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## Regulation and Governance of Artificial Intelligence in India

Accepted for publication in Global Political Economy

Research Repository link: <https://repository.essex.ac.uk/42374/>

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<https://doi.org/10.1332/26352257Y2026D000000055>

# **Artificial Intelligence Regulation in India and their Impact on the World of Work**

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This report is part of the Artificial Intelligence Observatory for the World of Work (AIPOWW) Symposium for Global Political Economy.

## **Introduction**

India is considered the world's biggest democracy since acquiring Independence in 1947 after the British ceded control (Gannon & Pillai, 2013). Tracing its roots to the Indus Valley Civilization, India remains one of the most socially diverse countries in the world. Apart from its many religions and sects, India is home to innumerable castes and tribes, as well as to more than a dozen major and hundreds of minor linguistic groups from several language families unrelated to one another (Britannica, 2024). Culturally, as per Steers et al.'s (2013) bipolar model, India is collectivistic, relationship-based, hierarchical, mastery-oriented and polychronic, while as per Gannon and Pillai's (2013) metaphorical conceptualization, India exhibits inherent contradictions with individualism, materialism, hierarchy, patriarchy, poverty and other inequalities coexisting with familism, relationality, paternalism, spiritualism, tolerance and modernity in a state of dynamic evolution (Beteille, 2006; Sinha, 2008).

Economically, India has achieved substantial success on many measures but remains a poor nation. Since 2003, it has been identified as a member of BRIC (Brazil, Russia, India, and China) nations that are expected to become wealthier by 2050 than most of the leading economic powers of today (Wright and Gupta in Gannon and Pillai, 2013). Contemporary India's increasing physical prosperity and cultural dynamism—despite continued domestic challenges and economic inequality—are seen in its well-developed infrastructure and a highly diversified industrial base, in its pool of scientific and engineering personnel (one of the largest in the world), in the pace of its agricultural expansion, and in its rich and vibrant cultural exports of music, literature, and cinema. Though the country's population remains largely rural and engaged in non-standard work, India has three of the most populous and cosmopolitan cities in the world—Mumbai (Bombay), Kolkata (Calcutta), and Delhi. Three other Indian cities—Bengaluru (Bangalore), Chennai (Madras), and Hyderabad—are among the world's fastest-growing high-technology centres, and most of the world's major IT companies now have offices in India (Britannica, 2024). It is no surprise then that the world-wide AI revolution is an integral part of India's continued growth story.

The Indian government believes that AI will be a kinetic enabler of India's digital economy and make governance smarter and more data-led. The government expects AI to add USD 967 billion to the Indian economy by 2035 and USD 450–500 billion to India's GDP by 2025, accounting for 10% of the country's USD 5 trillion GDP target. Over the past several years, the Indian government has taken steps to encourage AI adoption in the country, with the programme 'AI for All' at the core of this endeavour. India has been ranked 1st in AI Skill Penetration and 1st in the Number of GitHub AI Projects in the Stanford AI Index report 2023. The same Index places India 5th in the value of Private Investment in AI and Number of Newly Funded AI Companies.

India's National AI Programme via the IndiaAI Mission and the National AI Portal as well as India's (proposed) legislations, policies, responsible AI (RAI) initiatives and sandbox initiatives are detailed below in the sections on Regulation, Development and Governance. As one of the largest Global South economies, India has been nominated as the Council Chair of the [Global Partnership on AI](#) by winning more than two-thirds of first preference votes (MeitY, 2023). At the 6<sup>th</sup> meeting of the GPAI Ministerial Council held on 3<sup>rd</sup> July 2024 in New Delhi, the [New Delhi Declaration](#), focused on a renewed integrated partnership for harnessing the potential of AI for Good and for All (MeitY, 2024), was adopted.

## 1. Regulation

India currently does not have any regulation dealing directly or exclusively with AI (Joshi, 2024). But there is in place a National Programme on AI, called the IndiaAI Mission, under the Ministry of Electronics and Information Technology (MeitY) and a National Strategy on AI put forward by the Niti Aayog. Additionally, there are legislations or proposed legislations around IT, data protection and digitalization.

