The Role of Technology in Insolvency Proceedings: Driving Efficiency, Transparency and Access in the IBC Era

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Technology has immense potential to transform insolvency resolution by enhancing speed, transparency, and efficiency across processes under the IBC. Digital platforms enable real-time claim filing, verification, and data sharing among stakeholders, reducing delays and disputes. A robust, technology-driven insolvency framework can ensure faster recovery of credit, strengthen banks, reassure investors, and promote entrepreneurship. It aligns perfectly with India's aspiration to become a $5 trillion economy and a leading global investment destination. Drawing takeaways from empirical evidence in landmark insolvency proceedings—Essar Steel, Bhushan Steel, IL&FS, DHFL, Jet Airways, and Videocon—the article contends that technology accelerates claim verification, improves transparency, and maximises value. It recommends that by combining technological innovation with strong governance, India can build an insolvency ecosystem that is efficient, inclusive, transparent, and globally competitive. ***Read on to know more…***

I. Introduction

The enactment of the Insolvency and Bankruptcy Code, 2016 (IBC) stands as one of the most significant reforms in India's corporate and financial ecosystem. Before this watershed legislation, insolvency and bankruptcy matters were scattered across multiple statutes, tribunals, and forums—each working in isolation, often at cross purposes.

The Sick Industrial Companies (Special Provisions) Act, 1985 (SICA) had created the Board for Industrial

and Financial Reconstruction (BIFR) to handle distressed companies. However, proceedings before BIFR notoriously dragged on for years, often resulting in erosion of enterprise value. Similarly, the Recovery of Debts Due to Banks and Financial Institutions Act, 1993 (RDDBFI) provided for Debt Recovery Tribunals (DRTs), while the Securitisation and Reconstruction of Financial Assets and Enforcement of Security Interest (SARFAESI) Act, 2002 empowered banks to seize collateral. Alongside these, winding-up provisions under the Companies Act created further fragmentation.

The consequences were severe:

(i) Time inefficiency: Average resolution time exceeded 4.3 years.

(ii) Low recovery rates: Creditors recovered just 25 to 30 cents per dollar, compared to 70 to 80 cents in developed jurisdictions.

(iii) Mounting NPAs: By 2016, stressed assets in the banking system had crossed ₹8 trillion, straining credit flow.

(iv) Investor aversion: Global investors cited insolvency delays as a key deterrent to investing in India.

Against this backdrop, the IBC emerged as a comprehensive, time-bound, and creditor-centric framework. It consolidated the disparate laws and empowered creditors, under the supervision of the National Company Law Tribunal (NCLT). Section 12 of the IBC mandates resolution within 330 days, making timeliness the Code's hallmark.

However, legislation alone could not ensure efficiency in the insolvency process. The framework involves multiple stakeholders including debtors, financial creditors, operational creditors, insolvency professionals (IPs), regulators, and courts. Each stage of the insolvency process requires coordination, rigorous verification, diligent monitoring, and sound decision-making. In the absence of technological support, there is significant risk of delays, disputes, and inconsistent outcomes, undermining the objectives of the insolvency framework.

Thus, technology has become the backbone of the IBC's functioning. From e-filing platforms that facilitate legal professionals to submit documents online, to Information Utilities (IUs) that provide secure, tamper-proof debt records, to AI-driven forensic tools that uncover fraudulent transfers—digital infrastructure now underpins insolvency resolution. Technology ensures the IBC's goals of efficiency, transparency, and inclusivity are met.

II. The Current Technology Landscape under the IBC

The IBC framework, though new, has rapidly embraced digital tools. Several areas of insolvency practice now rely heavily on technology.

1. E-Filing and Digital Case Management: The NCLT and NCLAT have adopted e-filing systems that allow petitions, replies, and affidavits to be filed electronically. Integrated case management portals help stakeholders in tracking the following:

(i) Daily cause lists.
(ii) Case status updates.
(iii) Tribunal orders.

This has reduced reliance on physical appearances and registry visits. It also helps lawyers and IPs outside metropolitan cities to participate seamlessly. Importantly, e-filing creates digital audit trails, reducing opportunities for procedural manipulation.

For example, in the Essar Steel insolvency, a landmark case involving ₹42,000 crore, the use of e-filing and case tracking portals allowed multiple parties to file submissions within tight deadlines, keeping the process largely on schedule despite extensive litigation.

