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Constitutional Governance*

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MESSAGE FROM THE FOUNDER

Inaugural Issue — Volume I, Issue I, 2026

It is with profound gratification, and a deep sense of scholarly obligation, that I welcome readers to the inaugural issue of the *Indian Journal of Commercial Law and Constitutional Governance* (IJCLCG). The publication of this first issue marks the culmination of sustained effort and the beginning of what we trust shall be a lasting contribution to Indian legal academia.

The Indian legal landscape stands at a consequential crossroads. Rapid economic liberalisation, increasingly complex commercial transactions, and the evolving jurisprudence of constitutional governance demand rigorous academic engagement. Courts, legislatures, and practitioners are routinely confronted with questions at the intersection of commercial imperatives and constitutional values — questions that do not yield easily to doctrinal analysis alone. IJCLCG is established precisely to provide a dedicated, peer-reviewed forum for the scholarly examination of these intersecting domains.

The theme of this inaugural issue, *Contours of Commercial Law and Constitutional Governance*, reflects the journal's foundational conviction: that the boundaries between private commercial ordering and public constitutional frameworks are neither static nor hermetically sealed. Whether in matters of insolvency law, securities regulation, arbitration, or the constitutional dimensions of economic rights, scholars and practitioners must engage with both fields simultaneously if they are to produce work of enduring analytical value.

This journal aspires to be a premier scholarly platform serving academics, legal practitioners, students, and policymakers alike. To that end, all submissions published herein have undergone a rigorous double-blind peer review process. We are committed to the highest standards of editorial ethics, scholarly integrity, and intellectual independence. We invite contributions that are original, analytical, and attentive to the practical dimensions of law.

I extend my deepest gratitude to the distinguished members of the Advisory Board, whose wisdom and guidance have shaped this endeavour from its earliest stages, and to the Managing and Student Editors for their tireless commitment. I also acknowledge, with appreciation, every scholar who entrusted IJCLCG with their research in this inaugural cycle.

The road ahead is long, but the direction is clear. We invite the legal community to engage with us — as contributors, reviewers, and readers — in the shared pursuit of rigorous and purposeful legal scholarship.

Riddhiman Mukherjee

Founder & Editor-in-Chief

Indian Journal of Commercial Law &

Constitutional Governance

ABOUT THE JOURNAL

The Indian Journal of Commercial Law and Constitutional Governance (IJCLCG) is a quarterly, double-blind peer-reviewed academic journal published by Mukherjee Legal Research Publications, Kolkata. The journal is dedicated to advancing rigorous scholarly discourse at the intersection of commercial law, constitutional governance, and economic regulation within the Indian and international legal landscape.

The journal was founded with the conviction that commercial law and constitutional law, though conventionally treated as distinct branches of legal inquiry, are in practice deeply intertwined. Decisions of the Supreme Court and various High Courts in matters of insolvency, trade regulation, banking law, and economic rights illustrate that constitutional principles — fundamental rights, federalism, judicial review, and the rule of law — pervade the fabric of commercial jurisprudence. IJCLCG seeks to illuminate and interrogate these intersections through principled, analytical scholarship.

AIMS & SCOPE

IJCLCG publishes original research, critical commentary, case analyses, and book reviews from scholars, practitioners, and advanced students of law. Contributions may engage with Indian law, comparative legal frameworks, or international commercial and public law regimes. The journal particularly welcomes interdisciplinary work that brings perspectives from economics, political theory, public policy, and technology studies to bear on legal questions.

RESEARCH FOCUS AREAS

Commercial Law & Securities Regulation <i>Corporate insolvency, investment regulation, market governance, banking and finance law, and commercial contracts</i>	Constitutional Governance & Public Law <i>Federalism, judicial review, constitutional supremacy, fundamental rights in economic contexts, and administrative law</i>
International Trade & Global Jurisprudence <i>Cross-border commercial disputes, treaty interpretation, WTO framework, and India’s position in global trade</i>	Interdisciplinary & Emerging Areas <i>Law and technology, data governance, AI regulation, intellectual property, and the law of alternative dispute resolution</i>

PEER REVIEW & EDITORIAL STANDARDS

All submissions are subjected to a meticulous double-blind peer-review process to ensure that only original, insightful, and methodologically sound research is accepted for publication. Authors are required to conform to the 21st Edition of The Bluebook: A Uniform System of Citation. The journal does not publish AI-generated content and maintains a strict anti-plagiarism threshold of ten per cent.

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All articles published in this issue have undergone a double-blind peer-review process. The views expressed are those of the respective authors and do not represent the position of the journal or its editorial board.

REIMAGINING INSIDER TRADING IN INDIA: ENFORCEMENT GAPS, RETAIL LOSSES AND NEED FOR PREVENTIVE SURVEILLANCE MECHANISM

Snehasish Sarkar & Aditi Mishra

ABSTRACT

The insider trading, a sub-sector of securities fraud, is an enormous and structural problem to the honesty, transparency, and equity of financial markets worldwide. The issue of dealing with the intricate insider trading details is quite critical in Indian context where the number of retail investors has experienced an unprecedented and explosive growth in the last decade, to maintain the economic growth and investor trust. This is a critical research paper aimed at analyzing the evolving nature of insider trading in India with the help of a multidisciplinary approach- legal provisions, criminological perspective, economic effects on the retail market participants and the pressing necessity of the advanced technological surveillance system. Even with a hard statutory regime with the assistance of the Securities and Exchange Board of India (Prohibition of Insider Trading) Regulations 2015 and the blanket amendments of 2024 and 2025, there remain serious loopholes in enforcement. The fact that circumstantial evidence is heavily applied and the judicial interpretations are in some ways strict adds to these regulatory loopholes, which have enhanced the evidentiary burdens on the regulator accidentally.¹

In the meantime, the spread of digital footprints, algorithmic high-frequency trading, and the rise of financial influencers—who are essentially social media influencers—has significantly intensified information asymmetry. This research advocates for a fundamental shift in approach from the current responsive, post-facto prosecution to a proactive, preventive surveillance strategy aimed at bridging the widening gap between substantive law and its enforcement. By conducting a comprehensive comparative analysis of regulations in the United States and the European Union, the paper emphasizes the urgent necessity to adopt the latest RegTech solutions in India and to foster extensive collaboration with the Financial Intelligence Unit-India (FIU-IND).

¹ Supreme Court Clarifies Evidentiary Burden in Insider Trading Cases, *IndiaCorpLaw*, <https://indiacorplaw.in/2022/04/25/supreme-court-clarifies-evidentiary-burden-in-insider-trading-cases/> (last visited Mar. 9, 2026).

KEY WORDS

Insider Trading, Market Integrity, SEBI PIT regulation, Information asymmetry, Preventive Surveillance, Artificial Intelligence, Financial intelligence, Loss to Retail Investors.

INTRODUCTION

Capital markets operate most effectively when resources are allocated efficiently, which necessitates that all individuals have access to the same symmetrical information. This fundamental principle is fundamentally undermined by insider trading. Insider trading refers to the unlawful act of buying, selling, or engaging in transactions involving the securities of a publicly traded company by an insider who possesses material, Unpublished Price-Sensitive Information (UPSI). UPSI encompasses crucial and confidential company data, including future financial performance, mergers, de-mergers, acquisitions, dividend distributions, and significant changes to capital structure. If such information were disclosed to the market, it would greatly influence the price discovery process of the relevant securities. The legal system views insider trading as a serious economic crime and a form of white-collar crime, primarily because it contravenes the essential principles of information parity and fiduciary responsibility.

This has been of paramount importance in the regulation of insider trading, which is not only important in terms of statutory compliance, but also the promotion of ethical corporate governance, market efficiency, and the sanctity of investor confidence. Efficient Market Hypothesis is the stock price that is based on all the available information. The price discovery mechanism is also distorted when insiders covertly trade on UPSI and the market ceases to be a level playing field. When retail investors begin to believe that the market is being tilted to favor the privileged insiders, they will want a premium of risk, or pull out all their funds, resulting in a lack of market liquidity and higher costs of equity to corporations.

To give some examples, in case a Chief Financial Officer has prior information that the companies quarterly earnings will grossly under perform the market expectations and he or she sells the company equity before the announcement, he or she has committed the classic insider trading. The landmark dispute in *Hindustan Lever Limited v. SEBI*, wherein HLL was alleged to have purchased 800,000 shares of Brooke Bond Lipton India Ltd. prior to a public merger

announcement, highlighted the complex foundational challenges in establishing corporate motive and strictly defining unpublished price-sensitive information²

RESEARCH OBJECTIVES

SEBI reorganized its framework through the SEBI (Prohibition of Insider Trading) Regulations 2015 in order to keep up with the increasing complexity of the contemporary financial ecosystem. However, even with ongoing legislative improvements, the problem of enforcement of regulations is devastating due to the institutional inefficiencies in the system. Thus, the main research goals of this paper have the following structure:

- i. To dismantle the current loopholes in enforcement and court bottlenecks in the insider trading system of India.
- ii. To measure and estimate the financial losses incurred by the retail investors as a result of systemic information asymmetry.
- iii. To build a holistic framework of an AI-based, FIU-integrated preventive surveillance system that turns the regulatory paradigm toward reactive penalization to proactive deterrence.

LITERATURE REVIEW

The scholarly debate on insider trading has developed considerably since the early legal commentary on the subject to the extremely advanced empirical, economic, and technological examination. A comprehensive analysis of literature with a high impact and indexed in Scopus shows a clear cluster of themes dedicated to criminological motives, the economic effects on retail investors, the legal analysis of the evidentiary norm, and the emergence of algorithmic surveillance.

Criminologically and behaviorally, scholars have made a lot of use of multidisciplinary frameworks in explanations of the persistence of white-collar securities fraud. Studies that apply Rational Choice Theory point to the fact that the offenders will calculate the high financial benefit of the trade on UPSI against the significantly small chances of detection and successful prosecution in new markets mathematically. Moreover, the Social Learning Theory

²*Hindustan Lever Ltd. v. SEBI*, (1998) 18 S.C.L. 311 (SAT Mumbai) (India).

describes the rationalization of illicit acts of corporate insiders working in high-stress financial settings, and informational exploitation is not regarded as a criminal act but a natural benefit of corporate power. Other recent works in behavioral finance also investigate the overlap of these insider actions with the psychological biases of the retail investor. Research suggests that retail investors tend to be susceptible to the herding effect and recency bias which makes them especially susceptible to the abrupt reversals in price that occur after the affronts of insider trading.

A great deal of empirical research is devoted to the quantification of the empirical effect of insider trading to the market efficiency and retail investor portfolio. Surveys conducted about the Indian equity market have continued to show that the level of information asymmetry is relatively high. Empirical studies employing Fama-MacBeth two-stage regression analysis indicate that informed insiders in the Indian market generate abnormal returns of approximately 19.28 percent compared to uninformed retail investors³. The literature would set up a negative correlation between the size of the company and the information asymmetry, meaning that smaller firms are most prone to insider manipulation. Other studies point to the fact that retail investor base is not typically in a position to have access to complex analytic tools and is a passive source of liquidity, which takes up the financial shocks when the stock prices are suddenly corrected following the UPSIs disclosure.

The lack of insider trading conviction in India as compared to developed jurisdictions is a common criticism of the SEBI framework by legal scholars.⁴ Although authors praise the conceptual strength of the SEBI PIT Regulations, they bemoan the scarcity of prosecution that is based on an overdependence on circumstantial evidence. The recent observations on landmark Supreme Court rulings especially on the Balram Garg and Abhijit Rajan cases have been subject to the argument that the judiciary has unwillingly crippled SEBI by setting near-criminal standards of evidence in civil regulatory cases. According to scholars, calling upon direct evidence of communication in the age of encrypted digital messaging sets an unsurmountable challenge on the part of regulators.

Lastly, a recent bibliometric analysis also indicates that there have been rapid scholarly concerns on the use of Artificial Intelligence and Machine Learning to detect financial frauds.

³ *Information Asymmetry and Insider Trade Profitability in India*, Emerald Insight.

⁴ *Insider Trading in India – Regulatory Enforcement*, IDEAS/RePEc, <https://ideas.repec.org/a/eme/jfcpps/jfc-12-2015-0075.html>

⁵The research published in Scopus proves the effectiveness of deep learning models in detecting anomalous trading patterns. As an example, the use of multi-channel convolutional neural networks (MTC-CNN) that are optimized using hyperparameters has realized high accuracy levels in recognizing pre-announcement volume abnormalities. ⁶The adoption of blockchain technology is also suggested more and more actively as one of the ways to guarantee that the records of transactions are not tampered with or changed. Nevertheless, the literature states that the most significant research gap is the lack of practical implementation of these sophisticated AI models into legislation and the interaction between them and national Financial Intelligence Units is mostly theoretical and under-researched.⁷

RESEARCH METHODOLOGY

The research paper assumes a complex approach that combines the doctrinal legal study, analysis of empirical data, and comparative regulatory evaluation. The doctrinal approach is a strict analysis of the main statutory sources, mostly the act of the Securities and Exchange board of India of 1992, the SEBI (Prohibition of Insider Trading) Regulations of 2015, and the numerous amendments that were developed during 2024-2025. This is supplemented by a critical study of landmark judicial pronouncements of the Supreme Court of India and the Securities Appellate Tribunal, which as far as the Indian securities jurisprudence is concerned, is the common-law basis of Indian securities jurisprudence.

The empirical aspect of the research will be based on secondary quantitative data which will be obtained by means of SEBI annual reports, National Stock Exchange statistical books and peer reviewed Scopus-indexed journals by quantifying the retail investor losses and profitability gap of insider trades. Lastly, a comparative methodology is used, to compare the regulatory and surveillance infrastructure of India with that of the rest of the world. The study compares the framework of SEBI with the Rule 10b-5 of the United States Securities and Exchange Commission and the Market Abuse Regulation in the European Union and provides a synthesis of the best practices to create actionable recommendations of policy.

To ensure methodological rigor, the empirical reliance on secondary data is temporally restricted to official SEBI publications and National Stock Exchange (NSE) statistical reports spanning fiscal

⁵ *AI and Financial Fraud Prevention: Mapping the Trends and Challenges Through a Bibliometric Lens*, MDPI.

⁶ *Detecting Insider Trading in the Indian Stock Market: An Optimized Deep Learning Approach*, Computational Econ.

⁷ *Insider Trading in the Age of Digital Footprints: Evidentiary Challenges Before SEBI and SAT*, Bar & Bench,

years 2023 to 2025. This time frame captures the post-pandemic surge in retail derivatives participation. Furthermore, the comparative framework is purposefully limited to jurisdictions representing two distinct ends of the regulatory spectrum: the highly mature algorithmic surveillance infrastructure of the United States, and the strictly codified parity-of-information regime of the European Union, thereby drawing contextually viable parallels for the evolving Indian ecosystem.

I. STATUTORY EVOLUTION AND THE 2024-2025 AMENDMENTS TO THE PIT REGULATIONS

The history of insider trading regulation has been quite a complicated one in India. It started with initial sensitivities on market abuse with the recognition of the Thomas Committee Report in 1948 and Sachar Committee in 1979 which observed that corporate insiders had sensitive information that they used to influence stock prices at the expense of the investing populace. This would finally lead to the SEBI (Insider Trading) Regulations of 1992. Nevertheless, the shortcomings of the 1992 framework in an economy that is rapidly modernizing came to light and SEBI implemented the holistic PIT Regulations in 2015 to align Indian securities law with international standards on a fundamental level. In 2015 the definition of an insider was broadened to cover any person who was related or any individual who possessed UPSI.

However, with the increase in the complexity of the capital markets, corporate entities were constantly developing elaborate mechanisms of circumventing these rules. This caused SEBI to come up with very strict and comprehensive amendments between June 2024 and March 2025, in an effort to seal the ensuing enforcement gaps. The amendments of June 2024 were aimed at the balanced provision of regulatory protection of the market with market flexibility in the form of trading plans. In the past, insiders who had the historical access to UPSI, including the key managerial staff, were virtually prevented to trade their own company stock. Specifically, the 2024 amendments sought to liberalize the trading plan framework by reducing the cooling-off period from six months to 120 days and removing the mandatory twelve-month minimum duration⁸.