### 1.1 National Programme on AI/IndiaAI Mission

India's MeitY is implementing the 'National Programme on AI' which encompasses four components: Data Management Office, National Centre for AI, Skilling on AI, and Responsible AI. The ['IndiaAI Mission' initiative](#) is crucial to complement the ongoing 'National Programme on AI' by establishing a focused and comprehensive framework that addresses specific gaps in India's AI ecosystem. The objective of this exercise is to undertake a comprehensive study of the pillars of IndiaAI and to identify tangible action items that need to be worked on to achieve the Indian government's goal of "AI for all" (MeitY, 2023).

India's Ministry of Electronics and Information Technology (MeitY 2023) has set up seven working groups to drive the adoption of AI across various sectors. These groups address AI research, infrastructure, policy, and skills development. The detailed reports of each of the Working Groups are available [here](#).

Working Group 1 focuses on establishing three AI centres that will leverage India's strengths to tackle societal challenges. These CoEs will foster AI research and the development of indigenous technologies, while promoting collaborations between academia, industry, and research entities.

Working Group 2 aims to build a data-sharing platform with a federal structure, enabling government and non-government organizations to contribute datasets. This initiative will enhance decision-making and AI applications through collaborative data utilization.

Working Group 3 aligns with the National Data Governance Policy to establish the National Data Management Office (NDMO). This group will institutionalize data governance, oversee data management units, and ensure data-led governance and public service delivery.

Working Group 4 is centered on fostering AI startups, with a goal of developing 100 AI unicorns. It focuses on empowering startups, building AI infrastructure, and promoting collaboration between stakeholders, both domestically and globally.

Working Group 5 emphasizes AI education and skill development, recommending an AI-based curriculum from K-12 to postgraduate levels. The working group also encourages upskilling for faculty and promotes AI research collaboration among educational institutions.

Working Group 6 addresses AI computational resource limitations by establishing AI infrastructure, promoting AI adoption in critical sectors, and facilitating AI innovation hubs.

Working Group 7 focuses on developing AI-specific semiconductor designs, aiming to support domestic companies and startups in the design and deployment of AI chipsets.

Additionally, MEITY released the [Draft National Strategy on Robotics](#) in July 2023.

## 1.2 Niti Aayog Policy Documents

The Niti Aayog (which describes itself as a state-of-the-art resource centre with the necessary knowledge and skills that will enable it to act with speed, promote research and innovation, provide strategic policy vision for the government, and deal with contingent issues), has prepared the [2018 National Strategy for Artificial Intelligence](#), which claims that the transformative nature of AI technology, yet the nascent stage of its adoption worldwide, provides India with an opportunity to define its own brand of AI leadership. #AIforAll - the brand proposed for India - implies inclusive technology leadership, where the full potential of AI is realised in pursuance of the country's unique needs and aspirations. Niti Aayog holds that India's strategy should strive to leverage AI for economic growth, social development and inclusive growth, and finally as a "garage" for emerging and developing economies. In order for India to establish a leadership role, Niti Aayog positions its strategy document as a crucial foundational signposting of these goals (Niti Aayog, 2018).

According to Niti Aayog (2018), while AI has the potential to provide large incremental value to a wide range of sectors, adoption till date has been driven primarily from a commercial perspective. Technology disruptions like AI are a once-in-a-generation phenomenon, and hence large-scale adoption strategies, especially national strategies, need to strike a balance between narrow definitions of financial impact and the greater good. NITI Aayog has decided to focus on five sectors that are envisioned to benefit the most from AI in solving societal needs: a) Healthcare: increased access and affordability of quality healthcare, b) Agriculture: enhanced farmers' income, increased farm productivity and reduction of wastage, c) Education: improved access and quality of education, d) Smart Cities and Infrastructure: efficient and connectivity for the burgeoning urban population, and e) Smart Mobility and Transportation: smarter and safer modes of transportation and better traffic and congestion problems.

Niti Aayog (2018) acknowledges that as AI-based solutions permeate people's lives, questions on ethics, privacy and security will also emerge. Most discussions on ethical considerations of AI are a derivation of the FAT framework (Fairness, Accountability and Transparency). A consortium of Ethics Councils at each Centre of Research Excellence can be set up and it would be expected that all COREs adhere to standard practice while developing AI technology and products. In line with this, since data is one of the primary drivers of AI solutions, the appropriate handling of data, ensuring privacy and security is of prime importance. Challenges include data usage without consent, risk of identification of individuals through data, data selection bias and the resulting discrimination of AI models, and asymmetry in data

aggregation. The policy document suggests establishing data protection frameworks and sectorial regulatory frameworks, and promotion of adoption of international standards.