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2. E-Auctions for Asset Liquidation: Section 35(1)(f) of the IBC empowers liquidators to sell assets through public auctions. In Past E-Auctions were conducted via platforms like MSTC and e-Procure. Nowadays

E-Auctions are being conducted on BAANKNET Platform. These platforms offer:

(i) Transparent, tamper-proof bidding.

(ii) Wider bidder participation, including global investors.

(iii) Complete audit trails of transactions.

For instance, the Amtek Auto liquidation was conducted through MSTC e-auctions. The transparent process not only attracted multiple bidders but also helped realise higher values compared to traditional manual auctions. Similarly, in the liquidation of Electrosteel Steels, E-Auctions facilitated quicker sales and provided confidence to buyers that the process was free from collusion.

3. Information Utilities (IUs): The IBC introduced a unique innovation—Information Utilities (IUs)—as an independent, regulated entities to store authenticated financial information. The National E-Governance Services Ltd. (NeSL), India's first IU, records:

(i) Loan agreements.

(ii) Security interests.

(iii) Default information.

Creditors and IPs rely on NeSL's records for claim verification, avoiding prolonged disputes about whether a debt exists.

In the Videocon Industries case—with claims exceeding ₹64,000 crore—NeSL played a critical role in validating data quickly, saving months of litigation. By reducing disputes, IUs improve creditor confidence and accelerate resolutions.

4. Videoconferencing: The pandemic accelerated the adoption of video-conferencing tools by NCLT, NCLAT, and Insolvency Professionals (IPs) and various stakeholders. Even after restrictions eased, virtual hearings have remained common for procedural matters.

For Committees of Creditors (CoCs), video-conferencing and secure e-voting platforms have been transformative. Financial creditors spread across geographies can now participate without traveling. This inclusivity strengthens decision-making and reduces costs. The Jet Airways resolution exemplified this. Overseas aircraft lessors and creditors participated through online meetings, making coordination across jurisdictions feasible.

5. Digital Public Announcements and Claim Submissions: From the inception of the IBC framework, public notices inviting creditors' claims have been made available digitally in addition to traditional newspaper publications. Creditors can submit claims online, often through dedicated portals set up by Ips, who maintain cloud-based systems for:

(i) Recording creditor lists.
(ii) Maintaining voting records.
(iii) Uploading meeting minutes.

This practice has particularly benefited MSMEs and operational creditors, who can make submissions without incurring heavy costs. For instance, in the Jaypee Infratech insolvency, homebuyers (treated as financial creditors) were able to submit claims online, ensuring wider participation from thousands of individuals.

III. Advanced Technologies Reshaping Insolvency Practice

While basic tools such as E-Filing and E-Auctions have already streamlined processes, the real transformation lies in advanced technologies that are beginning to reshape insolvency practice in India and globally.

1. Artificial Intelligence (AI) and Machine Learning (ML): AI and ML tools analyse massive datasets to identify hidden patterns and anomalies. Their applications in insolvency include:

(a) **Fraud detection:**

(i) By analysing financial statements, statutory filings, and bank records, AI can flag unusual transactions that may constitute preferential transfers (Section 43), undervalued transactions (Section 45), or fraudulent trading (Section 66).

(ii) For example, a company making repeated transfers to related parties just before insolvency could be flagged as suspicious.

(b) **Predictive analytics:**

(i) ML models can forecast recovery rates by studying past insolvency cases across industries.

(ii) This helps CoCs in evaluating resolution plans with realistic expectations.

(c) **Resolution applicant profiling:**

(i) AI can analyse the track record, financial health, and compliance history of potential resolution applicants, reducing risks of failed plans.

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2. Natural Language Processing (NLP): Legal and financial contracts often span thousands of pages. Reviewing them manually is time-consuming and error prone. NLP-driven software can:

(i) Extract and highlight critical clauses such as guarantees, restrictive covenants, and change-of-control provisions.

(ii) Identify inconsistencies or compliance risks in contracts.

(iii) Reduce weeks of manual due diligence into a matter of hours.

In the resolution of Bhushan Steel, digital contract review tools helped the resolution applicant scan thousands of compliance documents quickly, allowing a timely submission of the Resolution Plan.

