in India: Opportunities and Challenges to the Judiciary in a Digital Age, 9 NAVEIÑ REET: Nordic Journal of Law & Social Research - Living Apart Together 345 (2020).
[26] Katherin Hurley et el., Justice Tech for All, American Family Insurance Institute for Corporate and Social Impact 36 (2020).

technological advancements for the preceding fifteen years[27]. Notably, 1992 marked the start of the computerisation initiative in the High Courts and the Supreme Court of India. As 2005 neared, this attempt reached varying degrees of completion across the judiciary[28].

Documents from the E-Committee of the Supreme Court of India reveal collaborative efforts by various High Courts and the National Informatics Centre (NIC) to digitise a broad range of judicial processes. These included creating cause lists, establishing payroll systems, and developing comprehensive database management systems to enhance communication between High Courts and their District or Subordinate courts. However, the lack of standardised technology, heavily influenced by local developers' preferences, resulted in significant inconsistency at a national level. This inconsistency posed considerable challenges in integrating new systems, maintaining them, and training personnel.

Significant progress was made between 1996 and 2000, with judicial systems in regions like Maharashtra, Karnataka, and Andhra Pradesh leading in developing sophisticated software suites, some of which remained in use for two decades. However, by 2005, the absence of a unified national strategy for ICT integration in the Indian judicial system became evident. Users within the system frequently expressed frustration with the inefficiency of the software and the prevalent inconsistencies. Although NIC attempted to create a universal database architecture for District and Taluk (Subordinate) courts, its integration was hindered. Eventually, it became obsolete due to its inability to align with regional needs. As noted by the E-Committee, these early ICT efforts, while incrementally improving court services, did not fully achieve the primary objectives of providing swift, high-quality, and economical justice, reducing adversities and corruption, and increasing transparency and accountability.

It is important to note that English, as the lingua franca of the Indian Judiciary, presents a significant challenge in a linguistically diverse nation. Only 3.8% of the population is fluent in English, with an additional 16.2% having basic

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[27] E-Court Committee, National Policy and Action Plan for Implementation of Information and Communication Technology in the Indian Judiciary, Supreme Court of India, (Aug. 01 2005), https://main.sci.gov.in/pdf/ecommittee/action-plan-ecourt.pdf.
[28] *Id* at 35.

proficiency. This disparity is stark when comparing the linguistic landscape of rural India, where only 1.7% are fluent, and 12.4% have limited proficiency, to urban areas, where 9% are fluent, and 25.8% possess some proficiency. The formal language and diction used in Indian courts, especially in writing judgments, are often inaccessible to individuals with basic English literacy.

IV.   E-Court Project

Prior to 2005, the integration of ICT within the judicial framework noticeably lacked standardisation. The seminal Action Plan 2005 commendably recognised and praised the commendable, albeit individualised, initiatives of certain judicious members. Nonetheless, a broader and more encompassing effort could have produced transformative effects on a larger scale. The successes and setbacks in these early endeavours laid the foundation for the conception of the E-Courts Project. It has been aptly observed that '...the software solutions thus crafted served more as adjunct translations of existing processes rather than catalysts for transformation. This approach, unfortunately, perpetuated, augmented, and even accentuated systemic flaws, making legal procedures increasingly arcane'[29].

In response, the Supreme Court of India ratified a national policy in 2005 to integrate ICT within the courts. The blueprint for this adoption in the judiciary outlines a tripartite strategy, encompassing Phases I, II, and III of the E-Court Project. These phases include enhancements in the courts' ICT infrastructure, developing software tools to streamline court operations, and improving digital skills among judicial officers and staff. Each phase of the E-Court Project has distinct objectives and imperatives. The inaugural phase tackled the foundational challenge of infrastructure enhancement and the development of indigenous software for expedited judicial processes. Phase II focused on software development for procedural efficiency and robust data management. Phase III aims to establish a comprehensive ecosystem to support both governmental and private sector initiatives in ICT applications within the legal sphere. The strategic principles of each phase highlight a dedicated commitment to transforming the judicial system, emphasising transparency, cost-efficiency, uniformity, and

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[29] *Id at* 5.

effectiveness. Throughout the E-Court Project's phases, a variety of software solutions have been introduced, including videoconferencing utilities, machine learning-powered translation tools, artificial intelligence-driven annotations and synopses, and comprehensive digital infrastructures for case archiving, among other innovations.

V.   Initiatives under the eCourt Project

The eCourt Project, planned under Action Plan 2005, has thus far completed two phases, with planning for the third phase underway at the time of writing this paper. The eCourt Committee of the Supreme Court of India has overseen most of the planning for the first two phases, with technical planning and implementation being a collaborative effort between the Committee's technical teams and the National Informatics Center of India (NIC).

A. Phase One

One of the initial steps in the national-scale digitisation of the judicial process was the launch of the E-Court Portal on August 7, 2013. The website is supported by the Court Information System (CIS) at the backend. This system underpins various judicial services for litigants and judicial officers and has undergone the development of three iterative versions. The E-Court Services mobile application, also accessible at kiosks in court complexes, offers options to complete various judicial processes online.

i.   Court Information System (CIS)

In the complex tapestry of the Indian judicial landscape, the Case Information System (CIS) plays a pivotal role in meticulously documenting the journey of a case as it moves through the judiciary. Developed by the National Informatics Centre in Pune, India, this innovative system has evolved over time and is currently in its third iteration. Even cases awaiting official registration are logged into CIS, providing the litigant with a unique Case Number Record (CNR)[30] upon

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[30] Calcutta High Court, What is Case Information System, Calcutta HC (Apr. 2, 2019), https://calcuttahighcourt.gov.in/downloads/ecourt_files/cis3/What_is_CIS.pdf.

initiation. Armed with this CNR, a litigant can closely track the progress of their case, whether through online portals or timely SMS notifications.