Notwithstanding the articulation of a strategic vision for India, the Niti Aayog (2018) document is seen as actively encouraging experimentation among India's population by the private sector, positioning India as a 'playground' for the globalised data-based technology industry, which relies upon the datafication of people and their environments for commodification. The role of the state is conceived of as a 'facilitator' or enabler for private enterprise, explicitly echoing some established tenets of liberal economic policy, including the assertion that government investment in a particular economic field may 'crowd out' and disincentivise private spending, and that regulation can disincentivise 'innovation' (Joshi, 2024).

The Niti Aayog's (2018) paper resulted in the establishment of [India's National AI Portal](#), the central repository for AI resources, research and development in the country, which portrays the IndiaAI Mission (Chauriha, 2024).

### **1.3 The Information Technology (IT) Act 2000**

A legal framework proposed by the Indian Parliament, [Information Technology Act 2000](#), is the primary legislation in India dealing with electronic commerce and cybercrime. It was formulated to ensure the lawful conduct of digital transactions and the reduction of cyber crimes, on the basis of the United Nations Model Law on Electronic Commerce 1996 (UNCITRAL Model). The IT Act 2000 came into effect on 17 October 2000, imposing restrictions on all individuals and companies - regardless of their nationality and country of registration respectively - and regardless of geographic location, including if a computer or computerized system/network or server is located in India (Acharya, 2024; Mackie, n.d.; Toppr, n.d.)

There have been some amendments associated with the IT Act 2000. The 2008 amendment brought modifications to Section 66A of the IT Act 2000. The modifications were made to address cases of cybercrime linked to the advent of technology and the internet. Specifically, it speaks to criminalizing sharing offensive messages electronically and indicates penalties for the same. This includes any message or information that incited hatred or compromised the integrity and security of the nation. However, the lack of clarity in defining 'offensive' messages led to unnecessary punishment of several individuals, ultimately resulting in the striking down of the section (Acharya, 2024; Apoorva, 2015). In 2015, another bill was initiated to amend Section 66A of the IT Act 2000, with the aim of safeguarding the fundamental rights guaranteed to citizens by the country's Constitution. This was later accomplished by declaring it as violative of Article 19 of the Constitution (Acharya, 2024).

### **1.4 Digital Personal Data Protection (DPDP) Act 2023**

India's Digital [Personal Data Protection Act, 2023](#) was adopted on 11 August 2023. India's first data protection act, it establishes a framework for personal data processing. Personal data, which is information that relates to an identified or identifiable individual, is used by businesses as well as government entities for the delivery of goods and services. Processing, which involves fully or partially automated (set of) operations performed on digital personal data, includes collection, storage, use and sharing of the data. The Act is expected to have an impact

on the majority of organizational areas, including legal, IT, human resources, sales and marketing, procurement, finance, and information security because of the type and volume of personal data that is collected, stored, processed, retained, and disposed of. On the one hand, such data allows for an understanding of the preferences of individuals, which may be useful for customisation, targeted advertising, and developing recommendations. On the other hand, such data may aid law enforcement. Yet, unchecked processing may have adverse implications for the privacy of individuals, which has been recognised as a fundamental right; individuals may be subject to profiling, loss of reputation and financial loss (Kalra, 2023; PRS, 2024).

### **1.5 The Proposed Digital India Act (DI Act) 2023**

The [Proposed Digital India Act, 2023](#), currently the Digital India Bill 2023, is set to replace India's existing Information Technology Act (IT Act) 2000, with a view to reflecting contemporary developments in the digital landscape (which are not reflected in the IT Act) and addressing the ever-changing digital landscape (Anand, 2023, Drishti, 2023). In other words, it is expected to serve as a modern regulatory framework for the Internet and AI age (Sur, 2023). This proposed new legislation is being designed to establish comprehensive oversight over India's digital ecosystem, seeking to facilitate fair trade practices, regulate tech giants, safeguard innovation, promote digital governance, ensure online safety and accountability and protect citizen/digital user rights in the open internet and AI context and expedite cyber offence adjudication. This move is expected to have significant implications for businesses operating in India's digital space. Aligned with India's goal of achieving a US\$1 trillion digital economy by 2025-26, the Digital India Bill aims to foster global innovation, entrepreneurship, and establish India as a trusted player in the global digital value chains. Recent reports suggest that the draft of the Digital India Bill will soon be released for public consultation by the central government (Anand, 2023, Behura, 2023; Drishti, 2023).