3. Blockchain and Smart Contracts: Blockchain can revolutionise claim verification and execution of Resolution Plan:

(i) Immutable debt records: Once a debt or default is recorded on blockchain, it cannot be altered. This would drastically reduce litigation over the existence of debt.

(ii) Smart contracts: Resolution plans could embed automated disbursement clauses. Funds would be released only upon achieving specific milestones, ensuring accountability.

Although tribunals in India have yet to formally adopt blockchain technology, pilot projects could pave the way. Countries like Singapore[1] are already exploring blockchain-based registries for secured lending, which can be adapted for insolvency proceedings.

4. Digital Forensics: In many insolvency cases, distressed companies often attempt to conceal asset transfers or inflate expenses. Digital forensic tools assist insolvency professionals in:

(i) Mapping fund flows across multiple accounts.

(ii) Identifying related-party transactions.

(iii) Tracing diversion of assets into shell companies.

For example, in the IL&FS crisis, forensic audits used advanced software to reconstruct complex webs of inter-company loans and identify instances of mismanagement.

5. Data Visualisation Dashboards: Interactive dashboards enhance transparency to insolvency proceedings by displaying:

(i) Progress of claim verification.

(ii) Voting percentages of creditors.

(iii) Timelines of asset sales.

Such dashboards enable real-time oversight for

[1] Supreme Court of Singapore, eLitigation System Overview (https://www.judiciary.gov.sg/services/elitigation).

creditors, regulators, and even the public especially in high-profile cases. Additionally, over time, anonymised dashboards could be made available for research and policy analysis.

IV. Case Examples of Technology in Action

1. Essar Steel Resolution: Essar Steel, one of India's largest insolvency cases (₹42,000 crore), highlighted the significance of technology in the insolvency process:

(i) E-filing systems facilitated submissions from multiple stakeholders.

(ii) Digital claim verification tools streamlined the verification process, even amid thousands of claims.

(iii) Online CoC voting ensured timely decision-making, leading to successful acquisition by ArcelorMittal.

The case demonstrated how technology can effectively manage even highly contested matters while adhering to statutory timelines.

2. Bhushan Steel (Now Tata Steel BSL): In Bhushan Steel's resolution, the use of digital due diligence tools empowered Tata Steel to swiftly review compliance records. This capability ensured that a compliant resolution plan could be filed within the required timeframe, ultimately leading to successful acquisition.

3. Videocon Industries: With claims surpassing ₹64,000 crore, the Videocon case involved multiple group entities. In this context, NeSL played a pivotal role in validating claims, effectively mitigating the risk of protracted litigation.

4. Jet Airways Revival Attempt: The Jet Airways case underscored the critical role of video-conferencing and online coordination in the insolvency process. Foreign lessors and creditors participated through digital meetings, ensuring global engagement. Although the revival faced challenges, the process showcased the feasibility of effectiveness of cross-border coordination in insolvency proceedings.

> ***In Bhushan Steel's resolution, the use of digital due diligence tools empowered Tata Steel to swiftly review compliance records.***

5. DHFL (Dewan Housing Finance Limited): One of the largest NBFC insolvencies, DHFL involved thousands of creditors, including individual retail investors. Online claim submission portals were essential in collating claims efficiently. The successful use of technology in the DHFL insolvency proceedings set a precedent for handling retail participation in financial service insolvencies.

6. IL&FS Group Insolvency: With over 300 subsidiaries, the IL&FS case was among the most complex. Technology helped mapping corporate structures, tracing inter-company loans and other financial flows, and coordination of resolution process across entities. Forensic software identified key instances of mismanagement.

7. Amtek Auto Liquidation: Conducted through MSTC's e-auction platform, Amtek Auto's asset sale demonstrated how digital auctions can promote transparency and attract better value.

Together, these cases illustrate that technology is not merely supportive but foundational to the effective functioning of IBC.

V. Comparative Global Practices

India's embrace of technology in insolvency mirrors global trends. Learning from international practices can further strengthen India's framework.

1. **United States of America (USA):** The PACER[2] (Public Access to Court Electronic Records) system provides nationwide digital access to filings, orders, and dockets for a small fee. This ensures:

(i) Standardisation across jurisdictions.

[2]PACER — Public Access to Court Electronic Records, United States Federal Judiciary (https://pacer.uscourts.gov/).

(ii) Easy access to case documents for all stakeholders.