The architecture of CIS features a wide array of modules, including Filing-Scrutiny-Registration and complex mechanisms such as Daily Proceedings-Cause Lists-Disposal, Summons and Notice generation, and the documentation of Orders and Judgments. Additionally, it includes a sophisticated precedent monitoring system, evident through its advanced dashboards, reports, and an interactive citizen interface presented as touchscreen kiosks within court premises. The widespread adoption of CIS across High Courts and District courts throughout India demonstrates its extensive reach. As of January 19, 2023, over five million users have downloaded the CIS's accompanying Android mobile application, reflecting its digital ubiquity. Recognising India's diverse linguistic landscape, CIS, from its version 2.0 onwards, has integrated bilingual functionality, with a particular emphasis on Hindi. The resounding success of CIS 2.0 has laid the groundwork for the development and implementation of CIS 3.0.[31]

CIS serves as a digital repository and functions as a virtual hub where all relevant parties can converge and collaborate. The platform's array of services includes[32]:

1. Virtual Courts
2. E-Filing
3. National Service and Tracking of Electronic Processes e-Summons Portal
4. Templatised frameworks for documents, encompassing warrants, summons, and judgments.
5. Registers delineating Fine, Fee, and Caveat
6. Nuanced watermarking provisions to trace document provenance.

Each version of CIS ambitiously aims to integrate comprehensive judicial processes more holistically. The substantial volume of cases digitised under CIS

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[31] R Arulmozhiselvi, Case Management and Information through CIS 3.0, eCommitte, Supreme Court of India (Aug. 26, 2018), https://cdnbbsr.s3waas.gov.in/s388ef51f0bf911e452e8dbb1d807a81ab/uploads/2020/08/2020082670.pdf.
[32] *Id at* 9-171.

reflects the system's efficacy and widespread acceptance. The seminal Action Plan 2005 emphasised the importance of digitising archival repositories, considering it a cornerstone of the ICT framework[33]. The vision was to create digital replicas of cases, mitigating the risks of physical degradation and bypassing the pitfalls of manual archiving. The ambitious project to digitise archives, projected to take three to five years, included strategic plans for capacity building and stringent security measures. This repository of digitised files was intended to be housed in a centralised system, serving as a repository for all such digital documents on a pan-Indian scale. This pioneering effort led to the creation of the National Judicial Data Grid.

ii.   National Judicial Data Grid (NJDG)

The National Judicial Data Grid (NJDG) functions as a comprehensive repository, encompassing orders, judgments, land records, reasons for case adjournments, and detailed case information from across the Indian judicial spectrum. This dynamic platform aggregates data from a vast network of 18,753 district and subordinate courts and all high courts, encompassing over 21.99 crore cases. It sheds light on 7 crore unresolved cases and catalogues over 20.10 crore orders and judgments[34]. NJDG's scope covers both civil and criminal litigations across 26 Indian states. In line with the National Data Sharing and Accessibility Policy (NDSAP) set forth by the Indian Government, an Open Application Programming Interface (API) has been developed. This allows Central and state government bodies to access the NJDG repository using a department-specific ID and access key. Additionally, a dedicated portal has been established to democratise data access for the general public. This interface enables users to apply various filters, generate graphical representations of requested data, and download raw data. Remarkably, despite handling large data sets, the website's response time remains swift, typically under 4000 milliseconds, with subsequent data modification or updating requests taking around 900 milliseconds. This efficiency is a testament to the effective caching mechanisms employed.

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[33] eCourt Committee, *supra note* 25 at 24.
[34] eCourts Committee, National Judicial Data Grid, Department of Justice (Oct. 19, 2023), https://doj.gov.in/the-national-judicial-data-grid-njdg/

The backbone of this data retrieval system is based on elastic search technology, a state-of-the-art, open-source algorithm designed for analysing unstructured data. NJDG provides intricate data analysis options categorised by case type, temporal segments like year and month, jurisdictional boundaries, litigation stages, and documented reasons for procedural delays. To further support judicial digitisation, 619 eSewa Kendras[35], essentially online service centres, have been established under the auspices of 25 high courts. These centres assist legal practitioners in optimally utilising NJDG[36]. The World Bank, in its 2018 'Ease of Doing Business Report,' praised NJDG, correlating it with India's significant improvement of 23 positions, ranking 100th among 190 nations[37].

A 2015 study by the National Council of Applied Economic Research highlighted the widespread awareness of NJDG, with about 80% of the judicial cadre aware of its existence, coinciding with the year NJDG was made publicly accessible. However, a critical examination of NJDG's data by T. Anand and D. Damle, as detailed in 'Problems with the E-Courts data,' identified some significant anomalies[38]. The primary issues noted were gaps in case data records and excessive data points, which negatively impacted the quality of data within NJDG. The launch of Version 3.0 of the Court Information System aims to address these issues, introducing robust data validation mechanisms during entry and improving integrations for a more streamlined data feed into CIS.