The Digital India Bill will work in conjunction with other notable legislation and policies, such as the Digital Personal Data Protection Act, the National Data Governance Policy, and the Indian Penal Code amendments for cybercrime. Together, these laws and policies are set to establish a comprehensive framework aimed at governing different facets of the digital sphere in India, aligning with the Digital India initiative (Anand, 2023, Drishti, 2023).

The success of the proposed Act hinges on various considerations. First, balancing the interests of various stakeholders, including tech giants and citizens' rights, ensuring that all voices are heard and taken into account in the drafting and implementation process. Second, substantial but adequate investment in resources, expertise, and infrastructure to ensure effective enforcement. Third, building up public awareness to educate citizens about their rights and responsibilities in the digital realm (Drishti, 2023).

The central government in India plans to have extensive consultations with various stakeholders (experts, industry, academia, media, general public) before finalising the Bill and presenting it to Parliament. This means that progressing the Bill to Parliament is expected to be undertaken after the 2024 general elections in India (Behura, 2023; NDTV, 2023). Experts feel that the delay will further prolong the much-needed regulation of the internet, which the current IT Act 2000 does not address effectively enough (Behura, 2023). Specifically, the delay stifles the growth of India's digital economy (deters investments, inhibits expansion and affects

global competitiveness), prolongs the supremacy of big tech, undermines online safety, hinders public policies pertaining to digital governance, data privacy and cybersecurity, and risks potential breaches of international agreements like the WTO agreement (Behura, 2023).

## The Draft National Data Governance Framework (NDGF) Policy

### Background

India, being the second most populated country in the world, has a large data market which is relatively unregulated. The lack of appropriate legislation has encouraged crimes such as data theft, data misappropriation, cybersquatting, etc. The increased usage of smartphones coupled with the easy availability of the internet has made it necessary to have a robust system of data governance (Balasubramanian, 2021). There has been a gradual demonstrated interest by the government in non-personal data (NPD) in recent times. This new focus on regulating non personal data can be owed to the economic incentive it provides (Chaudhary and Kundu, 2022). After focusing on the Digital Personal Data Protection Act 2023, India's Ministry of Electronics and Information Technology is furthering its commitment to regulate the processing of data in India by addressing the issues associated with NPD (Balasubramanian, 2021). In 2020, the Ministry of Electronics and Information Technology ('MEITY') constituted an expert committee under prominent industrialist Kris Gopalakrishnan to study various issues relating to NPD and to make suggestions on the regulation of non-personal data (Chaudhary and Kundu, 2022). The [expert committee report](#), released in July 2020 (Balasubramanian, 2021) differentiated NPD into human and non-human NPD, based on the data's origin. Human NPD would include all information that has been stripped of any personally identifiable information and non-human NPD meant any information that did not contain any personally identifiable information in the first place (eg. weather data) (Chaudhary and Kundu, 2022). The Committee also proposed the creation of a National Data Protection Authority (NPDA) as it felt this is a new and emerging area of regulation (Chaudhary and Kundu, 2022).

On 21 February 2022, the Ministry of Electronics and Information Technology (MEITY) came out with the [Draft India Data Accessibility and Use Policy 2022](#) (also called the Draft Policy). The Draft Policy was strongly criticised mainly due to its aims to monetise data through its sale and licensing to corporate bodies. The Draft Policy had stated that anonymised and non-personal data collected by the State that has "[undergone value addition](#)" could be sold for an "appropriate price". During the Draft Policy's consultation process, it had been withdrawn several times and then was finally removed from the website (Chaudhary and Kundu, 2022).