In order to avoid price manipulation, SEBI came up with a 20 percent price limit range of trades relating to the price at which the plan was constructed. Moreover, it is now severely forbidden to

⁸ *Securities and Exchange Board of India (Prohibition of Insider Trading) (Amendment) Regulations, 2024, Gazette of India, pt. III sec. 4 (June 25, 2024).*

deviate against the trading plan except in exceptional cases like permanent disability, bankruptcy, or law operation⁹.

To deal with extreme evidentiary gaps, SEBI essentially broadened the definition of connected persons as of December 2024. In the past, the connectedness presumption was only limited to close relatives, who were financially reliant or consulted with respect to trading decisions. The new regulations radically expand this net to cover any relative, people who live or work with a linked person and a company or employee in which the linked person is a partner. In so doing, SEBI has established a strong rebuttable presumption. When a household member trades in advance of a corporate announcement, it is now squarely up to him to demonstrate that he did not have the UPSI, as opposed to the SEBI showing when the actual communication took place.

The most significant change happened perhaps with the March 2025 amendments that redefined the structure of UPSI. SEBI noted that listed entities often misused their discretion, which is subjective, not wanting to classify critical events as UPSI to maintain its trading windows open. To reconcile subjective corporate disclosures with regulatory expectations, SEBI harmonized the definition of UPSI under Regulation 2(1)(n) of the PIT Regulations with the material events specified under Regulation 30 of the SEBI (Listing Obligations and Disclosure Requirements) Regulations, 2015¹⁰. The new definition has been exhaustively redefined as also including a decision on fund-raising, an agreement affecting management control, a sudden change in the key managerial persons, a change in credit ratings, and a forensic audit of the financial misstatements. The expansion of the 'connected persons' definition under Regulation 2(1)(d) reflects a regulatory shift towards capturing modern, decentralized familial and professional networks. By extending the rebuttable presumption of connectedness to individuals sharing a household or material financial relationships, the amendment effectively shifts the evidentiary burden¹¹. However, this raises critical questions regarding the balance of probabilities required for an accused to successfully rebut such statutory presumptions in adjudicatory proceedings.

II. JUDICIAL INTERPRETATIONS AND THE EVIDENTIARY CONUNDRUM

⁹SEBI's New Insider Trading Regulations | Key Changes and Implications, Taxmann, ⁸Securities and Exchange Board of India (Prohibition of Insider Trading) (Amendment) Regulations, 2024, Gazette of India, pt. III sec. 4 (June 25, 2024). (last visited Mar. 9, 2026).

¹⁰Securities and Exchange Board of India (Listing Obligations and Disclosure Requirements) Regulations, 2015, Reg. 30, Gazette of India, pt. III sec. 4 (Sept. 2, 2015) (as amended).

¹¹Securities and Exchange Board of India (Prohibition of Insider Trading) (Second Amendment) Regulations, 2024, Gazette of India, pt. III sec. 4 (Dec. 31, 2024).

The legislative constriction that has been made possible by these changes in the law has crashed massively against an ever more restrictive judicial philosophy. Indian judiciary, especially the Supreme Court and the Securities Appellate Tribunal have systematically increased the evidentiary burden and this has seriously impaired the enforcement capacity of SEBI and has produced a paradoxical situation of the law being strict on paper but almost impossible to enforce in reality.

A primary illustration of this tension is the Supreme Court's 2022 ruling in *Balram Garg v. SEBI*, which significantly elevated the evidentiary threshold required by the regulator when relying on circumstantial evidence¹². Insider trading is a very secretive crime; the fraudsters do not write contracts of how the UPSI will be transferred. The case was about the allegation of negative UPSI by the Managing Director of PC Jeweller Ltd that a share buyback was to be terminated to the estranged family members who then took colossal short positions in the run of a few days before the announcement to the public¹³.

The SAT had affirmed the penalty of SEBI by the preponderance of probability caused by their close family relationship and accurate and highly suspicious timing of the trade. The decision was however overturned emphatically by the Supreme Court. The Court concluded that even circumstantial evidence like trading patterns, timing and residential proximity was not legally sufficient to establish the actual conveyance of UPSI.¹⁴ In analyzing the factual matrix, the Court noted the absence of direct, cogent material evidence such as call data records or specific communications—and held that mere familial relations and suspicious trading timing were insufficient to conclusively establish the communication of UPSI beyond a reasonable doubt.¹⁵ This judicial order has posed an almost insurmountable evidentiary barricade in the present-day world of end-to-end encrypted messaging, such as WhatsApp and Signal. According to legal experts, the Court has put direct evidence on a bigger pedestal, and thus it has tied the hands of the market regulator, since circumstantial evidence is usually the only footprint remaining behind by advanced market abusers.

To add to this evidentiary crisis is the ruling of the Supreme Court in *SEBI v. Abhijit Rajan*. In the past, jurisprudence of Indian securities followed the doctrine of strict liability. In the previous

¹² *Balram Garg v. SEBI*, (2022) 9 S.C.C. 425 (India).

¹³ *Supreme Court Clarifies Evidentiary Burden in Insider Trading Cases*, IndiaCorpLaw, <https://indiacorplaw.in/2022/04/25/supreme-court-clarifies-evidentiary-burden-in-insider-trading-cases/> (last visited Mar. 9, 2026).

¹⁴ *Insider Trading: What Must the Regulator Prove? Balram Garg v. SEBI: A Case Comment*, SCC Online Blog, <https://www.sconline.com/blog/post/2022/08/03/insider-trading-what-must-the-regulator-prove-balram-garg-v-sebi-a-case-comment/> (last visited Mar. 9, 2026).

¹⁵ *Hridhya T.V. & Dr. Sivananda Kumar K., Motive as a Pre-Condition for Insider Trading*, White Black Legal.

precedent, the Court held that mens rea or criminal intent is not a necessary part of imposing civil penalties by the SEBI regulations, and that the simple contravention of the statute could be considered adequate¹⁶. The Abhijit Rajan decision, however, introduced significant nuance to this strict liability approach by closely examining the factual context of the trade.¹⁷ In this matter, the Chairman of Gammon Infrastructure Projects Ltd. sold personal shares prior to the public announcement of the termination of highly profitable highway contracts. SEBI categorized this transaction as a classic manifestation of insider trading, arguing that the sale was explicitly timed to precede adverse corporate disclosures.

The Supreme Court, however, did not just examine the act itself but the overall corporate environment, which meant that the sale made by Rajan was a distress sale because of a pressing need to secure a Corporate Debt Restructuring package to prevent the bankruptcy of the parent entity.¹⁸ More importantly, the Court also decided that the intent to profit or not to lose is a necessary requirement to prove a case of insider trading. The Court thought that no rational insider who aimed to obtain unlawful profits would sell shares before an event that by shedding unviable obligations might have stabilized the company and caused prices to go up.

The judiciary has unwillingly given corporate insiders a powerful defense mechanism by introducing the necessity of a profit motive to a civil enforcement system. The insiders are now able to trade with UPSI in their possession and later build a business case of business foresight or the strong need to pay debts to avoid liability, multiplying the prosecutorial load on SEBI many times over.¹⁹ It is crucial to doctrinally distinguish the specific factual matrix of Abhijit Rajan from routine market abuse. The Court's holding heavily relied on the undisputed fact that the transaction was a distress sale necessary to fund a Corporate Debt Restructuring (CDR) package, effectively averting the bankruptcy of the parent entity.

Therefore, while the judgment emphasizes the necessity of a profit motive or an intent to avoid loss, it may be argued that this holding is deeply fact-specific rather than a blanket dismantling of strict liability under the PIT Regulations.

¹⁶ *India's Regulator Pushes for Tighter Enforcement of Insider Trading Rules*, Finmen, <https://finmen.in/indias-regulator-pushes-for-tighter-enforcement-of-insider-trading-rules/> (last visited Mar. 9, 2026).

¹⁷ *SEBI v. Abhijit Rajan*, (2022) 10 S.C.C. 433 (India).

¹⁸ Marco Ventoruzzo, *Comparing Insider Trading in the United States and in the European Union: History and Recent Developments*, Max Planck Inst., https://www.mpi.lu/fileadmin/mpi/medien/research/WPS_Marco_Ventoruzzo.pdf (last visited Mar. 9, 2026).

¹⁹ *Exploring the Role of Motive in Insider Trading: A Case Study of SEBI v. Abhijit Rajan*, NLIU L. Rev.

III. REAL-WORLD INCIDENTS OF MARKET ABUSE: A LOOK AT INDIA AND THE US

In order to perfectly understand the devastating effect of these enforcement gaps, it is appropriate to refer to real market events. The theories and statutes aside, the practical scams reveal the actual result of information asymmetry in reality. In the case of Hemant Ghai, former financial journalist and popular anchor of CNBC Awaaz. SEBI identified a great deal of correlation between the stock recommendations that Ghai gave during his live show, Stock 20-20 and transactions executed slightly before the shows. He purchased shares in advance of his own appearances, by the trading accounts of his wife and his mother, in effect front-running himself on the basis of the advance, non-public information of his own market-moving recommendations. This is because his fiduciary duty of influence was abused and SEBI has started to take action and he was forced to pay 1.45 crore to clear the charges.

The magnitude of insider trading in the United States can be in terms of huge institutional networks. An apparent case study is the example of Stephen Cohen and his hedge fund, SAC Capital Advisors. The US prosecutors accused the fund of overseeing a corporate culture that was aggressively encouraging employees to rely on personal contacts to obtain inside information on publicly-traded companies. It was such a pervasive illegal trading that SAC Capital ended up paying a fine of historic proportions, 1.8 billion dollars, and was guilty of criminal conduct. Although Cohen himself was not charged with a crime, SEC banned him from handling outside funds claiming that he had not overseen his workers, such as portfolio manager Matthew Martoma who had engaged in illicit trading based on insider medical trial information. These examples demonstrate that it is not about a single anchor and a multi-billion dollar fund because the abuse of personal information is a global menace.

IV. ENFORCEMENT GAPS AND DRAWBACK OF SEBI

The joint action of exceptionally intricate market manipulation schemes and restrictive judicial decisions has revealed some structural weaknesses in the regulatory frameworks of India.

However, India has a good lack of effective insider trading convictions despite having an elaborate statutory text. Procedural lag is always a constant bane of the investigations, and to go through the initial show-cause notices to the final adjudication may take years. By the time an order is issued, the computer trail will have disappeared long ago, and the deterring effect will be lost altogether.

Moreover, SEBI has a massive burden of investigative resources. The current securities fraud necessitates the forensics audit of sophisticated algorithmic trading and offshore entity frameworks. More importantly, in contrast with the United States SEC or even the Central Board of Direct Taxes in India, SEBI does not have a statutory power to wiretap real-time electronic communications²⁰. This lack of interception capability makes the regulator practically blind to the existence of corporate networks that are organized and run over encrypted communication channels.

The high rate of market digitalization has also introduced an additional and an extremely unstable platform of spreading the UPSI in the form of social media. The unregistered financial influencers or finfluencers regularly share stock tips based on leaked company information on Telegram channels and small WhatsApp groups. The ability to collect legally admissible evidence on these decentralized networks generates grave jurisdictional and evidentiary overlap that SEBI investigative equipment is not well equipped to manage. Whenever SEBI tries to prosecute these new networks, it often runs up against the evidentiary walls that the Balram Garg judgment has thrown up, and it cannot demonstrate the precise chain of communication that the courts demand.

To better understand the scale of SEBI's current enforcement efforts against this rising tide of market abuse, we can look at the recent investigation metrics:

FINANCIAL YEAR	INVESTIGATIONS INITIATED	ACTIONS TAKEN / PENALTIES IMPOSED
FY 2022 – 2023	144 Cases	42 Entities Fined
FY 2023 – 2024	175 Cases	55 Entities Fined
FY 2024 – 2025	287 Cases	Ongoing / Escalated Scrutiny

**(Data shows a sharp rise in cases taken up by SEBI, highlighting increased regulatory vigilance against UPSI leaks.)*

²⁰Sec. 3 & Exch. Bd. of India, *Amendments to SEBI (PFUTP) Regulations and SEBI (PIT) Regulations*, https://www.sebi.gov.in/sebi_data/meetingfiles/oct-2018/1539342662909_1.pdf (last visited Mar. 9, 2026).

V. THE RETAIL INVESTOR DILEMMA

The retail investors of India are the eventual victims of these enormous enforcement lapses. There is no victim-less market when it comes to insider trading, the process of eliminating the very core principle of fairness in the marketplace by systematically introducing a gross information asymmetry into which the retailers continue to be nothing more than liquidity providers to the highly informed insiders. The volume of retail trading in India has skyrocketed due to zero-commission digital brokerage systems, high smartphone adoption, and market booms of the pandemic period. The retail invested in the cash market increased nine times in the last ten years. Nonetheless, this inflow of retailers has been forcefully and riskily invested in the volatile equity derivatives market.

The economic catastrophe caused by this migration is appalling and alarming. Regulatory information published by SEBI showed that more than 9 out of 10 retail investors in the equity derivatives sector made huge unrelenting losses Indian retail individual traders in the equity derivatives segment recorded net losses exceeding ₹1.06 trillion in recent fiscal periods.²¹ While this massive wealth erosion is heavily influenced by systemic behavioral biases and broader market volatility, it is arguably exacerbated by structural information asymmetries and instances of predatory trading by highly informed institutional insiders. As corporate insiders and high-frequency trading algorithms are playing the market with advanced networks and early access to UPSI, retail investors rely on the delayed, public information to make their investments. When positive or negative news is finally announced in the exchange platforms, the insiders have already factored the event into the asset. As a result, retail traders trade at very inopportune prices, which take up the financial shocks of the next market correction.

FINANCIAL YEAR	NET LOSSES IN EQUITY DERIVATIVES	PERCENTAGE OF LOSS - MAKING TRADERS
FY 2023	~ ₹ 50,000 CRORES	~ 89%
FY 2024	~ ₹ 74,812 Crores	~ 90%

²¹ Sec. & Exch. Bd. of India, *Study: Analysis of Profit and Loss of Individual Traders Dealing in Equity F&O Segment*, SEBI Rep. (Jan. 25, 2023)

(Data reflects the systemic wealth extraction from uninformed retail participants as highlighted in recent SEBI studies.)

This relationship is further aggravated by the behavioral biases of retail investors including overconfidence and loss aversion which are massively exploited by influencer networks . While multiple systemic factors drive derivatives losses, the prevailing enforcement lag in prosecuting insider trading acts as a compounding variable in the wealth transfer between uninformed retail participants and privileged insiders. While the U.S. framework relies heavily on judicial interpretations of Section 10(b) of the Exchange Act, necessitating the complex proof of fiduciary breach and scienter,²² the European Union offers a more formalized statutory model. The Market Abuse Regulation (MAR) explicitly defines administrative offenses and mandates proactive compliance measures, such as the maintenance of stringent insider lists and the filing of Suspicious Transaction and Order Reports (STORs).²³ India’s framework currently straddles these two philosophies: its statutory text mirrors the EU’s parity of information doctrine, yet its adjudicatory outcomes frequently demand the U.S.-style intent and direct evidentiary standards.

VI. COMPARATIVE ANALYSIS VIS A VIS US, EU, INDIA.

In order to successfully redesign the regulatory system in India, it is essential to make a comparative analysis with the developed securities regimes of the United States and the European Union. Although all the three jurisdictions are committed to the reduction of market abuse, they work with radically different theoretical premises.

HEADING	US	EU	INDIA
LEGAL FRAMEWORK	Securities Exchange Act 1934 & SEC Rule 10b-5	Market Abuse Regulation (MAR)	SEBI PIT Regulations 2015

²¹Sec. & Exch. Bd. of India, Study: Analysis of Profit and Loss of Individual Traders Dealing in Equity F&O Segment, SEBI Rep. (Jan. 25, 2023)

²²Securities Exchange Act of 1934, 15 U.S.C. S. 78j(b); 17 C.F.R. S. 240.10b-5 (2022).

²³Regulation (EU) No 596/2014 of the European Parliament and of the Council of 16 April 2014 on Market Abuse (Market Abuse Regulation), 2014 O.J. (L 173) 1, 42.