B. Phase Two

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[35] Ministry of Law, National Judicial Data Grid (NJDG) is a database of orders, judgements and case details of connected District and Subordinate Courts and High Courts created as an online platform on which data is updated on a near real-tie basis, Press Information Bureau (Dec. 16, 2022), https://pib.gov.in/PressReleseDetail.aspx?PRID=1884166.

[36] Apoorva Mandhani, World Bank Lauds National Judicial Data Grid in Ease of Doing Business Report, LiveLaw (Nov. 4, 2017), https://www.livelaw.in/world-bank-lauds-national-judicial-data-grid-ease-business-report/.

[37] Ministry of Commerce & Industry, India at 77 Rank in World Bank's Doing Business Report, Press Information Bureau (Oct. 31, 2018), https://pib.gov.in/newsite/PrintRelease.aspx?relid=184513.

[38] Devendra Damle & Tushar Anand, Problems With the E-Courts Data, 314 National Institute of Public Finance and Policy, New Delhi 11-18 (2020).

The initial years of the E-Courts Project Phase II (2014) concentrated on offering online judicial services and pursuing extensive automation in handling, logistics, and administration within the judiciary. The phase included various features like 'Automatic Alerts on missing data during entry' and new tools such as the 'Judicial Management Information System.' Out of 110 deliverables proposed for Phase II, 83 were completed, along with 21 additional deliverables, demonstrating a high rate of implementation. This success encouraged the E-Court Committee to explore the adoption of advanced technologies like AI and Machine Learning.

Traditional challenges within the Indian Judiciary, such as case research, management, and judgment writing, which were predominantly conducted using physical methods, were identified as areas for improvement. Judges typically chose their preferred mediums for these tasks. The E-Court Committee recognised an opportunity to employ specialised software and artificial intelligence in handheld devices to assist in these processes. This led to the launch of the SCI Interact (2020) and SUPACE (2021) initiatives.

i.   Supreme Court of India Interact (SCI-Interact)

The tool introduced in 2020 means to take the 17 benches of the Supreme Court paperless. This software came pre-loaded on a tablet provided to the judges of the Supreme Court. It enabled them to access files, add annexures to petitions and take soft notes on the current case without it being visible to someone else. This was meant to give an efficiency boost to the daily workings of the judges. It also enabled them to access documents and notes from previous cases at a moment's notice.

Apart from serving as a virtual filing cabinet for the judge's personal use, it is also e-filing of new cases and a view of pending cases. The IT hardware for this was maintained on-premises. It had a multiprotocol label-switching network for a secure and private WAN (wide area network) connection between the tablets and the IT hardware. Regular security audits were planned to prevent any confidential information breaches.

ii.   Supreme Court Portal for Assistance in Court's Efficiency (SUPACE)

The Supreme Court Portal for Assistance in Court's Efficiency (SUPACE), launched in 2021 by then Chief Justice S.A. Bobde, represents a ground breaking initiative to integrate artificial intelligence (AI) into legal proceedings. Building on the insights from SCI-Interact, SUPACE aims to enhance case management efficiency in the Supreme Court. Initially, it was trialled in the Bombay and Delhi High Courts to assess its effectiveness.

SUPACE uses machine learning algorithms to annotate, summarise, and retrieve relevant legal information, including precedents, statutes, and laws pertinent to specific cases. It aids judges in managing dockets and delegating tasks efficiently. The platform features a chatbot for case information in response to voice queries and a digital notepad to facilitate judgment composition. As a machine learning tool, SUPACE continuously refines its performance based on training data and feedback, becoming increasingly attuned to judges' preferences.

Despite SUPACE's potential benefits, concerns about technology's role in judicial decision-making have been raised. Experts like Judge Herbert B. Dixon Jr. (Ret.), Pro-Publica[39], and Brig. Gen Patrick Houston[40] has highlighted the risk of bias in AI algorithms within the judiciary. The danger lies in AI's pattern recognition potentially adopting negative societal biases.

Another concern is the "black box" nature of AI systems, where users may inadvertently accept software outputs without understanding the underlying processes. An incident in the UK, where a small error in alimony calculations affected thousands of cases, illustrates this risk[41]. At SUPACE's launch, Chief

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[39] Jeff Larson et el., How We Analyzed the COMPAS Recidivism Algorithm, Pro Publica (May 23, 2016), https://www.propublica.org/article/how-we-analyzed-the-compas-recidivism-algorithm.

[40] Patrick Huston & Lourdes Fuentes, The Legal Risks of Bias in Artificial Intelligence, Law360 (May 27, 2020), https://www.law360.com/articles/1274143/the-legal-risks-of-bias-in-artificial-intelligence.

[41] SUVAS, *infra* note 41 at 8, a small error in alimony calculations affected 3,638 cases between April 2011 and January 2012 and April 2014 and December 2015. Debts were erroneously added to the assets rather than deducted, resulting in inflated asset values.

Justice Bobde emphasised that it would preserve the judge's autonomy and discretion, serving primarily to expedite information delivery.