### *Focus*

[The Draft National Data Governance Framework Policy](#) (NDGF Policy) is a successor to this Draft India Data Accessibility and Use Policy. There is a change in the language put forth in the Draft NDGF Policy from the earlier Draft Policy, where the latter mainly focused on monetary growth. The new Draft NDGF Policy aims to regulate anonymised NPD kept with governmental authorities and make it accessible for research and improving governance. It wishes to create an 'India Datasets Programme' which will consist of the aforementioned datasets. MEITY opened the new Draft NDGF Policy for public comments in May 2022

(Chaudhary and Kundu, 2022). As per the government's implementation document for Budget 2023-2024, the Draft NDGF Policy is under finalization (Sarkar, 2024).

Presently in India, NPD is stored in a variety of governmental departments and bodies. It is difficult to access and use this stored data for governmental functions without modernising collection and management of governmental data. Through the Draft NDGF Policy, the government aims to build an Indian data storehouse of anonymised NPD datasets and make them accessible for both improving governance and encouraging research. It proposes the establishment of an Indian Data Management Office (IDMO; Chaudhary and Kundu, 2022) to be set up under the MEITY's Digital India Corporation (DIC). The IDMO will design and manage the India Datasets Programme and be responsible for the NDGF policy (see NDGF Policy document). The Draft NDGF Policy is expected to address a major hurdle in the adoption of AI in India, namely, the lack of datasets (Sarkar, 2024).

### *Caveats*

Several caveats around the Draft NDGF Policy have been highlighted. While Mathi (2022) cautions that anonymised datasets can be de-anonymised, Singh (n.d.) points out that whereas the draft NDGF Policy primarily concerns itself with making the government bodies better equipped at handling data, it does not expressly keep private entities out of the purview of the policy. The policy aims to include NPD datasets housed with ministries and private companies into the India Datasets Programme, encouraging private entities to share such data with the IDMO for further use by other requesting entities. The Draft NDGF Policy also does not expand on the technicalities involved in how such data shall be stored and the measures that may be undertaken to ensure the safety of such data. As pointed out by the Joint Parliamentary Committee Report reviewing the Data Protection Bill 2021, it is possible for anonymised data to be re-anonymised. This may have potential data protection and privacy related issues since NPD, though stripped of any identifiable characteristics may be business confidential information or may have information that may be proprietary to private entities. Therefore, as was the concern with the Draft India Data Accessibility and Use Policy 2022, there is a need for a proper legislation for NPD instead of only a policy (Singh n.d.).

Ajaykumar et al (2022) point out that the Draft NDGF Policy does not specify the composition and functioning of the IDMO; indicating this is believed to be important in the interests of accountability and transparency. Further, detailing how the Draft NDGF Policy and IDMO will interact with the provisions of the Data Protection Act 2023 is relevant. Moreover, while the role of the IDMO is envisaged as formulation of rules, standards, and guidelines for data, datasets, and metadata, the IDMO's consultation to this end is limited to ministries, state governments, and industry. Ajaykumar et al (2022) hold that the scope of consultation should be widened and other stakeholders such as civil society organisations and educational institutions should be involved; inclusive consultations are considered necessary to minimise inadvertent harm to specific stakeholders. They also caution that the IDMO needs to define standards for anonymisation, avoiding conflation with other methods such as pseudonymisation which replaces personal identifiers with artificial ones. Anonymisation requirements must reduce the risk of data being de-anonymised and create countermeasures in those cases. Standards for anonymisation need to be periodically updated to move in tandem with the changing requirements of dynamic data and data use cases. Apart from adhering to

global standards on this matter, the IDMO must create mechanisms to hold suppliers of data accountable for appropriate levels of anonymisation of said data before the data is transferred to the IDMO and any sub-authorities. Ajaykumar et al (2022) highlight that given the powers vested in the IDMO by the Draft NDGF Policy, it is important that the IDMO's decision-making process is transparent and the criteria for denial of requests clearly elucidated; these checks would help enhance access and citizen engagement with the Indian Datasets Programme. The Intellectual Property Rights (IPR) ownership of datasets must be recognised and elaborated on in the Draft NDGF Policy. Besides, the Draft NDGF Policy indicates the possibility of user charges, which can be seen as running contrary to its intended use as a public platform to catalyse India's "research and start-up ecosystem" (Sec. 2.2) and promote greater citizen participation and engagement (Ajaykumar et al, 2022).

## 2. Development

This section has three parts: Responsible AI initiatives; Sandbox initiatives; and Examples of AI development/deployment in Indian industry. Note that Indian industry refers to Indian public and private sector companies including Indian MNCs and not international MNCs based in India.