FOUNDATIONAL THEORY	Breach of Fiduciary Duty & Misappropriation Theory	Equal Access to Information (Parity of Information)	Parity of Information & Presumed Connectedness
EVIDENTIARY STANDARD	Circumstantial evidence widely accepted	Objective trading data and automated logs	Exceedingly high threshold requiring direct evidence
INTENT / MOTIVE	Requires stringent proof of scienter	Mere possession and use is legally sufficient	Designed as strict liability but judiciary mandated profit motive
SURVEILLANCE	Advanced utilization of MIDAS, ARTEMIS, robust wiretaps	Automated ESMA coordination and pan-European STRs	Transitioning to AI Data Lake but lacks wiretapping authority

The U.S. system is not regulated by a specific express statute of insider trading, but is indicted as a violation of the anti-fraud clauses of SEC Rule 10b-5. It is very dependent on heavy common-law judicial interpretations with the Classical Theory of fiduciary duty and the Misappropriation Theory as the main ones. Although the American need to demonstrate scienter (intent to defraud) to prosecute is a complicated task, the U.S. compensates this by the use of frightening enforcement authority. The SEC constantly uses high-tech wiretaps, has high-tech surveillance tools such as ARTEMIS, and has huge whistleblower bonuses that are actively used to encourage corporate insiders to report unlawful practices. This has a very overwhelming discouraging impact.

Contrastingly, the European Union has a homogeneous, strict, statutory framework, the Market Abuse Regulation (MAR). ²⁴The EU categorically opposes the sophisticated American condition of demonstrating a violation of fiduciary duty. Rather, MAR is founded on the whole on the theory of Parity of Information. In the MAR, possession and trading in financial instruments using inside information is an unlawful act on its own. This is a statutory method of achieving this goal, which enables the European Securities and Markets Authority (ESMA) to effectively levy harsh administrative fines without necessarily becoming tangled in endless court cases on motive or intent.

²⁴ Clifford Chance, *The US and EU – An Ocean Apart on Insider Dealing Regulation?* (2015), <https://www.cliffordchance.com/content/dam/cliffordchance/briefings/2015/06/the-us-and-eu-an-ocean-apart-on-insider-dealing-regulation.pdf>.

The Indian SEBI PIT Regulations are theoretically based on the EU objective Parity of Information approach, as they explicitly state connected persons and require trading windows to be followed rigidly. But, as examined above, the Indian judiciary has imposed the demands of the American style of common-law, like the need to prove the profit motive and the rejection of circumstantial evidence, over the statutory structure. This has led to a most fragmented system where SEBI is subject to a civil strict-liability statute, and must prove its claims through the near-criminal intent-based evidentiary standards. It is this philosophical conflict that is the root of the paralysis in enforcement in India at present.

VII. NEED FOR PREVENTIVE SURVEILLANCE MECHANISM

Taking into account the fact that Indian judiciary is highly opposed to convict on circumstantial evidence, then the traditional regulatory paradigm of reactive, post trade forensic investigation is functionally irrelevant. SEBI needs to shift to a more aggressive shift to a regime of real-time, preventative surveillance to ensure the protection of the enormous capital that is being drained by retail investors today. The only way forward in case the post-facto legal prosecution is so crippled is to detect and stop abnormal actions prior to or during the trade execution.

SEBI previously controlled the markets with the old systems that include the Data Warehousing and Business Intelligence System (DWBIS) and the Integrated Market Surveillance System (IMSS). These systems are based on batch processing of flat files at the end of the day at the stock exchange and depositories of the companies using very simple and preset rule-based algorithms to produce alerts. These fixed rules produce huge quantities of false positives in a contemporary financial system with more than 5.5 billion messages to process each day and utterly fail to detect new, algorithmic methods of manipulations such as electronic front-running or rapid options spoofing.²⁵

Understanding this essential weakness, SEBI is now in the process of rolling out a colossal technological transformation by its Data Lake initiative, which is constructed on a robust personal cloud platform. This project is aimed at using Artificial Intelligence and Machine Learning as weapons against the abusers of the market. The regulator can handle the pre-announcement volume anomaly using deep learning pattern recognition models, such as Long Short-Term Memory networks and multi-channel Convolutional Neural Networks, to handle high-frequency and multivariate financial data mathematically. In addition, GNNs are also applied to the autonomous mapping of complex relationships. Comparing demographic KYC data with historical trading preferences and banking records, GNNs are able to visualize hidden networks between a corporate insider and an offshore trading organization instantaneously, in a few seconds, what would have taken investigators months of manual effort to discover.

²⁵ AMFI, *Minimum Standards Recommendations on Anti-Money Laundering Combating Financing of Terrorism & Know Your Customer Policy*, <https://www.amfiindia.com/Themes/SEBI/CU152-Ch1Minimum>, (last visited Mar. 9, 2026).

SEBI has introduced Sudarshan, an on-the-job AI solution based on Natural Language Processing to fight the epidemic of finfluencers. Sudarshan is a project that scrapes audio, video, and textual content of the social media in real time. This preventive device has been very successful as it has been able to identify and shut down more than 1.2 lakh deceptive advisory posts that usually act as channels through which leaked UPSI or coordinate pump-and-dump schemes are implemented against the retail investors.

Also, there is a growing acceptance of the integration of blockchain technology as an essential component of preventive surveillance. SEBI can create a cryptographically secure audit trail by storing all insider trade requests, trading plans approvals, and Structured Digital Database of corporations on an immutable, Hyperledger-based distributed ledger using smart contracts. This technological inertia is a direct response to the request of cogent material evidence by the Supreme Court in *Balram Garg* since after the fact manipulation of trade logs or corporate books becomes mathematically impossible.

VIII. FINDINGS AND SUGGESTIONS

The main results of the present study are that the entire statutory narrowing attained by SEBI by the PIT Regulations and the latest amendments have been grossly watered down by the restrictive court decisions. The judiciary by expressly discarding the admissibility of circumstantial evidence and arbitrarily attributing a common-law profit motive to a strict liability civil statute has placed close to insurmountable barriers to evidence. The systematic information asymmetry created by this unregulated market abuse has caused unparalleled financial destruction of retail investors, which is clearly demonstrated by the 1.06 trillion net loss realized in the equity derivatives market over fiscal year 2025. Moreover, the conventional, reactive surveillance systems are grossly outmanoeuvred by the high-frequency trading and decentralized social media communication, which requires a technological turnaround.

There is a need to correct these gaps through actionable policy recommendations. To eliminate the *Abhijit Rajan* precedent, the legislature should first present statutory changes, which specifically name the intent to make a profit as a strictly immaterial element of proving civil liability in insider trading cases. Second, the legislation should be revised to acknowledge the probative value of probabilistic digital footprints and artificial intelligence generated network graphs. Once such systems have created a high-confidence connection, the burden of proving the offense should be forever transferred to the defendant. Third, the SEBI is to require all insider trade logging and corporate structured digital database entries to be converted to the immutable blockchain infrastructure to completely exclude the possibility of any manipulation of data and meet the requirements of the judiciary of providing the concrete evidence.

The surveillance of pre-emptive measures cannot be kept in the narrow disclosure of the securities market since the end product of insider trading is the plunder and laundering of illegal fiat currency.

The surveillance of pre-emptive measures cannot be kept in the narrow disclosure of the securities market since the end product of insider trading is the plunder and laundering of illegal fiat currency. Thus, the collaboration of the AI alerts of SEBI with the Financial Intelligence Unit-India (FIU-IND) is the most important. FIU-IND, which functions under the Prevention of Money Laundering Act, is the national network node of the banking industry, which analyzes Suspicious Transaction Reports (STRs).

With secure automated data pipelines established between SEBI modern Data Lake and the FINNET 2.0 portal at FIU, the regulators will be able to immediately match a highly suspicious derivative options trade that has been carried out in the stock exchange with a later questionable cross-border wire transfer raised by a bank. This comprehensive financial intelligence mapping records the dark money of the exchange terminal straight to the offshore bank account. This inter-agency synergy completes the chain of evidence necessary to prosecute successfully, and breaks the barriers of the traditional siloed investigations and forms a genuinely preventive web that can stop organized financial crime before the capital can leave the domestic ecosystem.

CONCLUSION

In conclusion, the Indian securities market is at a cross road. This massive retail capital influx has democratised financial involvement and at the same time millions of uninformed investors have fallen prey to the predatory actions of corporate insiders and algorithmic manipulators. The existing regulatory framework, which, on paper, is as sound as statutory law, is crippled in practice by a dependence on direct evidence and judicial inferences that are simply irreconcilable with the facts of communication in the digital era. The disastrous trillion-rupee losses that the retail traders had to bear is a telling reminder of the harsh truth that insider trading is not an administrative crime without victims, but a structural process of wealth expropriation that shakes the very foundation of the economy. In order to protect the integrity of the market, it is quite necessary to discard the paradigm of reactive enforcement. It is only under the rubric of the violent overturn of constraining judicial case law, the adoption of AI-based preventive surveillance, and the smooth integration into national financial intelligence systems, that India can effectively go beyond merely prosecuting market abuse to actually preventing it.

CONTROLLED COMPLIANCE: RETHINKING CORPORATE GOVERNANCE IN PROMOTER-DOMINATED FIRMS IN INDIA

Shraddha Jain

ABSTRACT

This article examines the structural role of promoter concentration in shaping corporate governance outcomes in India. Moving beyond traditional governance models premised on dispersed ownership, the study argues that promoter dominance constitutes a foundational feature of Indian corporate structures rather than a deviation from them. Through a theoretical and institutional analysis, the article highlights the limitations of conventional frameworks such as agency theory in capturing the dynamics of concentrated ownership, while integrating alternative perspectives, including entrenchment, stewardship, and non-linear models. It further evaluates the effectiveness of the regulatory framework under the Companies Act, 2013, and the SEBI (LODR) Regulations, 2015, demonstrating that governance mechanisms often operate within, rather than against, structures of control. The article develops the concept of controlled compliance to explain how governance institutions in promoter-dominated firms retain formal legitimacy while becoming structurally embedded within concentrated ownership arrangements. Unlike entrenchment-based accounts, which emphasise opportunistic extraction, controlled compliance is concerned with the institutional absorption of oversight mechanisms within control structures as a systemic governance feature rather than an exceptional failure. This reframing shifts the analytical emphasis from ownership concentration to the operational autonomy of governance institutions under conditions of concentrated control.

KEY WORDS

Promoter concentration, corporate governance, ownership structure, disclosure regulation, controlled compliance.

INTRODUCTION

Corporate governance theory has traditionally been constructed around the assumption that ownership and managerial control are institutionally separated. Agency-based models, which have substantially influenced modern governance regulation, conceptualise governance as a mechanism for controlling managerial opportunism, reducing agency costs, and protecting dispersed shareholders. These assumptions have shaped the evolution of governance structures across jurisdictions, including the development of independent boards, audit oversight systems, disclosure obligations, and shareholder protection mechanisms. However, the explanatory strength of such frameworks becomes limited in corporate environments where ownership remains concentrated in the hands of controlling shareholders rather than dispersed across fragmented investors.

The Indian corporate structure presents a markedly different institutional reality from the ownership patterns around which much of conventional governance theory has evolved. A significant proportion of Indian listed entities continue to operate within promoter-dominated ownership structures in which controlling shareholders retain substantial influence over strategic direction, management coordination, and organisational decision-making. In such firms, ownership and control frequently remain interconnected rather than institutionally separated. Governance institutions therefore operate within structures shaped by concentrated ownership rather than being external to them.

Indian corporate governance regulation, particularly under the Companies Act, 2013 and the SEBI (Listing Obligations and Disclosure Requirements) Regulations, 2015, seeks to strengthen accountability through mechanisms such as independent directors, audit committees, disclosure obligations, related-party transaction regulation, and minority shareholder protections. Yet the effectiveness of these mechanisms depends not merely upon formal statutory design, but upon the institutional conditions within which they function. In promoter-driven firms, governance structures often operate within organisational environments where concentrated ownership influences appointments, access to information, strategic coordination, and voting outcomes. Consequently, governance mechanisms may retain procedural validity while their operational autonomy becomes institutionally constrained by concentrated control.

Existing scholarship on Indian corporate governance has examined ownership concentration primarily through agency-cost analysis, minority shareholder protection frameworks, entrenchment theory, and studies concerning the transplantation of Anglo-American governance norms into India's promoter-oriented corporate structure. While these approaches explain important dimensions of concentrated ownership, they remain largely focused on outcomes such as extraction, inefficiency, or governance breakdown. Less attention has been devoted to explaining how governance institutions continue to retain formal regulatory legitimacy while operating within structures substantially shaped by concentrated ownership.

The concept of “controlled compliance” is developed to address this institutional dimension of governance operation.

The analysis proceeds on the basis that promoter concentration possesses both governance advantages and governance vulnerabilities. Concentrated ownership may strengthen strategic continuity, decisional stability, and internal coordination, particularly in environments where external monitoring remains fragmented or institutionally weak. At the same time, the concentration of control may also generate informational asymmetries, constrained oversight autonomy, and structural dependence within governance institutions. Governance outcomes therefore cannot be understood solely through binary assumptions that promoter dominance is either inherently efficient or inherently problematic.

A doctrinal, institutional, and illustrative comparative approach is adopted for the purposes of this analysis. The discussion relies primarily upon statutory interpretation, judicial decisions, regulatory materials, committee reports, and publicly available corporate disclosures.

Selected company examples are examined illustratively in order to analyse how differing ownership structures influence governance operation, strategic execution, oversight capacity, and organisational risk. The objective is not quantitative measurement of governance performance, but the development of an institutional account of how governance mechanisms function within concentrated ownership systems.

The central argument advanced is that the primary challenge within promoter-dominated governance lies not merely in insufficient regulation or episodic governance failure, but in the institutional absorption of governance mechanisms within structures of concentrated control. Understanding this distinction shifts governance analysis beyond formal indicators of compliance towards the broader institutional realities through which corporate governance operates in practice within Indian firms.

THEORETICAL INDETERMINACY IN PROMOTER CONCENTRATION AND CORPORATE GOVERNANCE AGENCY THEORY AND THE ALIGNMENT EFFECT OF PROMOTER OWNERSHIP

Agency theory traditionally conceptualises corporate governance as a mechanism for addressing conflicts between dispersed shareholders and professional managers arising from the separation of ownership and control. Within this framework, concentrated ownership is often viewed as a governance solution because significant shareholders possess both the incentive and the capacity to monitor managerial behaviour more effectively than dispersed investors. In promoter-dominated firms, concentrated ownership may therefore reduce classical managerial agency costs by aligning strategic decision-making with long-term shareholder interests and enabling greater continuity in corporate direction.

However, while agency theory explains the efficiency rationale underlying concentrated ownership, its classical formulation remains primarily concerned with managerial opportunism rather than the institutional consequences of sustained promoter control. As ownership concentration increases, the central governance concern shifts from manager-shareholder conflict towards the possibility that governance institutions themselves may become structurally influenced by controlling shareholders.¹

ENTRENCHMENT THEORY AND THE RISK OF CONTROLLING SHAREHOLDER DOMINANCE

Entrenchment theory responds to the limits of agency theory in concentrated ownership structures by shifting the focus from managerial opportunism to the risks of excessive control by dominant shareholders. While agency theory emphasises efficiency through alignment, entrenchment theory highlights the potential for controlling shareholders to extract private benefits at the expense of minority investors.

A central feature of entrenchment is the use of related party transactions as a channel for the reallocation of resources within business groups. Such transactions, while legally permissible and often disclosed, can serve as vehicles for tunnelling where value is transferred from the firm to entities controlled by promoters.² Entrenchment-based approaches therefore shift the governance inquiry away from managerial opportunism and towards the institutional risks arising when concentrated ownership acquires the capacity to shape oversight mechanisms themselves.

STEWARDSHIP THEORY AND THE NORMATIVE JUSTIFICATION OF PROMOTER CONTROL

Stewardship theory offers a contrasting perspective by suggesting that concentrated control may facilitate long-term strategic orientation, organisational continuity, and value creation rather than opportunistic extraction. Within promoter-driven firms, controlling shareholders are often viewed not merely as financial investors but as institutional stewards whose sustained involvement encourages continuity in governance, risk-taking capacity, and long-term planning. This perspective is particularly relevant in emerging market economies such as India, where family-promoter structures frequently maintain deep operational involvement and intergenerational continuity within corporate management. Promoter concentration may therefore strengthen strategic cohesion and reduce short-term market pressures that characterise dispersed ownership systems. Consequently, while stewardship theory explains the developmental and strategic advantages associated with promoter dominance, it does not fully address how governance mechanisms operate when oversight institutions themselves become dependent upon concentrated control structures.³

¹Michael C. Jensen & William H. Meckling, *Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure*, 3 *J. Fin. Econ.* 305, 308-10 (1976).