Another challenge in the later stages of Phase II was the lack of legal knowledge among Indian citizens, as evidenced by the low usage of E-Court Services by the general public. The formal English language used by the Indian Judiciary is often not accessible to common citizens. To address this, the Vice President of India urged the judiciary to use technology to bridge this gap. The Supreme Court of India introduced SUVAS, a tool for translating English judgments into nine vernacular languages. Additionally, the Supreme Court of India Reportable Judgements (E-SCR) platform allows users to search for judgments using various filters, with translations available for cases processed by SUVAS.

iii.   Supreme Court Vidhik Anuvaad Software (SUVAS)

Supreme Court Vidhik Anuvaad Software, or SUVAS, was launched to cater to the multilingual demographics of India. It is a translation tool that converts English judgements to recognised regional languages of India. It was presented to the President of India on November 26 2019, along with the launch of the Supreme Court Multilingual mobile app to commemorate Constitution Day[42]. The mobile app can be used for real-time access to Case Status, Display Board, Daily Orders, Judgements, Office Reports, and Circulars in English, Hindi and six other regional language scripts. SUVAS goes a step further; at present, it can translate English Judicial Documents into nine vernacular scripts (Assamese, Bengali, Hindi, Kannada, Marathi, Odia, Tamil, Telugu and Urdu) and vice versa. Currently, cases related to Labor, Rent Act, Land Acquisition and Requisition, Service, Compensation, Criminal, Family Law, Ordinary Civil, Personal Law, Religious and Charitable Endowments, Simple money and Mortgage, Eviction, Land Laws, and Agriculture Tenancies and Consumer Protection are being translated.

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[42] Supreme Court of India, Press Release: Supreme Court Vidhik Anuvaad Software, SCI (Nov. 25, 2019), https://main.sci.gov.in/pdf/Press/press%20release%20for%20law%20day%20celebratoin.pdf.

However, the number of translations analysed quantitatively over two months shows a diminishing trend of translation performed.

Year	Month	Number	Yearly total
2018	may and june	1	26
	july and august	4	
	september and october	9	
	november and december	12	
2019	january and february	64	350
	march and april	83	
	may and june	23	
	july and august	75	
	september and october	48	
	november and december	57	
2020	january and february	35	90
	march and april	24	
	may and june	11	
	july and august	8	
	september and october	8	
	november and december	4	
2021	january and february	8	61
	march and april	12	
	may and june	4	
	july and august	4	
	september and october	21	
	november and december	12	
2022	january and february	10	50
	march and april	5	
	may and june	17	
	july and august	8	
	september and october	4	
	november and december	6	
2023	january and february	23	23

The highlighted day on the press release for SUVAS indicates the month from which translations are available on the website. Beyond the quantitative aspect

of the number of translations completed per month, the quality of judgments is a more crucial factor for analysis. Each translation includes a disclaimer in the translated language stating that the original English version will be referred to in case of any substantial claim. This implies that the translated document is informational but not legally actionable. An analysis of translations in Hindi and Bengali shows that they often use formal language. The translations are done line-by-line rather than considering the context of entire paragraphs, which sometimes leads to errors in translating homonyms[43]. However, this issue is largely mitigated because most judgments contain short, point-based paragraphs. A notable oversight is the system's handling of Latin legal terms like 'ex-gratia,'[44] which are often not translated, indicating a closed corpus-based approach[45].

In January 2023, Chief Justice of India, D.Y. Chandrachud, highlighted the judiciary's commitment to enhancing access to justice through language during the inauguration of the Electronic Supreme Court Reports (E-SCR). This commitment was further demonstrated by the release of 1,286 judgments translated into various languages for India's Republic Day on January 26. A special committee led by a presiding justice and comprising retired judges has been established to ensure translation accuracy and quality. These judges, working remotely, utilise SUVAS to review translations. The success and impact of this revitalised translation project will be evaluated in the future, allowing for continuous refinement.

The introduction of these sophisticated services and software solutions underscored the need for robust data management. The National Judicial Data Grid (NJDG), with its vast judicial data, required an efficient system for managing its scale and complexity. Consequently, the judiciary collaborated with D-Space, a specialised data management firm, to develop a Data Management System (DMS) tailored to the Indian judicial context.

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[43] Assistant General Manager, State Bank of India & Ors v. Radhey Shyam, 6 SCC 438 (Supreme Ct. India 2007), SUVAS, Hindi Translation.
[44] *Id at* 4.
[45] Shuang Wang, Research on Bilingual Corpus Based Machine Translation, 687691 Applied Mechanics and Materials 1686 (2014).

iv.   Data Management Service (DMS)

While detailed public information on this proprietary software is limited, indications suggest that it operates as a key component within the larger framework of the open-source solution, DSpace[46]. It serves as a sophisticated repository within the Court Information System (CIS) in India, enabling the storage and retrieval of judicial documents through metadata tagging. This tagging allows for quick and efficient searches across different document types.

The software's capabilities extend to generating in-depth insights and data visualisations based on the tagged information, aiding in the analysis of trends and patterns in judicial data. On the security front, it features stringent access controls, providing browser-based, read-only access to authorised users, thus safeguarding confidential information. Additionally, it includes an internal server for digital signature verification of newly stored files and dynamic watermarking for monitored document viewing. Preliminary screenshots of the user interface suggest a modern and intuitive design, although these provide only a glimpse of the system's full capabilities and user experience. The emphasis on security, data integrity, and user-friendliness is crucial for the system's successful adoption by the judiciary and legal professionals.[47]

VI.   Technologies behind the ICT Adoption

Different types of architectures are commonly used to build software, each with a varying number of layers depending on the complexity and scalability of the software. Generally, any software architecture can be generalised to have three layers: the Presentation Layer (also known as User Interface/User Experience), the Business Logic Layer (also referred to as Backend/Core Technologies), and the Data Access Layer (often called Infrastructure/System Reliability Engineering), although the nomenclature varies with usage[48].