Additionally, US bankruptcy courts are experimenting with AI analytics for predicting case outcomes and recovery estimates.

2. **Singapore:** Singapore's e-Litigation portal is one of the most advanced. It integrates:

(i) E-filing of documents.

(ii) Scheduling and case management.

(iii) AI-powered legal research tools.

Singapore has also explored blockchain pilots for secured transactions, laying the groundwork for insolvency adoption.

3. **United Kingdom:** The UK Insolvency Service[3] maintains an online register of bankruptcies and insolvencies, updated in real time. It also facilitates digital director disqualification reporting, streamlining regulatory enforcement.

4. **Australia:** The Australian Securities and Investments Commission[4] (ASIC) runs a searchable insolvency notification system, integrated with corporate registries. Creditors can instantly check the status of distressed companies and directors.

5. **European Union:** The EU Directive[5] on Preventive Restructuring mandates member states to digitise insolvency registers and ensure interoperability. This Cross-Border focus is critical for the EU's single market and provides a model for India as it develops Cross-Border Insolvency protocols.

6. **Canada and South Africa:** Both countries have introduced digital insolvency registers and e-filing systems. South Africa's Company Tribunal, for instance, has moved much of its insolvency work online, improving accessibility.

[3]UK Insolvency Service, "The Insolvency Register", Government of the UK (https://www.insolvencydirect.bis.gov.uk/eiir/).

[4]Australian Securities and Investments Commission (ASIC), Insolvency Resources (https://www.asic.gov.au/regulatory-resources/insolvency/).

[5]EU Directive on Preventive Restructuring and Insolvency, 2019 (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32019L1023).

> ***"Global best practices highlight three key lessons for India -- integration across systems, universal accessibility, and seamless cross-border interoperability."***

These global practices highlight three key lessons for India:

(a) Integration: Seamless platforms combining filing, case management, and creditor communication.

(b) Accessibility: Public-facing portals enhance transparency and trust.

(c) Cross-Border Interoperability: Essential in an interconnected financial system.

VI. Stakeholder Perspectives

Insolvency proceedings impact a wide range of stakeholders. The integration of technology affects each group differently, offering both opportunities and challenges.

1. **Creditors:** Creditors — both financial and operational — are the primary beneficiaries of technology in insolvency.

(i) Speed and certainty: Digital claim verification through Information Utilities (IUs) eliminates disputes over debt existence.

(ii) Better decision-making: Predictive analytics and dashboards help creditors evaluate resolution plans on objective criteria.

(iii) Cost savings: Videoconferencing and e-voting reduce travel and logistical expenses, enabling even smaller creditors to participate.

However, not all creditors have equal digital access. Smaller lenders, especially rural cooperative banks, may face challenges in navigating portals or uploading documents. Bridging this digital divide is crucial.

2. Insolvency Professionals (IPs): IPs are at the heart of the insolvency ecosystem. Technology assists them in:

(i) Managing creditor claims.

(ii) Conducting forensic investigations with software tools.

(iii) Coordinating CoC meetings digitally.

(iv) Maintaining records and compliance documents in the cloud.

At the same time, IPs face steep learning curves. Many professionals come from legal or accounting backgrounds with limited exposure to digital forensics or AI tools. Capacity building and training are therefore essential.

3. Regulators and Tribunals: For regulators such as the Insolvency and Bankruptcy Board of India (IBBI) and tribunals like NCLT/NCLAT, technology ensures:

(i) Easier monitoring of insolvency timelines.

(ii) Access to real-time case data.

(iii) Audit trails for oversight.

Dashboards can help regulators identify systemic bottlenecks, such as specific tribunals where timelines are consistently breached, and design targeted reforms.

4. Debtors: For debtors, transparency enabled by technology reduces perceptions of bias. When claim verification and auctions are conducted digitally, debtors are assured of fairness in the process. At the same time, digital systems expose attempts to hide transactions or divert assets. This makes it harder for errant promoters to manipulate proceedings, aligning with the IBC's intent of accountability.

5. MSMEs and Operational Creditors: MSMEs often lack resources to participate actively in insolvency proceedings. Online claim submission portals allow them to file claims without engaging expensive legal counsel. In cases such as Jaypee Infratech, homebuyers (treated as financial creditors) benefitted from digital claim systems, which accommodated thousands of individuals. However, digital literacy challenges remain significant for small enterprises in rural areas.