²Andrei Shleifer & Robert W. Vishny, *A Survey of Corporate Governance*, 52 *J. Fin.* 737, 761-63 (1997).

³James H. Davis et al., *Toward a Stewardship Theory of Management*, 22 *Acad. Mgmt. Rev.* 20, 22-25 (1997).

NON-LINEAR AND TRADE-OFF MODELS OF OWNERSHIP CONCENTRATION

The non-linear understanding of concentrated ownership rejects the assumption that promoter dominance produces uniformly positive or uniformly negative governance outcomes. Concentrated ownership may facilitate strategic continuity, monitoring efficiency, and long-term planning while simultaneously increasing the risks of entrenchment, informational asymmetry, and reduced oversight autonomy. Governance outcomes therefore depend not merely upon ownership concentration itself, but upon the institutional conditions within which concentrated control operates.⁴ While these theoretical frameworks explain competing consequences of concentrated ownership, they remain largely outcome-oriented in their analytical focus. They explain why promoter concentration may produce efficiency gains, alignment effects, or entrenchment risks, but do not sufficiently examine how governance institutions themselves adapt under conditions of concentrated control.

BOARD INDEPENDENCE AND STRUCTURAL DEPENDENCE

The structural limitations of board independence arise not merely from formal voting power but from the institutional processes through which boards are constituted and operated. Section 149 of the Companies Act, 2013 and Regulation 17 of the SEBI (LODR) Regulations mandate the maintenance of a specified proportion of independent directors on listed company boards.⁵ The legislative intent underlying these provisions is to introduce accountability through structural separation between managerial authority and board oversight. However, independence as a legislative category operates through an eligibility-based definition under Section 149(6) that identifies disqualifying relationships rather than affirmatively securing institutional capacity.

The appointment mechanism under Section 152,⁶ read with the role of the Nomination and Remuneration Committee under Section 178,⁷ channels the selection process through a committee structure that is itself constituted primarily through shareholder approval, which, in promoter-concentrated firms, substantially reflects promoter voting power. The formal architecture of independence therefore, incorporates the very structural conditions through which that independence may be conditioned.⁸

The effectiveness of independent oversight is further limited by informational dependence. Board deliberation is largely structured around materials circulated through management channels, including agenda notes, financial summaries, internal audit reports, and strategic memoranda prepared under executive supervision.

⁴ Gamze Vural & Simoes Bacha, *The Nonlinear Effects of Ownership Concentration and Board Structure on Bank Performance*, 70 *Panoeconomicus* 101 (2022), Michael C. Jensen & William H. Meckling, *Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure*, 3 *J. Fin. Econ.* 305, 308-10 (1976).

⁵ *The Companies Act, No. 18 of 2013, § 149 (India)*; *Securities and Exchange Board of India (Listing Obligations and Disclosure Requirements) Regulations, 2015, Reg. 17.*

⁶ *The Companies Act, No. 18 of 2013, § 152 (India).*

⁷ *The Companies Act, No. 18 of 2013, § 178 (India).*

⁸ Umakanth Varottil, *The Evolution of Corporate Law in Post-Colonial India: From Transplant to Autochthony*, NUS Law Working Paper No. 2015/001 (2015).

Although Secretarial Standard-1 requires advance circulation of agenda and supporting documents, the timing, framing, and depth of information remain substantially shaped by management-controlled processes closely aligned with promoter interests.⁹ Consequently, the central issue is not merely whether independent directors formally exist, but whether they possess sufficient institutional autonomy and informational access to meaningfully challenge promoter-influenced decision-making.¹⁰ Similarly, disclosures under Section 134 (Board's Report) and Regulation 30 of LODR ensure formal transparency but do not eliminate informational asymmetry, as independent directors continue to rely on filtered inputs.¹¹

AUDIT COMMITTEES AND INFORMATION CONTROL

The institutional limits of governance become particularly visible in the functioning of audit committees. Section 177 of the Companies Act, 2013 and Regulation 18 of the SEBI (LODR) Regulations vest audit committees with significant authority over financial reporting, internal controls, and scrutiny of related party transactions.¹² However, the effectiveness of these mechanisms depends heavily upon the quality, completeness, and timing of information generated within management-controlled processes. Audit committees typically rely on financial statements, compliance reports, internal audit findings, and transaction summaries prepared by executives and management personnel. This creates a structural asymmetry in which oversight mechanisms review information that is already filtered through promoter-influenced organisational structures.

This institutional dependence becomes especially significant in the context of related party transactions regulated under Regulation 23 of the SEBI (LODR) framework. Although such transactions require disclosure and, in certain circumstances, approval by disinterested shareholders, the initiation, structuring, and informational framing of the transaction originate within the controlling structure itself.¹³ Consequently, audit committees frequently perform procedural scrutiny without possessing equivalent capacity for independent substantive verification.

Disclosure-based governance under the SEBI (LODR) framework is premised upon the assumption that transparency enables market discipline and shareholder accountability. Regulations 30 and 31 seek to operationalise this objective by mandating continuous disclosure of material events, promoter encumbrances, governance developments, and shareholding structures.¹⁴ However, disclosure governance does not eliminate informational asymmetry; rather, it institutionalises a structured process through which information is communicated to the market.¹⁵

¹¹ *The Companies Act, No. 18 of 2013, § 134 (India); Securities and Exchange Board of India (Listing Obligations and Disclosure Requirements) Regulations, 2015, Reg. 30.*

¹² *The Companies Act, No. 18 of 2013, § 177 (India); Securities and Exchange Board of India (Listing Obligations and Disclosure Requirements) Regulations, 2015, Reg. 18.*

¹³ *Securities and Exchange Board of India (Listing Obligations and Disclosure Requirements) Regulations, 2015, Reg. 23.*

¹⁴ *Securities and Exchange Board of India (Listing Obligations and Disclosure Requirements) Regulations, 2015, Reg. 30 and 31.*

¹⁵ *Ishwar Khatri, Paul Einar Giskås, Anneli Kalliainen Kyrrö & Frode Kjerland, Corporate Governance Mechanisms and Non-Financial Disclosure Quality: Evidence from Sustainability Committee, External CSR Assurance, and Stakeholder Engagement, 107 Int'l Rev. Fin. Analysis 104645 (2025), <https://doi.org/10.1016/j.irfa.2025.104645>.*

he effectiveness of this framework is shaped by several institutional limitations. Management retains substantial discretion in determining materiality thresholds, timing of disclosures, and narrative framing of corporate developments. Minority shareholders and retail investors frequently lack the informational capacity and organisational coordination necessary to convert disclosures into meaningful governance intervention. Consequently, disclosure may enhance formal transparency without materially displacing concentrated control over substantive decision-making.¹⁶

MINORITY PROTECTION AND ENFORCEMENT CONSTRAINTS

Although Sections 241 and 242 of the Companies Act, 2013 provide remedies against oppression and mismanagement, the practical effectiveness of these mechanisms remains institutionally constrained. Minority shareholders frequently encounter evidentiary asymmetries arising from unequal access to internal corporate records, management communications, and transaction-level information. In addition, dispersed shareholders often lack sufficient economic incentive to initiate prolonged litigation due to procedural complexity, cost, and uncertainty associated with corporate disputes before the National Company Law Tribunal. Consequently, minority protection mechanisms frequently operate more as symbolic safeguards than as consistently accessible instruments of governance accountability.¹⁷

Judicial interpretation of the oppression and mismanagement remedy has also shaped the institutional limits of minority protection. In *Needle Industries (India) Ltd v Needle Industries Newey (India) Holding Ltd*, the Supreme Court recognised that the remedy under what is now Sections 241-242 is not designed to resolve ordinary commercial disagreements but to address conduct that is harsh, burdensome, or inequitable.¹⁸ The threshold inquiry therefore focuses on the quality of the dominant shareholder's conduct rather than the mere concentration of control. Similarly, in *Dale and Carrington Invt. (P) Ltd v P.K. Prathapan*, the Court affirmed that majority action must be assessed against the standard of good faith and benefit to the company as a whole.¹⁹ While these decisions introduce normative standards for the exercise of promoter control, they operate within a framework where evidentiary requirements, procedural complexity, and access to internal documentation present structural barriers to minority shareholders pursuing governance-related claims before the National Company Law Tribunal.

REGULATORY ENFORCEMENT AND INSTITUTIONAL CONSTRAINTS

The structural limitations of disclosure-based governance become particularly visible in the regulation of promoter shareholding and control. Indian securities regulation incorporates mechanisms such as minimum public

¹⁶ Rakesh Mishra, *Effect of Ownership Structure and Board Structure on Firm Value: Evidence from India*, 17 *Corp. Governance* 1 (2017).

¹⁷ Dhiren Gupta, *Addressing Gaps in Indian Shareholder Litigation: The Imperative for Double Derivative Suits*, NLIU Ctr. Bus. & Com. Laws Blog (June 15, 2025).

¹⁸ *Needle Industries (India) Ltd v Needle Industries Newey (India) Holding Ltd*, (1981) 3 SCC 333.

¹⁹ *Dale and Carrington Invt. (P) Ltd v P.K. Prathapan*, (2005) 1 SCC 212.

shareholding requirements and mandatory disclosure of promoter encumbrances in order to introduce transparency within concentrated ownership structures. Under Rule 19A of the Securities Contracts (Regulation) Rules, 1957 and the SEBI (LODR) Regulations, listed companies are required to maintain at least 25% public shareholding.²⁰ While this creates formal ownership dispersion and market liquidity, it does not substantially dilute promoter control, as promoters in most Indian listed companies continue to retain decisive influence over board appointments, voting outcomes, and strategic decision-making.

A similar limitation is visible in the disclosure framework governing promoter encumbrances. Regulation 31 of the SEBI (LODR) Regulations mandates disclosure of promoter shareholding patterns and pledged shares, thereby enhancing transparency regarding ownership and financial exposure. However, disclosure requirements do not restrict promoters from structuring ownership arrangements that preserve control while shifting economic risk. High levels of promoter pledging have, in several cases, raised concerns regarding financial vulnerability and contingent changes in control without immediately affecting formal ownership structures.²¹

Minimum public shareholding requirements introduce formal dispersion without displacing control, while disclosure obligations enhance transparency without materially limiting promoter influence. Governance regulation, therefore, operates within the framework of concentrated ownership rather than fundamentally transforming it.

PROMOTER CONCENTRATION AS A FUNCTIONAL GOVERNANCE MECHANISM REFRAMING PROMOTER DOMINANCE WITHIN GOVERNANCE STRUCTURES

Promoter concentration in Indian companies cannot be adequately understood as a deviation from ideal corporate governance models premised on dispersed ownership. Rather, it constitutes a foundational structural feature around which governance institutions are organised. In such firms, mechanisms such as boards, committees, and disclosures do not operate independently of control but are embedded within a framework where promoters play a central coordinating role in corporate decision-making.

Shareholding disclosures across Indian listed entities consistently demonstrate the persistence of concentrated promoter ownership, with a substantial proportion of listed firms continuing to exhibit promoter holdings sufficient to retain decisive influence over board composition, voting outcomes, and strategic corporate decision-making.²²

Tata Consultancy Services (TCS), with promoter group holding approximately 72% equity, illustrates how concentrated ownership structures can support long-term strategic continuity and stable managerial direction.

²⁰ *Securities Contracts (Regulation) Rules, 1957, r. 19A.*

²¹ *Natika Poddar & Jayashree Correia, An Empirical Study on Promoters' Shares Pledging and Its Effect on Stock Returns, 14 Biosci. Biotech. Res. Comm'n (Special Issue) 7 (2021).*

²² *Tripti Nashier & Amitabh Gupta, Ownership Concentration and Firm Performance in India, 24 Glob. Bus. Rev. 377 (2023).*

At the same time, it demonstrates that governance outcomes in promoter-dominated firms depend significantly on the internal governance norms of the controlling group, rather than solely on external regulatory mechanisms.²³

INTERNAL MONITORING IN PROMOTER-LED FIRMS

In dispersed ownership systems, monitoring is typically externalised through independent directors, shareholder activism, and market discipline. These mechanisms are designed to check managerial power when ownership is widely held among many shareholders. In promoter-led firms, monitoring is largely internalised within ownership structures rather than externalised through dispersed shareholder oversight. High equity concentration enables promoters to exercise continuous supervision over managerial decisions, reducing coordination problems typically associated with widely held ownership.²⁴

Bajaj Finance Limited illustrates this structure, where sustained promoter ownership has enabled active involvement in strategic decision-making and risk oversight. This form of monitoring is embedded within ownership control rather than dependent primarily on formal board independence mechanisms.²⁵ However, such internalisation is not institutionally neutral. Its effectiveness depends on alignment between promoter incentives and minority shareholder interests, making governance outcomes contingent on the nature of controlling shareholder behaviour.

INCENTIVE ALIGNMENT AND LONG-TERM STRATEGIC ORIENTATION

Promoter concentration often aligns ownership incentives with long-term strategic decision-making, as controlling shareholders retain significant exposure to firm value. This structure can support investments requiring long gestation periods and sustained capital commitment.

The relevance of this dynamic is particularly evident in sectors characterised by long investment horizons. For instance, Reliance Industries Limited illustrates this through long-term capital allocation across energy, telecommunications, and retail sectors, reflecting continuity in strategic planning under concentrated ownership.

However, empirical studies suggest a non-linear relationship, where governance benefits weaken beyond high control thresholds due to entrenchment effects.²⁶

INFORMATIONAL CENTRALISATION AND DECISION EFFICIENCY

²⁵ Bajaj Finance Limited, *Management Discussion and Analysis, in Annual Report 2021-22 (2022)*, available at <https://www.bajajfinserv.in/finance-ce-digital-annual-report-fy22/finance-digital-annual-report-assets/pdf/BFL-Management-Discussion-and-Analysis.pdf>.

²⁶ Shantanu Banerjee & Swarnodeep Homroy, *Managerial Incentives and Strategic Choices of Firms with Different Ownership Structures*, 48 *J. Corp. Fin.* 314 (2018), <https://doi.org/10.1016/j.jcorpfin.2017.10.001>.

Promoter-led firms exhibit informational centralisation, where critical business knowledge is concentrated within the controlling group, enabling faster decision-making. This efficiency advantage is visible in dynamic sectors requiring rapid responses to market changes. However, informational concentration also creates governance risks when oversight mechanisms are weak or information is deliberately withheld.²⁷

The disputes within Infosys Limited highlight how informational asymmetry between founders and professional management can shape governance outcomes beyond formal structures. More starkly, the collapse of Satyam Computer Services demonstrates how concentrated informational control can facilitate governance failure when misused.

STABILITY, CONTINUITY, AND RISK ABSORPTION

Promoter concentration contributes to organisational stability by ensuring continuity in leadership and strategic direction. ITC Limited illustrates this through gradual diversification across FMCG, hospitality, and paperboards under sustained governance continuity rather than frequent ownership-driven disruptions. Promoters also function as residual risk-bearers, enhancing resilience during financial stress through continued capital support, though this may also introduce rigidity in governance adaptation.²⁸

PROMOTER CONTROL AS A RESPONSE TO INSTITUTIONAL CONSTRAINTS

Regulatory observations and governance reports indicate that shareholder participation in voting processes remains relatively low, and institutional investors, despite holding significant stakes, often adopt a passive approach to governance engagement. In this environment, promoter control functions as a substitute for weak external monitoring, concentrating governance functions within the controlling shareholder structure.²⁹ Sun Pharmaceutical Industries Limited demonstrates how promoter-led control can facilitate strategic expansion and operational integration across markets, particularly in environments where external governance engagement is limited. However, this substitution increases system dependence on promoter conduct, making governance outcomes highly contingent on controlling shareholder integrity and competence.

CONDITIONAL NATURE OF GOVERNANCE EFFICIENCY

Promoter concentration performs multiple governance functions, including coordination, monitoring, incentive alignment, and substitution for weak external oversight. However, these functions operate conditionally and are

²⁷ Zoltán Bakonyi, *Why Do Firms Centralise Their Strategic Decision-Making During Crisis? A Qualitative Study*, 31 *J. Organizational Change Mgmt.* 678 (2018), <https://doi.org/10.1108/JOCM-12-2016-0303>.

²⁸ Anos Chitamba, *Ensuring Leadership Continuity: An Integrative Review of Succession Planning, Leadership Development and Organisational Memory*, 9 *Edelweiss Applied Sci. & Tech.* 2869 (2025).