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[46] Veena P Oak, et el., Judgement Information System for High Court of Karnataka Using Open Source Digital Repository Software DSPACE, 687691 E-Gov. Products & Services 2 (2009).

[47] Dspace, Features, (Mar. 16, 2022), https://dspace.lyrasis.org/features/

[48] Lendy Lin et al., A Layer-Based Method for Rapid Software Developent, 64 ELSEVIER 1364 (2012).

The first layer, the Presentation Layer, excels particularly in mobile applications. For instance, the Supreme Court of India's application, available on both the Google Play Store (rated 4.5/5 with approximately 1,000 reviews and 100,000 downloads) and the Apple Store, assures users that no data is collected or shared with third parties. The app features a uniform design language, is available in six languages, has highly organised sections, and offers a straightforward user flow for most functionalities. The mobile app enjoys greater popularity than the Supreme Court of India's websites. However, it lacks features like readout or other support for users with visual disabilities.

In the Business Logic Layer, several challenges need addressing. These include catering to a multilingual demographic, accommodating varying levels of technical adoption across generations, handling a huge volume of data in petabytes, and building trust through crash-proof performance (emphasising service performance, security, availability, and resilience). The software layer should offer rich functionality for all stakeholders. Various technologies, such as machine learning for SUVAAS, search technologies like Elastic Search for NJDG, and DSpace for DMS, are employed. There have also been efforts to use deep learning to automate case scrutiny. The Data Access Layer, typically the innermost layer of the software, manages interactions with databases and encompasses both on-premise and cloud-based infrastructure. This layer is crucial for preventing cybersecurity attacks and requires regular security reviews and anti-piracy training for official use.

VII.   Assessing the e-courts Project: Analysing the Goals and Outcomes

To evaluate the success and failures of the e-courts Project, it's crucial to first understand the implementation goals of Phases I and II from a high-level perspective. The Draft Policy for Phase III (Draft) of Digital Courts Vision and Roadmap categorises the efforts undertaken in these phases into three broad types: updating public infrastructure, creating systems, and developing digital services. Updating public infrastructure involved equipping courts with digital access and data handling capabilities, including high-speed internet connectivity and infrastructure such as servers, personal computers, scanners, and specialised software. Efforts were also made to minimise the carbon footprint, including energy backup through solar panels.

Services for lawyers and litigants varied regionally, while those for judges were standardised. For lawyers/litigants, services included online court fee payments, information kiosks, virtual courts, e-filing, and automated email notifications. The e-courts Services App, accessible on mobile devices, facilitates these services. For judges, the focus was on case and document management, supported by the JustIS mobile application at the district judiciary level. These services are powered by central systems developed by the e-courts Committee and the National Informatics Center, managing and analysing data from services like ICJS, NSTEP, CIS, and NJDG. The Case Record Number (CNR) plays a crucial role in tracking the case's history and current state across various systems.

However, implementation has faced challenges. The federal nature of the Indian Judiciary and the autonomy of high courts have led to variances in implementation and nomenclature, complicating unified data analysis. A lack of digitisation of older cases and inaccuracies in data entry have impeded historical analysis. Additionally, the practice of creating physical documents before digitising them introduces potential errors and affects data quality.

The e-courts Project also faced challenges in achieving national cohesion at the service level. Due to administrative autonomy, there's variability in traditional processes such as document management and case assignment. Centralising tendencies have not always been effective, as evidenced by multiple states' development of indigenous mobile applications. Inadequate adoption in some areas has resulted in gaps, such as non-digital FIR submission processes and the need for physical copies in e-filing. This decentralised adoption has led to a weak feedback loop and subpar performance of advanced services like SUPACE and SUHAS. However, the sectoral rollout of eCourt technologies in countries like China and Singapore has been successful in scaling up to national projects.

This way of implementation has faced several challenges. Indian Judiciary is federal in nature. Each high court has the autonomy to decide its own administrative practices. This has resulted in a variance in the implementation. There is diversity in the nomenclature across courts. This has resulted in challenges in the development of any analysis or unified data system on the metadata of cases present in the NJDG. There was a lack of digitisation of older cases before 2015, and many cases (before version 3 of CIS introduced increased

validation) had missing data or erroneous entries. This prevents any historical analysis of the direct data or metadata. In many courts, there is a double layer of effort. Physical documents are first prepared, and then those are copied to create the digital version. There are chances of errors creeping in bulk duplication of form-type documents. This lowers the quality of judicial data available for analysis. However, the strides made to create various data handling and management systems that work on CNR have been pivotal in laying the groundwork for the different services being created.

The implementation has faced challenges in finding national cohesion at the service level. The early steps of digitisation of the judicial process are a steep climb. Due to the autonomy of administration, there is a variety in the traditional processes for document management, assignment of cases to the judge's docket, staff management, and personal research/documentation of the judge. A centralising tendency cannot work and has been found in the development of indigenous services mobile applications by multiple states. In places where adoption has been inadequate, many judicial processes like submission of FIRs are non-digital processes, lawyers are often required to file a physical copy apart from e-filing, and registries maintain a physical register. A decentralised adoption has led to an inadequate feedback loop and resulted in the lacklustre performance of cutting-edge services like SUPACE and SUHAS. However, China and Singapore have adopted similar methods of sectoral rollout of eCourt technologies. By collecting and working on the metrics of their regional efforts, they have been able to scale up to national projects remarkably.