### 2.1 Responsible AI initiatives

India's National Programme on AI/IndiaAI Mission via the National AI Portal emphasizes that the [ethical principles](#) which guide AI converge around the following: Transparency, Justice and fairness, Non-maleficence, Responsibility and accountability, Privacy, Beneficence, Freedom and autonomy, Trust, Dignity, Sustainability and Solidarity.

Niti Aayog's ([2021a](#) - and [2021b](#) ) documents on responsible AI propose principles for the responsible management of AI systems that may be leveraged by relevant stakeholders in India. Niti Aayog (2021a) identifies issues arising from 'systems' and 'society', based on case studies of AI systems in India and around the world.

'Systems considerations' arise as a result of system design choices and deployment processes and have the potential to impact stakeholders interacting with a specific AI system. These include:

- a) Lack of understanding an AI system's functioning makes it difficult to reliably and safely deploy AI systems
- b) Challenges in explaining specific decisions of AI systems makes it difficult to trust them
- c) Inherent bias could make the decisions prejudiced against segments of population
- d) Potential for exclusion of citizens in AI systems used for delivering important services and benefits
- e) Difficulty in assigning accountability

- f) Privacy risks
- g) Security risks” (Niti Aayog 2021a)

‘Societal considerations’ are broader ethical challenges pertaining to risks arising out of the very usage of AI solutions for specific functions and have potential repercussions on the society beyond the stakeholder interacting directly with specific systems. These include:

- a) Impact on Jobs
- b) Malicious psychological profiling

Based on the Indian Constitution and various laws enacted thereunder, the Paper identifies the following broad principles for responsible management of AI:

- “a) Principle of Safety and Reliability
- b) Principle of Equality
- c) Principle of Inclusivity and Non-discrimination
- d) Principle of Privacy and security
- e) Principle of Transparency
- f) Principle of Accountability
- g) Principle of protection and reinforcement of positive human values” (Niti Aayog 2021a)

While the aforementioned principles will guide the overall design, development and deployment of AI in the country, operationalizing these principles is important to realise desired results (Niti Aayog, 2021b). The manner and degree of implementation of these principles must provide an enabling environment for promoting a responsible AI ecosystem in India, with a focus on maximising the benefits of AI for all while minimising AI-related risks (Niti Aayog, 2021a). The Niti Aayog 2021b document is a step in this direction and puts forward two key concepts: calibration, in that regulatory and policy interventions designed for realising the principles must be calibrated to the uses and the risk-profile of AI systems; and continuous assessment, in that these principles are ingrained into an AI system’s lifecycle.

Niti Aayog’s (2021b) document puts forward a series of actions, divided among three stakeholders - governments, private sector and research institutions - that the ecosystem must adopt to drive responsible AI. Thus:

*The government’s role* is designing ideal regulatory and policy interventions, creating awareness, accessibility and capacity building, and facilitating precise procurement strategies; and

*The private sector's and research institutions' role* is incentivising ethics by design, creating frameworks for compliance with relevant AI standards and guidelines, and the promotion of responsible AI practices in research.

In the context of regulation, the paper recommends a risk-based mechanism for regulating AI in India. Regulation must be proportional to the likelihood of harm that can be occasioned by an AI system; greater the risk of harm, greater the regulatory scrutiny attracted by the relevant AI system. In order to determine the risk posed by AI systems, the paper proposes the adoption of specific policy interventions, such as sandboxing and controlled deployments. Further, in instances where the perceived risk of harm is low, governments may prefer regulatory forbearance and allow market players to lead with self-regulation. Sectoral regulators may however, continue to oversee AI-related developments in their field to avoid conflicting guidelines in the future (Niti Aayog, 2021b).

Niti Aayog (2021b) notes that policy and regulation-building on AI is currently being explored by various limbs of government, but recommends that it is important to augment the capacities of such bodies and ensure cohesive policymaking on AI. In light of this, it is proposed to set up an independent, multi-disciplinary advisory body at the apex-level, whose remit covers the entire digital sector. This proposed Council for Ethics and Technology (CET) will aide sectoral regulators in formulating appropriate AI policies and serve as a think-tank for creating quality research products around issues related to AI. The CET will be also responsible for devising model guidelines or ethics review mechanisms that will evaluate the efficacy of AI systems.