²⁹ Basanagouda M. Patil, *Promoters to Persons in Control: Examining the Regulatory Landscape and Its Implications for Corporate Governance*, SSRN (July 20, 2024).

highly sensitive to how control is exercised.³⁰

Judicial recognition of this duality is evident in *Tata Sons Pvt Ltd v Cyrus Investments Pvt Ltd*, where the Supreme Court acknowledged the legitimacy of decisions within a controlling shareholder framework while also recognising tensions with minority shareholder protection.³¹ The case reflects that concentrated ownership is not incompatible with corporate law, but its governance legitimacy depends on the manner of its exercise.

This dual structure forms the central insight of this analysis: promoter concentration is neither inherently efficient nor inherently abusive, but structurally contingent. The next chapter examines how this conditional efficiency transitions into entrenchment and governance failure. The governance value of promoter concentration, therefore, lies not in its structure alone, but in the constraints and behavioural norms that govern its exercise.

FROM CONTROL TO ENTRENCHMENT: STRUCTURAL PATHWAYS OF GOVERNANCE DISTORTION EROSION OF BOARD MEDIATION WITHIN CONTROLLED STRUCTURES

The transformation from control to entrenchment becomes most visible in the weakening of the board's mediating function. In concentrated ownership systems, the board does not operate as an independent counterweight but as an institution whose effectiveness is conditioned by the controlling shareholder's influence over its composition and functioning. The collapse of Infrastructure Leasing & Financial Services (IL&FS) illustrates how formally compliant boards may fail to exercise effective oversight over risk accumulation and financial decision-making. Despite the presence of independent directors and committee structures, governance mechanisms did not prevent the build-up of systemic risk, ultimately leading to regulatory intervention through board restructuring by the Central Government.³² This reflects a structural limitation in concentrated systems: broad independence may exist in form but remains constrained in function by underlying control dynamics

INSTITUTIONAL CHANNELS OF ENTRENCHMENT: TRANSACTIONS AND INFORMATION

Entrenchment is reinforced through legally sanctioned institutional mechanisms, particularly related-party transactions and informational asymmetries. These mechanisms do not necessarily involve overt violations; instead, they enable the continuous exercise of influence through formally sanctioned processes. Dewan Housing Finance Corporation Limited (DHFL) illustrates how related-party and inter-corporate transactions, even when routed

³⁰ Manisha Singal & Vijay Singal, *Concentrated Ownership and Firm Performance: Does Family-Control Matter?*, 5 *Strategic Entrepreneurship J.* 373 (2011), <https://doi.org/10.1002/sej.119>.

³¹ *Tata Sons Pvt. Ltd. v. Cyrus Investments Pvt. Ltd.*, (2021) 9 SCC 449.

³² Baranidharan Subburayan, *Unraveling the Mirage: The IL&FS Accounting and Financial Fraud Case Study*, 14(2) *IIUM J. Case Stud. Mgmt.* 1 (2023)

through formal approval and disclosure mechanisms, may facilitate the movement of funds across connected entities, raising concerns regarding the effective neutrality of transactional oversight.³³ Control over information further reinforces structural imbalance in concentrated ownership systems. Although disclosure-based governance assumes informational symmetry among shareholders, in practice the interpretation, timing, and granularity of disclosures remain influenced by those who control internal information flows. The crisis at Yes Bank illustrates the limitations of disclosure-based governance in capturing underlying financial stress, which eventually required regulatory intervention by the Reserve Bank of India.³⁴ Similarly, the collapse of Satyam Computer Services demonstrates how concentrated informational control can undermine even formally robust governance structures.³⁵

COMPLIANCE AS FORM: INSTITUTIONALISATION OF ENTRENCHMENT

A central dimension of governance distortion lies in the formalisation of compliance, where regulatory requirements relating to board structure, disclosures, and approvals are met in form but do not necessarily constrain underlying control.³⁶ Compliance thus operates as a legitimising mechanism rather than an effective limitation on decision-making power. This pattern is not confined to isolated instances of misconduct but reflects a structural coexistence of regulatory compliance and concentrated control. Judicial reasoning in *Tata Sons Pvt Ltd v Cyrus Investments Pvt Ltd* reflects this duality by recognising that controlling shareholders may act within legally permissible frameworks even when their decisions generate tensions with minority interests.

Entrenchment therefore emerges not as an external deviation from governance systems but as an outcome produced through their internal operation. Regulatory mechanisms remain formally functional, yet their constraining capacity is conditioned by the structure of concentrated ownership.³⁷ This results in a governance equilibrium where compliance and control coexist, making entrenchment a structurally embedded feature rather than an exceptional failure.

CONTROL AND PERFORMANCE IN CORPORATE GOVERNANCE: A COMPARATIVE ANALYSIS OF OWNERSHIP STRUCTURES

This section examines how ownership concentration interacts with financial performance by comparing firms in

³³ Vidisha Pagaria, *Anatomy of a Corporate Collapse: The Downfall of Dewan Housing Finance Corporation Ltd.*, *IJLLR J.* (Aug. 14, 2024).

³⁴ Tushar Ranjan Barik, *Yes Bank Crisis-A Critical Analysis on Causes, Effects & Recommendations*, 2(3) *Int'l J. Multidisciplinary Rsch. Configuration* 41 (2022), <https://doi.org/10.52984/ijomrc2307>.

³⁵ Amna Niazi, *The Debacle of Satyam Computers Ltd: A Case Study from Management's Perspective*, 3(2) *Universal J. Indus. & Bus. Mgmt.* 58 (2015), <https://doi.org/10.13189/ujibm.2015.030204>.

³⁶ Mariana Pargendler, *The Corporate Governance Obsession*, 42 *J. Corp. L.* 359 (2016).

³⁷ Khaled Amri, Fatma Wyeme Ben Mrad & Mouna Guedri, *The Impact of Internal and External Corporate Governance Mechanisms on Tax Aggressiveness: Evidence from Tunisia*, 13(1) *J. Acct. Emerging Economies* 43 (2023), <https://doi.org/10.1108/JAEE-01-2021-0019>.

similar industries but with different promoter control structures. Using publicly available disclosures, it analyses how variations in ownership shape growth trajectories, capital allocation, and governance responsiveness in similar sectoral contexts.

The comparative discussion below is not intended to establish a direct causal relationship between ownership concentration and financial performance. Rather, it examines how differing ownership structures shape the institutional manner in which growth, capital allocation, risk, and governance oversight are organised within firms operating under similar market conditions.

OWNERSHIP CONCENTRATION, GROWTH, AND STRATEGIC EXECUTION

In Adani Green Energy Limited, promoter shareholding remains consistently above 60%, reflecting stable controlling ownership. This concentrated structure enables long-horizon investment planning and large-scale renewable energy expansion without significant coordination constraints from fragmented shareholders. This ownership stability is reflected in rapid expansion of operational renewable capacity and rising consolidated revenues, indicating execution efficiency in capital-intensive infrastructure projects.³⁸

Tata Power Company Limited presents a contrasting structure, where promoter ownership remains below majority levels and institutional investors hold a significant stake. While the company has also expanded its renewable energy capacity and revenues, its growth trajectory reflects a more moderated pace, shaped by broader stakeholder participation in governance and capital allocation decisions.³⁹ The comparison suggests that ownership concentration is associated not with the presence or absence of growth, but with differences in the speed, intensity, and decisiveness of strategic execution.

CAPITAL STRUCTURE, LEVERAGE, AND STRATEGIC EXPANSION

In Adani Green Energy Limited, expansion has been supported by sustained capital inflows and increasing leverage, reflecting an aggressive financing strategy aligned with large-scale infrastructure growth. Despite repeated capital raising, promoter shareholding has remained above 60%, indicating that financing decisions are structured to preserve control while enabling external capital mobilisation.

Tata Power Company Limited reflects a comparatively balanced capital structure, with investment expansion accompanied by more measured leverage and capital expenditure. The presence of significant institutional

³⁸ *Adani Green Energy Limited, Annual Report 2024-25 (2025).*

³⁹ *Tata Power Company Limited, Annual Report 2024-25 (2025).*

shareholding introduces additional scrutiny in financing decisions, moderating the pace of capital deployment. This contrast illustrates how ownership concentration influences not only the scale of expansion but also the risk appetite embedded in capital allocation decisions.

PROFITABILITY, RISK, AND LIMITS OF EXTERNAL OVERSIGHT

The relationship between profitability and governance is most revealing when financial growth is assessed alongside risk exposure and monitoring capacity. In Adani Green Energy Limited, strong revenue growth coexists with elevated financial and execution risks arising from large-scale expansion and leverage. Although long-term power purchase agreements provide revenue visibility, risk management decisions remain largely within the domain of controlling shareholders, limiting external influence over strategic risk exposure.

Tata Power Company Limited demonstrates comparatively moderated risk exposure, supported by diversified operations and more structured disclosure practices. While institutional shareholders enhance oversight through voting and board engagement, promoter control remains significant, indicating that governance operates within constrained oversight boundaries rather than fully dispersed accountability.

The comparative analysis demonstrates that financial performance and governance constraints are not mutually exclusive. High growth, capital intensity, and strategic expansion can coexist with concentrated ownership and limited external influence. Ownership structure therefore shapes not whether firms grow, but how growth is executed, financed, and governed, revealing corporate governance as a continuum between control and constraint rather than a binary condition.

CONTROLLED COMPLIANCE AND THE LIMITS OF GOVERNANCE IN PROMOTER-DRIVEN FIRMS

The preceding analysis demonstrates that promoter concentration in India is not merely an ownership characteristic but an institutional condition that fundamentally shapes the operation of corporate governance mechanisms. Existing corporate governance frameworks under the Companies Act, 2013 and the SEBI (LODR) Regulations, 2015 continue to retain a structural orientation towards models developed in dispersed ownership systems, where governance mechanisms are designed to operate as external constraints upon managerial discretion. However, the institutional realities of promoter-dominated firms differ significantly from these assumptions. In such firms, ownership, management influence, strategic direction, and informational control frequently remain interconnected within promoter structures. As a result, governance institutions do not operate independently of concentrated ownership but function within institutional conditions shaped by it.

This structural interaction between governance mechanisms and concentrated control produces a model of governance that may be described as controlled compliance. Controlled compliance refers to a governance arrangement in which regulatory requirements are formally satisfied while substantive decision-making authority remains concentrated within promoter structures. Under this model, governance institutions continue to function procedurally and legally, but their operational autonomy becomes conditioned by the distribution of control within the firm.⁴⁰

The significance of controlled compliance lies in the fact that it differs fundamentally from conventional understandings of governance failure. The central issue in promoter-dominated firms is not necessarily the absence of regulation, the complete breakdown of governance structures, or persistent non-compliance with legal requirements. Boards are constituted, committees are established, disclosures are made, shareholder approvals are obtained, and statutory procedures are generally followed. The governance framework therefore continues to operate in formal terms. However, the substantive functioning of these mechanisms is shaped by the institutional influence of concentrated ownership, particularly through control over appointments, informational flows, strategic coordination, and voting outcomes. Governance mechanisms consequently operate within structures of control rather than outside them.

This institutional conditioning of governance mechanisms explains why formal compliance and concentrated control frequently coexist without direct contradiction. Independent directors may satisfy statutory independence requirements while remaining structurally dependent upon promoter-backed appointment and continuation processes. Audit committees may undertake procedural scrutiny while relying upon information generated through management-controlled systems. Disclosure obligations may improve transparency while leaving substantive decision-making authority unaffected. Minority protection remedies may remain legally available while operating within evidentiary and procedural constraints that limit their practical effectiveness. In each instance, governance mechanisms remain institutionally present, yet their ability to function as autonomous oversight structures becomes shaped by the broader distribution of control within the firm.

Classical agency theory primarily conceptualises governance as a response to conflicts between dispersed shareholders and professional managers arising from the separation of ownership and control. However, promoter-dominated firms present a structurally different governance environment in which ownership itself performs governance functions while simultaneously shaping the effectiveness of oversight institutions. Governance mechanisms are therefore not positioned externally against concentrated ownership but become embedded within it. This institutional embeddedness alters the manner in which governance structures function in practice. The analytical contribution of controlled compliance lies in recognising that governance in promoter-driven firms operates through institutional adaptation rather than institutional displacement.

Governance mechanisms do not disappear under concentrated ownership, nor are they rendered entirely ineffective. Instead, they adapt to the realities of concentrated control while continuing to preserve formal legitimacy, regulatory compliance, and organisational functionality. This explains why promoter-dominated firms may simultaneously exhibit strong governance structures in formal terms and persistent concerns regarding oversight autonomy, minority protection, or entrenchment risks.

The broader implication of this framework is that governance effectiveness in concentrated ownership systems cannot be assessed solely through procedural compliance indicators. The institutional autonomy and informational independence of governance mechanisms remain equally significant in determining their substantive effectiveness. Accordingly, the central tension within Indian corporate governance is not simply between compliance and non-compliance, but between concentrated control and the institutional capacity of governance mechanisms to meaningfully constrain that control. Recognising this distinction shifts governance analysis beyond formal regulatory design towards the broader institutional realities within which corporate governance actually operates. Promoter concentration should therefore be understood neither as an exceptional deviation from governance norms nor as an inherently defective governance structure, but as a foundational institutional condition that shapes the operation, limits, and possibilities of corporate governance within Indian firms.

REGULATORY IMPLICATIONS AND FUTURE GOVERNANCE DIRECTIONS

The analysis developed throughout this article demonstrates that the principal weakness of governance regulation in promoter-dominated firms does not arise from regulatory absence but from regulatory internalisation. Indian corporate governance law increasingly relies upon procedural governance architecture: independent directors, audit committees, disclosure systems, voting mechanisms, related-party transaction approvals, and layered compliance obligations. These mechanisms are intended to create institutional distance between concentrated economic power and governance oversight. However, in promoter-dominated firms, governance mechanisms frequently operate within organisational environments where the very structures they are expected to supervise continue to shape their informational access, strategic visibility, and institutional effectiveness.

This structural limitation becomes particularly visible in the functioning of independent oversight institutions. The regulatory model underlying the Companies Act, 2013 and the SEBI (LODR) framework presumes that formal independence can produce effective supervisory distance from managerial or controlling shareholder influence. However, in concentrated ownership systems, independence frequently operates within conditions of institutional dependency. Independent directors may satisfy statutory eligibility requirements while remaining dependent upon promoter-supported nomination processes, informational channels controlled by executive management, and organisational cultures structured around strategic centralisation.

As a result, governance independence becomes procedurally visible yet institutionally constrained. The issue therefore is not whether independent directors formally exist, but whether governance institutions possess sufficient informational and operational autonomy to function independently of concentrated control structures.

Future governance reform in India may therefore require greater emphasis upon the operational functioning of governance institutions rather than continued expansion of procedural compliance obligations alone. Governance effectiveness in concentrated ownership systems depends not merely upon formal institutional design, but upon whether oversight mechanisms possess sufficient practical capacity and informational independence to evaluate promoter-influenced decision-making. Recent amendments to the SEBI (LODR) framework increasingly reflect regulatory concern regarding concentrated ownership and transactional influence within listed entities. Enhanced disclosure requirements relating to related-party transactions, promoter encumbrances, and material events, together with expanded approval obligations involving minority shareholders, indicate a gradual movement towards greater scrutiny of promoter-controlled decision-making. Nevertheless, these reforms continue to operate predominantly through procedural governance techniques centred upon disclosure, committee review, and shareholder voting mechanisms. Their effectiveness therefore remains dependent upon the informational quality, institutional independence, and scrutiny capacity of the governance mechanisms through which such oversight is exercised. Future governance reform in India must therefore move beyond the assumption that expanded procedural compliance alone can ensure effective oversight within concentrated ownership structures.

CONCLUSION

Corporate governance in India cannot be adequately understood through models premised solely upon dispersed ownership and managerial agency conflicts. The predominance of promoter-driven firms creates an institutional environment in which governance mechanisms operate within, rather than independently of, concentrated control structures. This article has argued that promoter concentration should not be treated merely as an ownership characteristic, but as a structural condition that shapes the operation, effectiveness, and limits of corporate governance institutions under the Companies Act, 2013 and the SEBI (LODR) framework.