6. Employees and Workmen: Employees and workmen, often unsecured creditors, can now submit claims electronically. This ensures their voices are not drowned out in creditor meetings dominated by banks and financial institutions. Digital transparency also reassures employees that wage arrears are accurately recorded and prioritised.

7. Investors and Resolution Applicants: Investors seeking to acquire distressed assets benefit from digital due diligence tools, data rooms, and contract review software. These tools speed up assessments and reduce the risk of overlooking compliance obligations. However, investors also need clarity on the legal admissibility of emerging technologies like blockchain in Indian tribunals. Without regulatory recognition, reliance on such tools carries risks.

> ***"There is a need for clear legislative and judicial guidelines on the admissibility of blockchain records, AI-driven forensic reports, and smart contracts in resolution plans."***

VII. The Road Ahead for India

India has made significant progress in integrating technology into insolvency, but much more remains to be done. A 10-point roadmap could accelerate transformation:

1. Unified Insolvency Technology Platform: A single integrated portal should combine:

(i) NCLT e-filing.

(ii) IU data.

(iii) E-auction systems.

(iv) Claim Verification Tools

(v) CoC voting tools.

(vi) Dashboards for case tracking.

This would eliminate duplication and improve interoperability.

2. Legal Recognition for Emerging Tech:

There is a need for clear guidelines from the legislature and the judiciary regarding the admissibility of:

(i) Blockchain records as evidence.

(ii) AI-driven forensic reports.

(iii) Smart contracts in resolution plans.

A clear regulatory framework would give confidence to creditors and investors.

3. Cybersecurity Standards: All insolvency-related platforms should follow mandatory encryption protocols and undergo periodic audits. Given the sensitivity of financial data, breaches could erode trust in the system.

4. Capacity Building and Training: Regular training programs should be organised for:

(i) Insolvency Professionals.

(ii) Tribunal staff.

(iii) Small creditors.

This would address digital literacy gaps and ensure effective use of tools.

5. MSME Inclusivity Measures: Dedicated support desks and simplified claim submission apps should be developed to help MSMEs, and small creditors navigate the process.

6. Cross-Border Insolvency Tools: India's insolvency framework will increasingly deal with foreign creditors. Digital systems must be designed for:

(i) Seamless participation of overseas stakeholders.

(ii) Integration with global insolvency databases.

7. Public Data Analytics Portals: IBBI could release anonymised insolvency datasets for research and policymaking. This would help identify patterns, improve forecasts, and refine regulations.

8. AI-Assisted Resolution Planning: AI tools could assist in:

(i) Comparing proposed resolution plans against benchmarks.

(ii) Simulating recovery scenarios.

(iii) Flagging compliance gaps

9. Continuous Feedback Loops: Digital platforms should capture data on delays, challenges, and user experiences. Regulators can use this feedback to continually refine rules and technology infrastructure.

VIII. Conclusion

Technology has become indispensable to insolvency landscape in India. What began with simple tools like e-filing and e-auctions has evolved into a sophisticated ecosystem encompassing Information Utilities, videoconferencing, forensic analytics, and potentially blockchain and AI.

Empirical evidence from landmark insolvency proceedings—Essar Steel, Bhushan Steel, IL&FS, DHFL, Jet Airways, and Videocon—illustrates that technology accelerates claim verification, improves transparency, and maximises value. While challenges such as cybersecurity, interoperability, and digital literacy persist, the trajectory is clear: technology-enabled insolvency will represent the future.

Global best practices—from the US PACER system, Singapore's e-Litigation portal, and the EU's cross-border digital registers—provide valuable insights. India must move toward integrated, user-friendly platforms that not only serve domestic stakeholders but also inspire confidence among global investors. The ultimate goal extends beyond merely procedural efficiency; it aims for substantial economic impact. A robust, technology-driven insolvency framework ensures faster recovery of credit, strengthens banks, reassures investors, and promotes entrepreneurship. It aligns perfectly with India's aspiration to be a $5 trillion economy and a leading global investment destination.

By combining technological innovation with governance, India can craft an insolvency ecosystem that is efficient, inclusive, transparent, and globally competitive. Technology is no longer a supplementary tool: it is the engine propelling the IBC forward.