The public infrastructure refers to the devices and hardware present in courts to support the usage of services (like e-filing, payment of fees online and virtual courts) and a constant input stream of real-time data to the underlying systems (like CIS and NJDG). India has seen strides of growth in terms of public infrastructure available in the court complexes. National Council of Applied Economic Research (NCAER) report on the eCourt Project Phase I outlined several dissatisfactions with the infrastructure provided in the court complexes[49].

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[49] Sohini Paul, Evaluation Study of eCourts Integrated Mission Mode Project, NCAER https://ncaer.org/publication/evaluation-study-of-ecourts-integrated-mission-mode-project.

In the report for Phase I, only 15% of judicial officers and 60% of court officials were satisfied with the available infrastructure. Video Conferencing was available in only 59% of the courts which were surveyed. However, the report created on similar lines in 2021 has outlined a positive switch[50]. 68.1% of judges, 92.6% of court officials at the district level, and 75% of judges and 74.2% of court officials at the lower level have expressed satisfactory access to infrastructure. A similar number of judges and officials surveyed by the NCAER have also been happy with the quality of the hardware. As of March 24 2023, 99.4% of the court complexes earmarked for digitisation have gotten high-speed internet access[51]. The widespread prevalence of technical hardware has eased the digital transformation for courts in India. It allows unfettered access to the services and systems built under the e-courts Project.

The first phase of the e-courts project suffered from a lack of adequate computer knowledge and, hence, adoption among judges and court officials. Training was included as a crucial item in phase II of the eCourt Project. However, its success has been a mixed bag. Most judges and court officials have received training on CIS and how to use the hardware provided to them. A significant number of members trained have understood the material being taught. However, almost everyone trained across all systems and hardware expressed dissatisfaction with the frequency of training. For systems like NJDG and NSTEP, only a minority of surveyors have received training. For lawyers and litigants, numerous help options exist in the services on the various web and mobile applications; however, understanding these options requires a prior understanding of the underlying legal process. Additionally, the initiative of eSeva Kendra for accessing case-related information and assistance in e-filling for the common citizen has only 956 locations. The lower level of legal knowledge of the litigants is evident in the adoption numbers of informational eCourt services. Only 34.38 per cent of the litigants surveyed had knowledge of the e-courts Project. Knowledge of kiosks meant to dispense information stands at only 18.75% of

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[50] Ncaer, Evaluation of the eCourts Project Phase-II, e-Committee, Supreme Court of India https://ecommitteesci.gov.in/publication/ncaer-evaluation-of-the-ecourts-project-phase-ii/
[51] Ministry of Law, Security of Judicial Digitization Process, Press Information Bureau https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1910431.

those surveyed. At the district level, none of the litigant respondents to the NCAER Phase II survey[52] had used any of the eCourt Services or visited any online portal. The litigants at the district level have never used any of the video conferencing, e-filing, e-pay, digital signatures, or obtained any information from the kiosk. In the lower level of courts or the Taluk level, on the other hand, all the respondents who had knowledge of the available services had accessed the e-courts Services through the mobile app, used the national online portals, had knowledge of the video conferencing equipment, and half of them have obtained information from the kiosks. Digital literacy and an overlapping interest in involvement in the personal litigation process are found more in Taluks and village courts than at the district level. The NCAER phase II survey also noted that the rural areas necessitated a knowledge of the eCourt Services due to the difficulties in access to physical courts. The thing to note is that even in rural areas, computer literacy and the social category of the litigant influenced have been considered dependent variables for the knowledge of the e-courts project.

TABLE 5.3: TRAININGS RECEIVED UNDER E-COURTS PHASE II

	District Courts		Taluka Courts	
	Judges	**Court Officials**	**Judges**	**Court Officials**
Training Received (percentage of total sample in each respondent category)				
CIS	91.5	96.3	75.0	87.9
NJDG	55.3	63.0	50.0	37.9
NSTEP	10.6	48.1	4.2	45.5
Hardware	63.8	44.4	56.3	28.8
Frequency of training-on a periodic basis (percentage of those trained)				
CIS	27.9	15.4	27.8	17.2
NJDG	23.1	76.5	29.2	24.0
NSTEP	20.0	69.2	100.0	6.7
Hardware	30.0	58.3	55.6	36.8
Usefulness of training (percentage of those trained)				
CIS	100.0	100.0	100.0	89.7
NJDG	96.2	100.0	100.0	96.0
NSTEP	100.0	100.0	100.0	90.0
Hardware	96.7	58.3	88.9	89.5

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[52] Lin, *supra note* 46, at 37.

VIII. Conclusion

The e-courts project, aimed at adopting ICT within the Indian Judiciary, sought to accomplish three primary objectives: reducing the workload on judges and court officials, particularly in terms of pending cases; minimising the cost and complications associated with litigation for lawyers and litigants; and enhancing the transparency of the judicial process while increasing legal literacy among the public. This adoption of ICT was intended to digitise various judicial processes and simplify those designed for a non-digital era. In turn, these digitisation initiatives were expected to make the judiciary faster, more streamlined, and more accessible while reducing litigation costs. Upon examining the initiatives planned over the years, we observe a combination of successes and failures in achieving these objectives.