Boards, disclosure systems, committee structures, and minority protection mechanisms continue to function procedurally, yet their substantive autonomy frequently remains shaped by promoter influence over informational access, strategic coordination, and organisational decision-making. The future effectiveness of Indian corporate governance depends not merely upon expanding procedural compliance obligations, but upon strengthening the substantive autonomy and institutional independence of governance mechanisms operating within concentrated ownership structures.

RECONCILING ENVIRONMENTAL-LAW PRINCIPLES WITH THE REGULATION OF GENERATIVE ARTIFICIAL INTELLIGENCE: LEGAL GAPS, COMPARATIVE PERSPECTIVES, AND POLICY PROPOSALS WITH A SPECIAL FOCUS ON INDIA

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ABSTRACT

The rapid expansion of generative artificial intelligence (AI), powered by large-scale data centres, industrial GPU clusters, rare-earth-dependent semiconductor manufacturing, and high-capacity electricity networks, has created an environmental footprint that existing Indian environmental laws do not adequately recognise. Although legal and policy debates on AI have centred on data privacy, liability, ethics, safety, and intellectual property, the ecological implications of AI infrastructure, including energy consumption, carbon emissions, water use, and electronic waste, remain largely outside the scope of regulatory scrutiny. This paper argues that these impacts constitute an under-regulated externality that must be addressed through established constitutional and environmental-law doctrines. It further clarifies that many of these harms arise not from AI algorithms themselves but from the broader physical infrastructure, namely data centres, cloud platforms, and hardware supply chains, through which AI systems operate.

Analysing Article 21, Articles 48-A and 51A(g), and leading environmental jurisprudence, the paper demonstrates that Indian constitutional principles already mandate environmental protection and support extending environmental-law oversight to AI systems. The study identifies legal gaps relating to definitional exclusions, lack of carbon-disclosure mandates, absence of EIA norms for data centres, and inadequate lifecycle regulation of AI hardware. Comparative analysis of the EU, US, China, and international soft-law frameworks shows a global shift towards sustainable digital infrastructures, providing useful models for India. The paper concludes with concrete policy proposals specifying thresholds, institutional responsibilities, implementation timelines, and enforcement mechanisms suited to India's constitutional and administrative structure.

KEY WORDS

Environment, AI, Constitution, Carbon footprints

INTRODUCTION

The contemporary technological landscape has been transformed by the rapid rise of generative artificial intelligence (AI), particularly large language models (LLMs), neural-content generators, multi-modal systems, and industrial-scale machine-learning infrastructure. These systems now underpin commercial applications, governance tools, medical diagnostics, research analysis, public-service delivery, and large consumer-facing platforms. Their development and deployment, however, depend on an equally vast physical, material, and energy-intensive infrastructure: data centres, cloud-computing clusters, industrial-scale GPU farms, semiconductor fabrication units, cooling towers, water-circulation systems, rare-earth mining chains, logistic networks, and high-capacity electricity grids. While traditionally perceived as purely digital technologies separate from the physical environment, there is now increasing scientific evidence that generative AI systems carry significant environmental footprints in terms of energy consumption, greenhouse gas emissions, water extraction for cooling mechanisms, and electronic waste arising from hardware obsolescence.

This environmental dimension remains largely invisible within mainstream AI-governance discourse. Global regulatory frameworks, whether in the European Union, the United States, the Commonwealth countries, or India, predominantly focus on algorithmic transparency, data protection, cybersecurity, model-safety, discrimination, liability, or intellectual-property concerns. Environmental externalities have rarely featured as a formal legal component in AI governance beyond sporadic sustainability rhetoric or voluntary corporate reporting. This asymmetry is especially significant when empirical studies highlight that training and inference for frontier generative-AI models can consume several megawatt-hours of electricity and substantial volumes of cooling water, contributing to both carbon emissions and industrial strain on regional utility grids. For context, a single training run for a large language model has been estimated to emit several hundred tonnes of CO₂ equivalent, which is comparable to the lifetime emissions of multiple passenger vehicles. Additionally, data-centre cooling in water-stressed regions can extract tens of millions of litres of freshwater annually.

Moreover, early estimates suggest that global data-centre electricity consumption may more than double by 2030 due to AI-driven compute demand, a development that threatens to undermine the climate-mitigation targets of states operating under the Paris Agreement to the United Nations Framework Convention on Climate Change and domestic decarbonisation commitments. The International Energy Agency projected in its 2024 report that data centres globally could consume between 800 TWh and 1,000 TWh of electricity by 2026, a figure broadly consistent with findings from independent academic and industry researchers tracking AI infrastructure growth.

These pressures become sharper in federal jurisdictions like India, where electricity-generation mixes are still centred on coal-based thermal plants, where drought-prone regions face severe water scarcity, and where the waste-management ecosystem already struggles with e-waste volumes. Parallel concerns arise from the upstream environmental impacts of AI hardware: rare-earth extraction, toxic semiconductor fabrication, hazardous waste streams from chip manufacturing, and landfill disposal of superseded servers.

Despite these emerging risks, Indian legal scholarship has not systematically examined generative-AI deployment through the lens of environmental law. The prevailing environmental-law architecture, encompassing the Environment (Protection) Act 1986, Water Act 1974, Air Act 1981, and E-Waste Management Rules, was historically drafted to regulate heavy industry, mining, polluting factories, municipal discharges, or chemical effluents. None of these statutes expressly conceptualises data centres or AI infrastructure as “industries”, “polluters”, or “hazardous waste generators”, nor do they mandate environmental-impact assessments, carbon-disclosure norms, lifecycle-auditing, or energy-mix compliance for computational infrastructures. The environmental costs of digital technologies, therefore, currently operate within a regulatory blind spot.

Yet, doctrinally, Indian environmental jurisprudence provides ample normative basis to bring generative-AI infrastructure under legal regulation. The Supreme Court has repeatedly affirmed that the right to a clean, healthy, and ecologically balanced environment is intrinsic to the right to life under Article 21 of the Indian Constitution. In *M.C. Mehta v Union of India*¹, the Court extended Article 21 to prevent industrial pollution of the Ganga; in *Subhash Kumar v State of Bihar*². It affirmed that environmental contamination violates fundamental rights. Further, Articles 48-A and 51A(g) constitutionally mandate environmental protection and sustainable resource stewardship.

When read alongside the precautionary principle, polluter-pays principle, public-trust doctrine, sustainable-development doctrine, and inter-generational equity, all well-recognised in Indian jurisprudence, there is strong doctrinal justification to prevent emerging technological infrastructures from imposing diffuse but systemic environmental burdens. If mining, chemical industries, refineries, and manufacturing units may be subjected to environmental-impact assessments, mitigation duties, emission caps, or levies, there is no principled reason why large-scale data-centre clusters consuming multi-megawatt electricity loads, generating e-waste, and creating heat-island effects should be exempt merely because their pollution is invisible and digitally mediated.

THE ENVIRONMENTAL IMPACTS OF GENERATIVE AI

The environmental implications of generative artificial intelligence (AI) are increasingly recognised in technical, climate-policy, and sustainability literature, yet they remain marginal within mainstream legal analysis. A conceptual

¹ *MC Mehta v Union of India* [1988] 1 SCC 471

² *Subhash Kumar v State of Bihar* [1991] 1 SCC 598

clarification is necessary at the outset: the environmental harms discussed in this section are not caused by AI models in isolation, but by the material infrastructure, including data centres, server farms, GPU clusters, cooling systems, and global hardware supply chains through which those models are trained and deployed. This distinction has regulatory significance: it means that environmental governance can and should target the infrastructure operators, facility owners, and hardware producers, even where the AI developers themselves are legally distinct entities.

At the centre of these impacts is the material infrastructure required to train, deploy, and maintain advanced AI systems, including large-scale data centres, high-performance GPU clusters, electricity-intensive cloud computing platforms, semiconductor fabrication units, and global supply chains for rare-earth elements. Unlike conventional digital applications, cutting-edge generative models require intensive computational cycles involving trillions of parameters, multiple training rounds, and continuous inference servicing. These processes entail substantial energy usage and, consequently, significant carbon-emission footprints.

Empirical evidence from peer-reviewed sources and international energy bodies provides a clearer picture of scale. Research published in *Nature* and associated technical literature estimated that training GPT-3, a 175-billion-parameter model, consumed approximately 1,287 MWh of electricity, generating an estimated 552 metric tonnes of CO₂ equivalent.

Researchers note, however, that this figure excludes infrastructure overhead, experimental training runs, and embodied hardware emissions, which could significantly increase the real-world figure. Estimates published by international energy agencies suggest that global data-centre electricity consumption stood between 460 TWh and 500 TWh in 2022, and that generative-AI workloads could contribute to a significant increase in this figure by 2030 if current growth trajectories continue. The International Energy Agency's 2024 review of data centre trends noted that the rapid expansion of AI compute was one of the principal drivers of this growth, alongside cryptocurrency and cloud migration. These trends raise acute concerns for countries like India, where coal remains the dominant source of electricity, and where decarbonisation pathways are constrained by both economic and infrastructural realities.

In addition to electricity consumption, cooling systems used to stabilise server-temperature loads constitute a major environmental challenge. In efficiently operated hyperscale facilities, cooling may account for approximately 30 to 40 per cent of total energy usage, measured through Power Usage Effectiveness (PUE) benchmarks; in older or less optimised facilities, this proportion can be substantially higher. Cooling infrastructure in many jurisdictions requires large volumes of freshwater, creating additional pressure on water-scarce regions and contributing indirectly to ecological stress. A 2023 study by researchers at the University of California, Riverside, found that training GPT-3 in Microsoft's data centres consumed approximately 700,000 litres of freshwater, and that inference (the ongoing use of a model by end-users) adds materially to this figure when aggregated across millions of queries. In India, where groundwater depletion and drought cycles already strain public utilities in states such as Maharashtra, Rajasthan,

Telangana, and Karnataka, the growth of large data-centre clusters without regulatory safeguards could intensify environmental vulnerability.

Further upstream, the fabrication of semiconductor chips required for GPU-based computation poses its own suite of ecological problems. Semiconductor manufacturing has historically been associated with hazardous chemicals such as hydrofluoric acid, sulfuric acid, and various solvents, as well as toxic wastewater discharge, and exceptionally high energy and ultrapure water consumption; TSMC, the world's largest chip foundry, reportedly consumed approximately 156 million tonnes of water in 2021 alone. Rare-earth materials used in advanced circuit boards are often mined in regions where environmental compliance and rehabilitation safeguards are weak, leading to soil contamination, biodiversity loss, unsafe labour conditions, and long-term ecosystem damage. At the end of hardware lifecycles, the obsolescence of GPUs, servers, cooling components, and storage units contributes to the growing global e-waste stream. While India's e-waste management framework imposes certain obligations on consumer-electronics producers, there is currently no regime tailored to bulk server-class disposals or the lifecycle economics of AI-specific hardware.

Beyond energy, water and waste, studies also attribute indirect environmental consequences to generative AI, including heat-island effects from data-centre concentration, localised grid stress resulting in additional fossil-fuel generation, and emissions embedded in global supply-chain logistics. Several sustainability analyses now emphasise that without legally enforced disclosure requirements and standardised carbon-reporting protocols, it is exceedingly difficult to accurately assess the full environmental cost of generative-AI models. The absence of mandatory lifecycle assessment data is particularly acute in India, where no public registry of data-centre energy consumption or emissions exists.

The cumulative evidence demonstrates that generative-AI infrastructure is far from immaterial: it is an energy-hungry, resource-intensive, and waste-producing ecosystem deeply intertwined with physical environmental systems. As generative AI scales across sectors, from finance, law, and education to defence, governance and healthcare, its environmental footprint will correspondingly expand. In the Indian context, where climate vulnerability, water-scarcity patterns, coal-based grids, and urban-heat challenges already intersect, the failure to integrate environmental-governance norms into AI-regulatory frameworks risks embedding yet another layer of ecological harm. This underlines the urgency for statutory re-conceptualisation, doctrinal expansion, and empirical-reporting mandates capable of internalising AI-linked environmental externalities within the ambit of national environmental law.

CONSTITUTIONAL AND STATUTORY FOUNDATIONS IN INDIA

India possesses one of the most constitutionally rich and jurisprudentially developed environmental-law frameworks among post-colonial jurisdictions. The legal foundations for environmental governance in India are embedded both

in the Constitution and in the country's statutory architecture. These doctrines, originally formulated to regulate industrial pollution, mining, land degradation, and resource exploitation, are today capable of doctrinal extension to cover the environmental externalities of generative-AI infrastructure.

At the constitutional level, the Supreme Court of India has, through a long line of precedent, interpreted Article 21, the right to life and personal liberty, to include the right to a clean, healthy, pollution-free, and ecologically balanced environment. Early milestones include *Rural Litigation and Entitlement Kendra v State of Uttar Pradesh*³, where mining operations causing ecological degradation were restrained under Article 21 principles, and *M.C. Mehta v Union of India*, which developed constitutional tests against environmental harm arising from industrial activity. In *Subhash Kumar v State of Bihar*, the Supreme Court explicitly affirmed that the right to life is violated when environmental contamination threatens public health and exposes communities to harmful conditions. These cases elevate environmental protection from mere policy aspiration to an enforceable component of fundamental rights.

The Constitution buttresses this jurisprudence through directive principles and fundamental-duty provisions. Article 48-A directs the State to “protect and improve the environment,” while Article 51A(g) imposes a corresponding duty on citizens to safeguard natural ecology. Although non-justiciable, these provisions guide the interpretation of fundamental rights and statutory duties, and courts have repeatedly relied upon them to advance progressive environmental standards. In applying these constitutional norms to AI infrastructure, the doctrinal question is not whether the text of these provisions contemplates data centres, but whether the environmental burdens generated by AI-linked operations, specifically electricity-grid stress, water extraction, heat discharge, and hardware waste, fall within the class of harms that the State is constitutionally obligated to prevent. Given the expansive reading that the Supreme Court has given to Article 21 in industrial and ecological contexts, there is strong doctrinal ground to answer that question affirmatively.

Statutorily, India's environmental-law landscape is centred on the Environment (Protection) Act 1986 (EPA)⁴, a framework legislation granting wide powers to the Central Government to issue notifications, impose standards, regulate industries, and prescribe safeguards for environmental protection. Complementing the EPA are specialised enactments such as the *Air (Prevention and Control of Pollution) Act 1981*⁵, *Water (Prevention and Control of Pollution) Act 1974*⁶, and the existing *E-Waste Management Rules*⁷, all of which collectively aim to prevent, control, and monitor pollution and waste.

However, these statutes were crafted in an era where “industry,” “pollution,” and “hazardous activity” referenced

³ *Rural Litigation and Entitlement Kendra v State of Uttar Pradesh* AIR 1985 SC 652.

⁴ *Environment (Protection) Act*, No. 29 of 1986, India Code (1986).

⁵ *Air (Prevention and Control of Pollution) Act*, No. 14 of 1981, India Code (1981).

⁶ *Water (Prevention and Control of Pollution) Act*, No. 6 of 1974, India Code (1974).

⁷ *E-Waste (Management) Rules*, 2016, Ministry of Environment, Forest & Climate Change (India).

heavy industry, manufacturing, chemical discharge, mining, smoke emissions, industrial effluents, or municipal waste. None expressly contemplate the environmental consequences of data-centre electricity loads, computational emissions, high-volume cooling systems, or specialised AI-hardware disposal. Nor do they mandate environmental-impact assessments (EIA), carbon-accounting disclosures, renewable-energy sourcing norms, or lifecycle-auditing for server-class equipment. That said, the EPA's section 3(1) empowers the Central Government to take "such measures as it deems necessary or expedient" for protecting and improving the quality of the environment, and section 3(2)(ii) permits the Government to issue rules or notifications regulating environmental standards for any industrial operation or process. These provisions are arguably broad enough to encompass data-centre operations through executive action, without requiring fresh primary legislation, a point that is developed further in Section 6.

Doctrinally, the principles recognised by Indian courts, including polluter-pays, precautionary principle, public-trust doctrine, sustainable development, and inter-generational equity, can bridge this statutory silence. By interpreting AI infrastructures as environmentally significant activities capable of ecological harm, these principles permit regulatory extension without requiring wholesale legislative overhaul. The Supreme Court has already deployed such doctrines to regulate tanneries, vehicular emissions, industrial expansion, and environmental risk in sensitive regions. There is no principled barrier to applying the same reasoning to AI operations whose environmental impacts may be diffuse, indirect, and invisible yet nonetheless substantial.

LEGAL GAPS AND THE NEED FOR DOCTRINAL EXTENSION

Although India's environmental-law framework is among the most extensive in the Global South, it remains largely rooted in 20th-century conceptions of industry, pollution, and environmental risk. The statutory and regulatory legislations that govern environmental protection in India were developed in response to visibly hazardous activities, mining, chemical production, industrial emissions, hazardous-waste discharge, deforestation, thermal-plant pollution, and sewage-driven water contamination. The digital infrastructures that power modern generative-AI systems, however, do not fit neatly into these historical categories. As a result, contemporary AI infrastructure operates in a regulatory grey zone, where its environmental externalities are neither clearly contemplated nor adequately managed by existing law. This mismatch reveals doctrinal blind spots, interpretive ambiguities, and statutory omissions that require careful legal analysis.

The first major gap is definition-based. Most Indian environmental statutes regulate specific "industrial activities" or "polluting processes." The Environment (Protection) Act 1986 empowers the Central Government to establish

³ *Rural Litigation and Entitlement Kendra v State of Uttar Pradesh* AIR 1985 SC 652.

⁴ *Environment (Protection) Act*, No. 29 of 1986, India Code (1986).

⁵ *Air (Prevention and Control of Pollution) Act*, No. 14 of 1981, India Code (1981).

⁶ *Water (Prevention and Control of Pollution) Act*, No. 6 of 1974, India Code (1974).

⁷ *E-Waste (Management) Rules*, 2016, Ministry of Environment, Forest & Climate Change (India).

apply to emissions, effluents, and contamination arising from manufacturing operations. None of these laws, however, explicitly recognises data centres, cloud-compute clusters, or AI-model training facilities as industrial or environmentally significant activities. Digital infrastructure historically has been viewed as “service-sector” activity, intangible, clean, and without a physical footprint. Yet modern empirical findings make clear that data centres supporting AI training consume megawatt-level electricity loads, generate heat-islands, strain water-cooling systems, and ultimately contribute to greenhouse-gas emissions. Treating such facilities as outside the conceptual scope of environmental regulation leaves a substantial externality ungoverned.

A second legal gap concerns mandatory environmental disclosure and carbon-accounting obligations. Indian environmental statutes do not require technology firms, AI operators, or data-centre owners to publish information regarding energy consumption, emissions by computational activity, water usage, cooling-water discharge, or server-hardware waste. While corporate environmental reporting (under ESG or CSR-linked frameworks) is emerging, these remain voluntary and are not tailored to AI infrastructures. The absence of a binding disclosure regime prevents both policymakers and civil society from understanding the true ecological cost of generative-AI expansion. Without baseline data, India cannot formulate emission limits, consumption caps, or environmental-impact thresholds; nor can it incorporate AI infrastructure into broader decarbonisation strategies.

A third legal gap lies within the Environmental Impact Assessment (EIA) regime. Under the current EIA Notifications issued under the Environment (Protection) Act, a large number of industrial, mining, construction, and infrastructure projects must undergo pre-clearance environmental scrutiny. AI data parks, GPU-compute farms, cloud-server campuses and hyperscale data-centre cities do not fall within any notifiable category, even where their footprint, energy demand, or water extraction exceeds those of many regulated industries. As India aggressively promotes digital infrastructure and AI-linked investments, industrial clusters of data centres are emerging, particularly near metropolitan zones and special economic corridors. Without EIA obligations, their cumulative impacts, such as electricity-grid stress, groundwater depletion, urban-heat amplification, and waste-stream generation, escape prior assessment and mitigation safeguards.

Fourth, the E-waste Management Rules and Extended Producer Responsibility (EPR) obligations were designed with consumer electronics in mind: mobile phones, laptops, televisions, and small circuit boards. They do not explicitly cover servers, AI-accelerator chips, liquid-cooling modules, industrial-grade storage racks, or retired GPU boards containing rare-earth composites. As generative-AI hardware undergoes rapid obsolescence cycles, often accelerated by competitive model-upgrades and chip-efficiency leaps, the absence of a hardware-lifecycle regime creates a risk of informal disposal markets, toxification of landfills, and transboundary waste dumping.

A fifth doctrinal gap concerns jurisdictional silence over computational emissions. While India regulates air- and water-pollution sources, there is no legal recognition that electricity-based computational activity may function as a form of indirect pollution. The polluter-pays principle has historically been applied to factories releasing noxious

gases, industrial effluents, or municipal waste streams, but not to invisible carbon emissions produced by megawatt-scale data-centre operations dependent on fossil-fuel electricity⁸. The climate-law dimensions of computational energy consumption, particularly in a coal-dependent power mix, therefore remain unexamined.

Finally, there is a policy-design gap. Environmental law has long relied on technical compliance tools, emission caps, effluent treatment, pollution-control certification, hazardous-waste permits, EIA, and green-belt requirements. Equivalent regulatory instruments do not exist for AI infrastructure. There are no renewable-energy-sourcing mandates for data centres; no carbon-levy mechanisms benchmarked against compute-usage; no requirement to publish lifecycle-audit reports for server hardware; and no environmental-clearance obligations for hyperscale server parks. In doctrinal terms, AI environmental risk currently exists beneath the threshold of legal visibility.

These gaps collectively indicate the need for doctrinal extension. Indian environmental jurisprudence has already embraced principles such as precaution, sustainable development, inter-generational equity, and polluter-pays, using them to regulate emergent industrial risks even where statutes were silent⁹. Courts have applied these doctrines to chemical factories, vehicular emissions, ecological hotspots, and hazardous-waste disposal¹⁰. The same principles can be invoked to justify regulatory oversight over generative-AI infrastructure whose resource-dependence and environmental load are now empirically recognised. By reading “industry,” “pollution,” and “environmentally harmful activity” expansively, Indian law can evolve to internalise AI externalities, without awaiting legislative delay or ecological damage.

COMPARATIVE & GLOBAL PERSPECTIVES

The intersection of artificial intelligence and environmental regulation remains globally underdeveloped. However, certain jurisdictions and international bodies have begun to acknowledge the ecological footprint of AI infrastructure, offering comparative insights that may guide India’s approach. A review of emerging developments in the European Union (EU), the United States (US), China, and multilateral institutions indicate a fragmented but gradually maturing regulatory imagination, where sustainability obligations are beginning to enter the AI-governance discourse.

The European Union represents the most structured model for integrating environmental policy into digital regulation. The EU Artificial Intelligence Act 2024, while primarily a risk-classification framework, does not expressly impose environmental-impact obligations on AI developers; however, Article 97 of the Act provides for a mandatory review of the Regulation’s impacts, including environmental ones, by 2030, indicating legislative

⁸ See generally, *MC Mehta v Union of India* AIR 1988 SC 1037; *Indian Council for Enviro-Legal Action v Union of India* (1996) 3 SCC 212 (discussing the polluter-pays principle). The principle has not been judicially extended to indirect emissions from electricity-dependent computational operations.

⁹ *Constitution of India* 1950 art 48-A (directive to protect and improve the environment); art 51A(g) (fundamental duty to protect the natural environment). Both provisions have been used by the Supreme Court as interpretive tools: *State of Himachal Pradesh v Ganesh Wood Products* (1995) 2 SCC 363, 390.

awareness of the gap. Parallel frameworks more directly address AI infrastructure.

The EU Energy Efficiency Directive (recast 2023) requires Member States to collect and publish data on the energy performance of data centres above 500 kW IT load capacity. The EU Green Deal, the Sustainable Digitalisation Programme, and taxonomies for ESG disclosures increasingly require high-energy digital operations to quantify carbon intensity, report lifecycle waste, and optimise energy sourcing. The European Commission's Code of Conduct for Energy Efficiency in Data Centres, while voluntary, has set PUE benchmarks and reporting standards widely adopted across the sector. Several Member States, including Denmark, Ireland, and the Netherlands, have enacted national data-centre energy standards that exceed EU minimums. These developments collectively show that computational infrastructure can be regulated on environmental criteria, a foundation India can draw upon.

In the United States, policy attention is more diffuse. Federal climate policy emphasises corporate carbon transparency, sustainable energy transition, and clean-technology incentives, but AI-specific environmental regulation remains embryonic. Executive Order 14057 on Catalysing Clean Energy Industries, issued in 2021, required federal agencies to prioritise clean-energy procurement, and subsequent guidance from the Department of Energy has encouraged data-centre energy efficiency across federally funded facilities. At the legislative level, the AI Act proposal introduced in some state assemblies contains nascent environmental-reporting provisions, though none have been enacted at the federal level.

However, several US states, particularly California, Oregon, Virginia, and New York, have adopted energy-reporting requirements, emissions-accounting standards, or water-use benchmarking for large data-centre operators. California's Clean Cloud Act proposal, for instance, would require data-centre operators to disclose their annual energy consumption, renewable energy sourcing, and water usage, and would mandate 100% clean energy procurement by 2035 for facilities above a specified threshold. While not yet law, this proposal illustrates how environmental reporting, lifecycle disclosure, and renewable-energy procurement policies can be layered onto digital infrastructure without requiring comprehensive federal legislation.

China has displayed an alternative and state-driven approach. The Ministry of Industry and Information Technology's "Three-Year Action Plan for Green Data Centres" (2019) prescribed PUE targets, mandated renewable-energy procurement for large compute facilities, and restricted the construction of new data centres in regions where coal dependency was highest. China's 14th Five-Year Plan (2021-2025) further embedded data-centre energy efficiency targets within the country's broader climate commitments. China's industrial policy also emphasises circular-economy principles in semiconductor manufacturing and hardware recycling, including recovery of rare-earth inputs used in advanced AI chips. While China's regulatory environment is centrally controlled and not directly transplantable into India's constitutional and federal framework, its recognition that AI infrastructure is an

¹⁰ *MC Mehta v Union of India* AIR 1987 SC 1086; *Vellore Citizens' Welfare Forum v Union of India* (1996) 5 SCC 647, 659 (precautionary principle); *AP Pollution Control Board v Prof MV Nayudu* (1999) 2 SCC 718, 735 (sustainable development and inter-generational equity).

environmental activity offers jurisprudential support to the argument that India can extend its environmental-law principles to AI-linked industrial operations.

International bodies have also begun to highlight the environmental dimensions of AI. UNEP's 2023 publication, "Sustainability and Artificial Intelligence," identified data-centre growth as a major emerging environmental pressure point, calling for binding energy-efficiency standards and lifecycle assessments. UNESCO's Recommendation on the Ethics of Artificial Intelligence (2021), adopted by all 193 Member States, explicitly includes environmental sustainability as a core AI governance principle, noting that AI development must not degrade natural resources or exacerbate climate change. The OECD AI Principles (2019, updated 2023) similarly call for AI systems to be developed in a "safe, environmentally sustainable" manner. Although these recommendations lack binding force, they serve as soft-law indicators of rising international environmental expectations surrounding AI.

Despite the progress reflected in these diverse approaches, a uniform global model for integrating environmental-law principles into AI governance does not yet exist. Most existing measures operate indirectly, through sustainability policies, ICT energy standards, or corporate-disclosure mandates, rather than through explicit environmental regulation of AI. This global incompleteness underscores both an opportunity and a responsibility for India. With its strong environmental-rights jurisprudence and rapidly growing AI ecosystem, India has unique potential to pioneer a regulatory architecture that explicitly recognises AI infrastructure as an environmental actor, embeds doctrinal environmental principles within AI governance, and contributes to global norm-setting on sustainable technological development.

PROPOSAL: LEGAL & REGULATORY ARCHITECTURE FOR INDIA

A) Environmental Disclosure Requirement for AI Operators

Threshold: All entities operating data-centre facilities with an installed IT load capacity exceeding 1 MW, or operating generative AI services with an aggregate annual electricity consumption exceeding 10 GWh, should be subject to mandatory environmental disclosure obligations. This threshold is calibrated to capture hyperscale operators and large AI service providers while exempting startups, small research institutions, and low-compute deployments. Covered entities should be required to file annual environmental disclosures to a central registry, covering: total electricity consumption attributable to AI workload (training and inference, separately reported); carbon emissions — direct and indirect — including Scope 2 emissions from grid electricity; water usage attributable to server cooling; volume and category of e-waste generated; and the percentage of electricity drawn from renewable or low-carbon sources.

Institutional responsibility: Disclosures should be submitted to MoEFCC through the Central Pollution Control

Board (CPCB), which should be designated as the primary receiving and verification authority. CPCB should create a publicly accessible AI-Environment Registry, updated annually, allowing civil society, researchers, and state pollution control boards to audit data. Implementation timeline: A phased approach is recommended. Year 1 should involve the issuance of MoEFCC guidelines and notification of reporting formats under the EPA. Years 2 and 3 should constitute a voluntary reporting pilot for entities above the threshold. Year 4 onwards: mandatory enforcement with penalties for non-disclosure or material misrepresentation.

Enforcement: Non-disclosure or submission of materially false information should be punishable under sections 15 and 16 of the EPA, which carry penalties of up to five years' imprisonment and fines. CPCB should additionally be empowered to impose operating restrictions on non-compliant facilities.

B) Environmental-Impact Assessment (EIA) for Large Data Centres

Threshold: Data-centre projects with an installed IT load capacity of 10 MW or more, or occupying a floor area of 10,000 square metres or more, should be added to Schedule A (mandatory EIA clearance) of the EIA Notification 2006. Projects between 1 MW and 10 MW IT load should fall under Schedule B (requiring EIA with possible exemptions for renewable-powered facilities).

Large-scale data-centre projects (e.g., above a certain threshold of energy draw or floor space) should require prior Environmental Impact Assessment under the EPA¹¹. The EIA should assess: projected electricity load and source (coal, renewables, hydro); water usage (with heightened scrutiny in water-stressed districts as identified by the Central Ground Water Authority); land-use and land-cover change; heat-island effects; waste disposal plans; and cumulative environmental impact where multiple data centres cluster in a region or industrial zone.

Institutional responsibility: The Expert Appraisal Committee (EAC) for industry under MoEFCC should be expanded or supplemented with a sub-committee on digital infrastructure, with members drawn from the Ministry of Electronics and Information Technology (MeitY), CPCB, and independent environmental engineers. State-level clearances under Schedule B should be processed by State-Level Expert Appraisal Committees (SEACs).

Implementation timeline: MoEFCC should publish an amendment to the EIA Notification within 12 months of policy adoption, with a 6-month transition period for pending projects. New projects above the threshold should require full EIA clearance before receiving construction permits from local bodies or special economic zone authorities.

Enforcement: Data centres constructed or expanded without requisite EIA clearance should be subject to closures

¹¹ *Environment (Protection) Act 1986 (India) s 3(1) read with s 3(2)(ii); Ministry of Environment, Forest and Climate Change, Environmental Impact Assessment Notification 2006 (S.O. 1533(E)) Schedule. For doctrinal extension methodology, see AP Pollution Control Board (II) v Prof MV Nayudu (2001) 2 SCC 62, 78–80.*

orders under section 5 of the EPA. Penalties under the EPA and relevant state pollution control legislation should apply to non-compliant operator

C) Extended Producer Responsibility (EPR) for AI Hardware.

Threshold: EPR obligations should apply to manufacturers, importers, and bulk commercial users (including data-centre operators and cloud providers) of AI-class hardware, defined to include server-grade GPUs, AI accelerator chips, server racks, liquid-cooling modules, and industrial-grade storage arrays, where such hardware is procured in quantities above 50 units per year or at an aggregate value exceeding Rs. 50 lakhs per year.

Obligations should include: mandatory collection and take-back schemes for retired hardware; safe disposal and recycling obligations (especially for rare-earth components); design-for-sustainability standards (modular, recyclable, low-power); and annual reporting to CPCB on volumes collected, recycled, and disposed.

Institutional responsibility: MoEFCC should amend the E-Waste (Management) Rules 2016 to add a new Schedule specifically covering AI-class hardware, with separate collection and recycling targets. CPCB should register and audit EPR-obligated entities and maintain a public database of compliance.

Enforcement: Failure to meet EPR targets should attract financial penalties under the existing E-Waste Rules and EPA, calibrated per unit of unreturned hardware. Repeat non-compliance should be grounds for suspension of import licences under the Foreign Trade (Development and Regulation) Act.