In solving the issue of reducing the workload of Judges and Court Officials, there have been initiatives aimed at three levels:

- Digitisation of Judicial Process: e-filing, e-registry, and CIS 3.0 have become integral to the daily functioning of most Court complexes.
- Digitisation of Case Management: Most judges rely on the JustIS application to manage the cases in their docket. Delhi and Mumbai High Court is testing SUPACE for Case Management. On wider adoption, SUPACE can dramatically cut down the repetitive activities for a judge.
- Digitisation of Document handling: Judges usually access documents of current cases and research in digital form; NJDG serves as a backbone for most document-oriented services. ICJS is used extensively for penitentiary/police documents. The watermarking feature in CIS 3.0 decreases the chances of untracked court documents.

Despite the robust services at the infrastructure level, the initiatives aimed at simplifying the workload for judges and court officials are hindered by several challenges. These include regional differences in legal terminology, duplication of efforts due to the maintenance of both physical and electronic registers, and the need for more comprehensive training across all levels of stakeholders. Plans for Phase III of the judiciary's technological advancement include the establishment of a National Judicial Technology Council. This council will focus

on creating reusable training modules for all services and systems, offering certifications for various users, and providing specifications and standards to ensure consistency in the metadata and data within the National Judicial Data Grid (NJDG). Additionally, Phase III seeks to foster an ecosystem that allows external entities to develop services that simplify or analyse judicial processes and data. There are also plans to enhance integration with the Crime and Criminal Tracking Network Systems, which would provide judges with direct access to police evidence, such as forensic reports.

In terms of addressing the backlog of pending cases, the period before the COVID-19 pandemic saw slow but steady progress in reducing the case backlog across all levels of the judiciary. The number of pending cases was consistently declining until the pandemic began, after which the trend reversed, and a decrease in pending cases has not been observed since. While the widespread adoption of ICT systems in most court complexes has streamlined the work of judges and court officials, it has not significantly reduced the number of pending cases. With the further development of the ICT ecosystem as envisioned in Phase III, there is potential to improve court efficiency by analysing new case metadata in conjunction with the existing cases in a judge's docket. To date, ICT has played a supportive role in diminishing administrative burdens and reducing the wait times for documents in a case. Still, it has not accelerated the hearing or judgment phases, as current data indicates. Judges spend approximately 87% of their time in hearings and adjudicating cases, so the focus should be on simplifying their administrative and research tasks.

We recommend adopting statistical analysis strategies as a technical innovation for scheduling court cases. The involvement of academics and the growing open-source data science community in India could be instrumental in introducing innovations that create and improve scheduling algorithms for case management tailored to the judicial sector's needs. The foundations for such a statistics-based analysis, which is aware of case contexts, weight, preconditions of courts and expertise of judges, already exist, albeit discretely. Integrating all these domain expertise would be a mammoth undertaking; the help of academicians and open-source forums where multiple innovations exist will be integral to success. For this very cause, the third phase of the eCourt Project will need to make significant and digestible data available in programmable formats like Application

Programming Interfaces (API) or consider using more modern Remote Procedure Calls (RPC) as these data are event-based[53].

Examining the second objective for the adoption of ICT in the Indian Judiciary, we observe that services aimed at enhancing the litigation experience for lawyers and litigants can be categorised into three levels:

- First, digitising interactions between litigants/lawyers and courts: Services such as e-filing and providing a CNR number for tracking have simplified lawyers' work.

- Second, digitising interactions between courts and litigants/lawyers: Services like NSTEP are used to serve court summons. Virtual courts without a judge have been introduced for driving offences, and e-fines have simplified the punishment process for minor offences.

- Lastly, efforts to reduce litigation costs: The Supreme Court of India has identified alternative dispute resolution (ADR) to mitigate expensive court trials. CIS 3.0 includes end-to-end online services for various ADR methods, which can be tracked through CNR.

According to the National Council of Applied Economic Research (NCAER) survey conducted during Phase II of the e-courts Project, only about one-third of the litigants were aware of the project. For most litigants, lawyers remain the primary source of both action and information. In contrast, lawyers are generally more familiar with online services and report frequent usage. The ecosystem approach of Phase III presents an opportunity to develop services that enhance legal efficiency for law firms and individual practices, inviting entrepreneurs and private entities to improve efficiency, access, and reduce costs and resource expenditure for legal practices.

The widespread adoption of online litigation services is evident, as over 19.2 million cases were heard in virtual courts by the end of the COVID-19 pandemic in July 2022. Data from the National Judicial Data Grid (NJDG) during the pandemic suggests a rapid uptake in case volume, indicating a decrease in the hassle of accessing legal services. The NCAER survey also highlighted the

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[53] Hewlett Packard Enterprise, DCE 1.1 Remote Procedure Call, The Open Group (1997).

benefits reaped by litigants from the SMS facility for case updates. However, the adoption of Alternate Dispute Resolution (ADR) methods has been limited, with insufficient awareness and information available to the common citizen on initiating and proceeding with these alternatives. While the efforts to improve lawyers' work have seen reasonable adoption and satisfaction, litigants have generally remained less aware and have benefitted minimally from most eCourt services. Before the pandemic, there was little to no reduction in litigation costs attributed to the e-courts Project. However, recent developments, such as the adoption of virtual courts or Lok Adalats in metropolitan cities for minor litigations like traffic violations and the increase in ADR in rural areas, demonstrate progress. Phase III aims to focus on reducing the cost and complexities of litigation for both lawyers and litigants.