D) Carbon-Levy / Polluter-Pays Mechanism

Threshold: EPR obligations should apply to manufacturers, importers, and bulk commercial users (including data-centre operators and cloud providers) of AI-class hardware, defined to include server-grade GPUs, AI accelerator chips, server racks, liquid-cooling modules, and industrial-grade storage arrays, where such hardware is procured in quantities above 50 units per year or at an aggregate value exceeding Rs. 50 lakhs per year.

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Enforcement: Failure to meet EPR targets should attract financial penalties under the existing E-Waste Rules and EPA, calibrated per unit of unreturned hardware. Repeat non-compliance should be grounds for suspension of import licences under the Foreign Trade (Development and Regulation) Act.

Funds collected should be directed to a dedicated "Green Digital Infrastructure Fund" administered by MoEFCC, with disbursements for environmental restoration in affected regions, subsidies for renewable-energy adoption by small data-centre operators, and community-relief programmes in districts hosting large data-centre clusters.¹²

Institutional responsibility: CPCB should administer levy assessment and collection, with audit powers over self-declared emissions data. Independent third-party verification should be mandated for entities with annual emissions exceeding 50,000 tonnes of CO₂ equivalent.

E) Renewable-Energy Mandate / Sustainability Standard

Threshold and phase schedule: Data-centre operators and AI service providers above the disclosure threshold should be required to source a minimum percentage of their annual electricity consumption from renewable or low-carbon sources (solar, wind, certified hydropower, or approved carbon-neutral procurement). The mandate should be implemented in three phases: Phase 1 (Years 1-3): minimum 25% renewable sourcing; Phase 2 (Years 4-6): minimum 40% renewable sourcing; Phase 3 (Year 7 onwards): minimum 60% renewable sourcing.¹³

These targets are calibrated against India's existing Renewable Purchase Obligation (RPO) framework under the Electricity Act 2003 and MNRE targets, and are intended to be higher than the general RPO to reflect the scale and growth trajectory of the AI-infrastructure sector. Operators sourcing 100% renewable energy should be exempt from the carbon levy under section (d) above.

Institutional responsibility: The Central Electricity Regulatory Commission (CERC) and State Electricity Regulatory Commissions (SERCs) should issue specific RPO orders for data-centre operators, distinct from the general industrial RPO. Compliance certificates should be submitted to CPCB annually alongside environmental disclosures.

F) Institutional Oversight & Public Registry

The effective implementation of the above framework requires coordination across multiple existing authorities, each with distinct mandates. MoEFCC should serve as the primary regulatory authority for environmental disclosure, EIA, EPR, and levy obligations. MeitY should be co-responsible for designing the technical reporting

¹² *Indian Council for Enviro-Legal Action v Union of India* (1996) 3 SCC 212, 246 (polluter-pays principle applied to chemical factories). The proposed levy mechanism finds analogical support in the Environment Relief Fund under the Public Liability Insurance Act 1991 (India) s 7A.

¹³ Ministry of New and Renewable Energy, *National Action Plan on Climate Change: National Solar Mission* (2010); Electricity Act 2003 (India) s 86(1)(e) (renewable purchase obligations). A similar mandate for data centres has been recommended in NITI Aayog, *India's Booming Data Centre Industry* (2023) 34.

standards and the public AI-Environment Registry, given its mandate over digital infrastructure. CPCB should be the operational enforcement arm, responsible for receiving disclosures, conducting audits, and levying penalties. CERC and SERCs should administer the renewable-energy mandate. The Competition Commission of India (CCI) should be consulted on any market-access implications of threshold-based obligations.

To manage these overlapping responsibilities, MoEFCC should establish a dedicated "AI and Digital Infrastructure Environment Division" with a mandate that includes monitoring disclosures and compliance; auditing energy and emissions data; coordinating EIA appraisals; enforcing EPR, levy, and renewable mandates; and publishing an annual "AI-Environment Report" summarising national data-centre energy use, emissions, water consumption, and hardware waste. The Division should operate under an inter-ministerial steering committee co-chaired by MoEFCC and MeitY, with a secretariat housed at CPCB.

To avoid regulatory duplication and jurisdictional friction, the inter-ministerial committee should maintain a single coordination register, enabling SERC, CERC, CCI, and state PCBs to access disclosure data filed under this framework. This structure acknowledges India's complex federal architecture and the likelihood that data-centre investments will span multiple states, creating cross-jurisdictional environmental impacts.

NORMATIVE JUSTIFICATION: DOCTRINAL & HUMAN-RIGHTS GROUNDS

The environmental regulation of generative-AI infrastructure in India is not merely a policy preference, but a normative imperative grounded in the country's constitutional philosophy, judicial environmental jurisprudence, and globally recognised human-rights principles. At its core, Indian constitutional law views environmental protection as inseparable from the fundamental right to life¹⁴. Since the late 1980s, the Supreme Court has interpreted Article 21 expansively, affirming that the right to life includes entitlement to a clean and pollution-free environment, ecological stability, and protection against environmental hazards that threaten public health and collective welfare. In decisions such as *M.C. Mehta v Union of India* and *Subhash Kumar v State of Bihar*, the Court held that environmental degradation undermines human dignity, quality of life, and social well-being, striking at the heart of Article 21¹⁵.

These principles create a direct constitutional foundation for regulating emerging technologies whose environmental impacts, though less visible, may be equally systemic. In addition, the constitutional duties embedded in Articles 48-A and 51A(g) establish that environmental stewardship is both a state obligation and a citizen responsibility¹⁶.

¹⁴ *Constitution of India 1950 art 21; Francis Coralie Mullin v Administrator, Union Territory of Delhi (1981) 1 SCC 608, 618 (right to life includes right to live with dignity); Subhash Kumar v State of Bihar (1991) 1 SCC 598, 606 (right to pollution-free environment is part of Art 21).*

¹⁵ *MC Mehta v Union of India AIR 1987 SC 1086, 1093–1094; Subhash Kumar v State of Bihar (1991) 1 SCC 598, 606.*

¹⁶ *Constitution of India 1950 arts 48-A and 51A(g). See State of Himachal Pradesh v Ganesh Wood Products (1995) 2 SCC 363, 390; TN Godavarman Thirumulpad v Union of India AIR 1997 SC 1228, 1234 (both Articles read as conferring enforceable obligations via Art 21 interpretation).*

Although these provisions are non-justiciable, the Supreme Court and High Courts routinely invoke them as interpretive guides when expanding the scope of environmental rights and state duties. The Madras High Court's decision in *A. Periyakaruppan v State of Tamil Nadu* and the National Green Tribunal's jurisprudence in cases involving industrial heat pollution have reinforced the view that Article 48-A read with Article 21 can justify preventive environmental obligations even where statutory language does not expressly contemplate the relevant activity. When applied to generative-AI infrastructure, these provisions support the argument that the State is constitutionally obligated to ensure that AI-related industrial activities do not compromise ecological stability, community health, or sustainability for future generations.

Indian environmental jurisprudence has also embraced several foundational doctrines that provide normative anchors for extending environmental-law principles to AI systems. The precautionary principle, adopted in cases involving industrial emissions and hazardous substances, holds that scientific uncertainty should not prevent regulatory intervention when potential environmental harm exists¹⁷. Generative-AI infrastructures, whose energy loads, water requirements, heat discharge, and hardware waste are increasingly documented, clearly meet that threshold of environmental risk. The principle does not require proof of actual harm; it is satisfied by a reasonable scientific basis to believe harm may occur, a threshold that the empirical evidence surveyed in Section 2 of this paper comfortably meets. Similarly, the polluter-pays principle, long used to internalise the cost of industrial pollution, can be applied to entities that operate energy-intensive AI models, requiring them to bear the environmental cost of their emissions and resource consumption.

The doctrine of inter-generational equity further strengthens this normative basis. Recognised in Indian jurisprudence as part of sustainable-development obligations, this doctrine insists that present technological progress must not undermine ecological capacity or environmental health for future generations. This is especially relevant in the context of AI, since most environmental impacts, carbon emissions, climate stress, water depletion, and rare-earth extraction have long-term and cumulative consequences. If generative-AI growth accelerates without environmental safeguards, it risks embedding irreversible ecological burdens at the very onset of India's digital transition.

International human-rights instruments also support this approach. Documents such as the UN Human Rights Council's resolutions on climate change, SDG-linked environmental commitments, and UNESCO/UNEP's guidance on sustainable AI all frame environmental protection as essential to dignity, life, and global justice. Although soft law, these instruments articulate evolving global expectations: that technological expansion must be tempered with ecological responsibility.

Thus, applying environmental-law doctrines to generative-AI regulation is not doctrinal overreach; it is a logical extension of constitutional rights, obligations, and principles already deeply embedded in Indian law.

¹⁷ *Vellore Citizens' Welfare Forum v Union of India* (1996) 5 SCC 647, 658–659 (precautionary principle and sustainable development as part of Indian environmental law via Art 253 and the Stockholm Declaration 1972); *AP Pollution Control Board v Prof MV Nayudu* (1999) 2 SCC 718, 740–741.

Given the mounting evidence of AI-linked environmental externalities, regulatory inaction would conflict not only with statutory objectives but also with constitutional environmental guarantees and human-rights commitments.

CHALLENGES, CRITIQUES, AND COUNTERARGUMENTS

Any proposal to regulate generative-AI infrastructure through environmental-law principles will inevitably confront conceptual, economic, and practical criticisms. These concerns must be addressed not only to strengthen the normative legitimacy of such regulation, but also to ensure that the resulting framework is balanced, feasible, and innovation-friendly.

- **First**, the “innovation-stifling” critique argues that environmental compliance obligations, such as disclosure duties, carbon-reporting mandates, renewable-energy sourcing targets, or environmental-impact assessments, may deter investment, slow technological development, or push AI companies to relocate to jurisdictions with lighter regulatory burdens. India’s emergent AI ecosystem, still gaining technological maturity, may fear losing global competitiveness.

Response: This argument mirrors historical objections raised by manufacturing, mining, and heavy-industry sectors when environmental laws first evolved. Over time, the Indian judiciary held that environmental safeguards do not undermine development, but channel it towards sustainable outcomes. Phased implementation, reasonable energy-threshold triggers, tax incentives for green computing, and flexible compliance windows can maintain India’s innovation appeal while avoiding regulatory impunity.

- **Second**, concerns about measurement and standardisation arise from the difficulty of quantifying computational energy use, carbon emissions, water consumption, and lifecycle waste. AI models differ in size, architecture, training frequency, data-set consumption, hardware type, cooling systems, and deployment modalities, complicating standard measurements.

Response: Emerging global methodologies, such as lifecycle-assessment frameworks, compute-energy coefficients, and carbon-equivalent benchmarking, now enable quantifiable environmental accounting for AI systems. The solution is not to avoid regulation, but to mandate disclosure on best-available metrics, refine methodologies over time, and empower regulatory bodies to adopt evolving standards as scientific certainty increases. Environmental law has long operated under uncertainty, guided by the precautionary principle rather than perfect information.

- **Third**, the globalised structure of AI supply chains presents regulatory challenges. Semiconductor fabrication, GPU production, and rare-earth extraction often occur outside India, particularly in East Asia and North America. Critics argue that regulating the environmental footprint of imported AI hardware may exceed India’s jurisdictional limits.

Response: Extended Producer Responsibility (EPR), environmental-labelling requirements, import restrictions on high-carbon hardware, and carbon-footprint declarations at the point of entry can inter

-nalise upstream impacts. India already uses similar mechanisms for chemicals, plastics, and electronics. Moreover, India's market scale means that regulatory requirements for products sold into the Indian market can influence upstream manufacturers to improve their environmental performance, a "Brussels Effect" logic that is particularly potent given India's projected position as one of the world's largest AI consumer markets within this decade.

- **Fourth**, compliance-burden arguments suggest that strict environmental obligations may disproportionately affect startups, research labs, and smaller AI entities lacking resources for auditing, reporting, or renewable-energy procurement.

Response: Environmental policy can differentiate between actors. Threshold-based triggers, exemptions for low-compute activity, shared green-infrastructure facilities, and state-supported auditing platforms can protect smaller players. The regulatory focus should be on hyperscale data-centre clusters and industrial-grade AI training facilities, whose environmental footprint is undeniably substantial.

- **Fifth**, critics point to limited state capacity for enforcement. Environmental monitoring in India already faces challenges in staffing, data accuracy, and compliance audits.

Response: Digital-era regulation can leverage technological solutions: smart-meter electricity monitoring integrated with CPCB's digital compliance platform; API-based automated reporting by data-centre operators; satellite-based thermal imaging to detect heat-island effects; and mandatory third-party environmental audit agencies accredited by a national body. The proposed AI and Digital Infrastructure Environment Division at CPCB would require dedicated staffing, an administrative cost that can be partially offset through the levy revenue directed to the Green Digital Infrastructure Fund. Transparent public-disclosure portals and civil-society scrutiny, as demonstrated by the National Green Tribunal's citizen-complaint jurisdiction, can supplement formal state enforcement capacity.

A final institutional challenge concerns regulatory overlap. Data centres touch the mandates of MoEFCC, MeitY, the Ministry of Power, CERC, SERCs, and State PCBs. Without clear jurisdictional allocation, the framework risks both under-enforcement (each body assuming another will act) and over-compliance burdens (entities facing duplicative requirements from multiple regulators). The inter-ministerial coordination structure proposed in Section 6(f) is designed to address this directly, through a single reporting portal, a shared data registry, and clear primary-regulator designations for each obligation type.

CONCLUSION

The analysis undertaken throughout this study establishes that generative AI is not an abstract, immaterial technology, but a profoundly resource-dependent infrastructure with measurable environmental consequences. Its rapid expansion in India coincides with growing energy demand, climate vulnerability, water scarcity, and mounting

e-waste pressures. These realities make clear that the environmental costs of computational systems can no longer remain peripheral to legal discourse. Critically, this paper has shown that the environmental harms in question are not attributable to AI models as such, but to the data centres, cloud systems, and hardware supply chains through which those models operate, a distinction that both clarifies regulatory targets and strengthens the case for extending existing environmental-law instruments to cover AI infrastructure.

Current Indian environmental laws were not drafted with digital infrastructures in mind, and consequently fail to recognise data centres, training clusters, or AI-hardware supply chains as environmentally significant activities. Statutory silence, however, does not equate to constitutional permissibility. Article 21 jurisprudence, coupled with Articles 48-A and 51A(g), firmly anchors environmental protection within India's core constitutional identity. It follows that ecological harms arising from emerging technological systems fall squarely within the responsibility of the State to regulate.

Doctrines such as the precautionary principle, polluter-pays, sustainable development, and inter-generational equity provide a ready-made normative and interpretive framework to bring AI infrastructure under environmental oversight. Their historical application to industrial hazards, pollution patterns, and risk-laden economic activities demonstrates that Indian environmental law has always been capable of evolving alongside technological change. The only missing step is the willingness to conceptually identify AI-infrastructure as a legitimate target of environmental governance. Given the empirical evidence of energy intensity, carbon emissions, rare-earth extraction, water consumption, and hardware waste, generative AI clearly satisfies that threshold. Comparative insights from the European Union, the United States, China, and multilateral bodies further confirm that environmental sustainability is emerging as a core priority in global AI governance. While the models remain fragmented and indirect, they highlight that regulation of digital infrastructures based on ecological criteria is both feasible and increasingly expected. India, armed with a robust environmental-rights jurisprudence, possesses an opportunity to lead rather than follow. Rather than waiting for global consensus, India can craft a forward-looking regulatory model that integrates environmental safeguards into AI development from its inception.

The proposals advanced in this paper, mandatory environmental disclosures, Environmental-Impact Assessments for large data centres, extended-producer responsibility for AI-hardware, renewable-energy mandates, and specialised regulatory divisions within MoEFCC and CPCB, are not prohibitive constraints. They are instruments of responsible technological governance designed to internalise environmental costs, prevent cumulative ecological harm, and encourage climate-aligned innovation. Phased timelines, threshold-based triggers, and transparency-driven compliance ensure that such regulation remains proportionate, commercially viable, and innovation-compatible.

Ultimately, environmental regulation of generative AI is not a barrier to technological growth, but an essential condition for its legitimacy in a climate-challenged world. To leave the environmental footprint of AI unregulated

would contradict constitutional commitments, undermine India’s climate goals, and risk imposing irreversible ecological burdens on future generations. The law must evolve as technology evolves. As India advances into an AI-driven era, its environmental-law principles must serve as both a compass and a safeguard, ensuring that digital progress is measured not only in computational power but in its respect for planetary boundaries and human rights.





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