While steps to improve legal services for lawyers have seen considerable adoption, the same cannot be said for litigants, who have shown low awareness and benefited minimally from the e-courts services. Phase III promises to address these gaps, particularly in reducing litigation costs and enhancing the overall efficiency of legal processes. Regarding the final goal of ICT adoption by Indian courts, the eCourt Project has undertaken numerous steps to enhance the transparency of the Indian Judiciary and faced several challenges in improving the country's legal literacy. These efforts can be generally grouped into three areas:

- First, providing information on ongoing cases to improve transparency: Litigants and lawyers can access information about their cases through a web portal, mobile application, or kiosk located on court premises. Updates and hearing dates are also communicated via SMS and email. Digital boards in court premises display real-time information on daily case scheduling.
- Second, offering information on historical cases to enhance transparency: The judgement search portal l on the eCourt website and public data on NJDG give insights into cases since 2015. E-SCR also supports research on historical cases through searches based on acts, legislation, parties, and facts.
- Lastly, incorporating multi-language support to improve legal literacy and transparency: Almost all eCourt Project applications support multiple Indian

languages, and SUVAS provides judgements translated into regional languages.

This paper has highlighted several instances where limited awareness and legal literacy have impeded the adoption of digital services among litigants. There is minimal emphasis on legal studies at the school level in India, leaving the Supreme Court of India as the primary entity responsible for promoting legal literacy. The formal language used in courts, primarily English, is not easily comprehensible to the majority of the population. While the Supreme Court has focused on adopting modern technologies like machine learning-based translation, these efforts have yet to demonstrate significant improvements in quality or scope. Enhancing legal literacy could also benefit from innovations in educational technology, such as animations, multi-language audio, social media videos, and interactive workflows on the eCourt web portal and mobile application. These resources would allow users to simulate using various eCourt services, thereby reducing unfamiliarity with the legal system and tools among common citizens and addressing perceived opacity in the judiciary.

The National Council of Applied Economic Research (NCAER) survey for Phase II indicates high usage of eCourt services in rural areas, showing a direct correlation between usage and factors like social category and computer literacy. This highlights a risk in the increased adoption of eCourt Services among litigants, potentially exacerbating India's digital divide. The disparity in internet access - 103.98 subscribers per 100 people in urban areas compared to 34.60 in rural areas - suggests that easing processes based on such sectional adoption could disproportionately benefit privileged sections of society at the expense of the less privileged.

Private entities have an opportunity to leverage the infrastructure established in Phase III, offering legal assistance through machine learning-driven expert systems. Advancements in machine translation technology could soon enhance the provision of translations in various regional languages. The corpus of Indic languages, crucial for training translation algorithms, is an actively evolving field of academic research. Human-reviewed and endorsed translations can add a vital layer of accuracy to refine tools like SUVAS.

Despite progress, there is still ground to cover to meet the three primary objectives set for the e-Court Project in 2005. A retrospective analysis of past successes and failures also unveils several risks associated with a myopic focus on these objectives. Among the risks identified, five are particularly prominent:

- As the automated virtual court project grows and increasing assistance is taken for judicial research from AI, there are chances that deposing minor cases becomes a mechanical activity for judges. This might deteriorate the quality of judgements. The same risks exist for adopting templates for similar judgements. Limitations on assistance, in the form of separation of duties, need to be made explicit to prevent spill-over of technology to judicial decision-making.

- The increase in reliance on technology means increasing the surface area for malicious hacking attacks on the systems and services provided by the e-courts Project. There have been records of regular security audits and regular updates of court software to the latest versions, according to the NCAER survey. Such practises need to be continued with vigour. Additionally, regional tools and extensions developed also need to be included in a regular security review.

- The production of judicial information on various platforms will require complex data planning to stay sensitive to data privacy requirements. This information had been traditionally gatekept by the complexity of the judicial process and the casual scrutiny of judicial officers. A case contains numerous personal details. The data can also be criminally misused to construct social phishing attacks by posing as court representatives. Many of the software built might run afoul of the spirit of the Digital Personal Data Protection Act, 2023.

- Easing the process of litigation and reducing the cost of litigation rapidly can lead to multiple issues like the sharp divide between those who can access the system and those who can't, a sharp increase in the number of cases filed due to lowering the threshold of access, and frivolous matters inundating the lower courts and ADR platforms.

- Generative Artificial Intelligence and Large Language Models have garnered significant attention in 2023, particularly for their potential in fields like law

that involve complex language usage[54]. However, these technologies also inherit the same concerns related to data biases that are common in most supervised learning models. This leads to risks when considering their immediate application in general judicial contexts. Additionally, their 'black-box' nature, which obscures the understanding of how conclusions are derived, further amplifies these risks[55]

The 2005 Action Plan established a three-phase structure for the e-courts Project. This paper's analysis confirms that the e-courts Committee has effectively recognised the importance of an ecosystem approach. Such an approach promotes innovation in the justice delivery system by encouraging contributions from India's burgeoning entrepreneurial sector. Despite the widespread and significant adoption of ICT in the judiciary, offering comprehensive services to almost all stakeholders, the actual engagement of litigants remains limited. To build a strong foundation for future technological advancements in India's judicial system, the e-courts Project must fulfil the objectives set forth in the 2005 Action Plan.

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[54] Sean A Harrington, The Case for Large Language Model Optimism in Legal Research from a Law & Technology Librarian, SSRN https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4492121.
[55] Emily Sheng et al., The Woman Worked as a Babysitter: On Biases in Language Generation, Cornell University, arXiv https://arxiv.org/abs/1909.01326.