In addition to proposing these government-driven measures, Niti Aayog (2021b) notes that the delivery of ethical AI will also be influenced by the private sector. In light of this, it is recommended mandating responsible AI practices for any public-sector procurement of AI systems and in the adoption of high-risk AI. The private sector is also encouraged to devise unique ways to ensure cost-effective compliance with AI standards, with the paper recommending the assignment of relevant roles to specific personnel and the leveraging of open tools and materials to achieve the same.

Niti Aayog (2021b) underscores high-quality research as a priority in aiding the implementation of the AI principles, including through government-formulated guidance on measuring the impact made by AI research initiatives. At the same time, it advocates that responsible AI principles should be a critical consideration for the research itself.

Joshi (2024) maintains that the Niti Aayog (2021 a and b) responsible AI documents extoll the virtues of AI systems while highlighting that AI governance must balance innovation with potential risks. Yet, according to him, these documents recommend a largely non-interventionist, self-regulatory approach towards AI, while recognising the possibility of risks to rights, which are, however, relayed as distant scenarios of unknown/unknowable risk, to be dealt with when such risks are more tangible or apparent.

Further, the state of Tamil Nadu in South India has pioneered efforts to create an ethical AI policy which emphasizes transparency, accountability and inclusivity. They have created the [DEEP-MAX](#) scorecard to evaluate the ethical aspects of AI systems before public rollout. A search of India's top public and private sector firms across industries revealed that several

Indian IT firms have responsible AI policies. Some examples of these include [Infosys](#), [TCS](#), [Wipro AI](#), and [Techmahindra](#).

NASSCOM (National Association of Software and Service Companies, a non-governmental, non-profit trade association and advocacy group that serves the Indian IT and business process outsourcing (BPO) industry) realizes the critical need to optimally balance the imperatives of AI-enabled innovation and growth with AI-related public safety concerns. It has therefore started the [NASSCOM Responsible AI Hub](#), which implements and supports a range of strategic programmes and activities aimed at stakeholder sensitization and capacity building, and domestic and global policy action. The NASSCOM Responsible AI Hub has launched the [NASSCOM Responsible AI Resource Kit](#), an openly accessible collection of self-regulation guidance and tools to help businesses with the adoption of responsible AI practices (NASSCOM, 2024).

In line with its focus on responsible AI, NASSCOM (2023) undertook a survey to ascertain the preparedness of the Indian technology industry to meet the benchmarks for RAI (responsible AI) compliance. 535 senior executives from large firms, SMEs and start-ups were included. Respondents had to report the RAI maturity of their businesses by rating them as matured, advancing, exploring and lagging. 29% reported matured RAI practices and policies while 31% reported advancing, 29% exploring and 10% lagging. Larger firms (43%) report higher RAI maturity compared to SMEs (28%) and start-ups (19%). 30% of TMT (technology, media and telecom) industries, 38% of BFSI and 21% of healthcare industries have matured RAI policies and practices, with another 1/3<sup>rd</sup> businesses in each having initiated formal steps towards RAI adoption. Those reporting higher AI maturity tend to report higher RAI maturity. 89% of businesses having matured RAI practices and policies are committed to invest in workforce development to ensure robust RAI compliance, while approximately 60% of businesses having lower levels of RAI maturity are committed to invest in workforce development for RAI compliance. 55% of businesses with matured RAI practices and policies have internal AI ethics boards/committees, indicating their steady relevance for businesses to ensure robust development and implementation of RAI strategies. Among the barriers to RAI implementation, large enterprises and SMEs cite lack of access to high quality data and startups cite lack of skilled technical and management personnel.

## 2.2 Sandbox initiatives

India has had several sandbox initiatives such as in finance, telecom and urban development where there is an interface with technology (CHASE India n.d.). RBI, SEBI, National Urban Renewal Mission (see CHASE India n.d. Annexure 2) as well as the [Telecom Act 2023](#) and the [state of Maharashtra's Mumbai Fintech Hub](#) are some examples of these.

Sandboxes directly focused on technology include:

[Telangana](#) started a sandbox initiative in 2023 to test innovative Web 3.0 solutions..

Karnataka has enacted the [Karnataka Innovation Authority Act 2020](#) which establishes an Innovation Authority dedicated to promoting and regulating innovative technologies through a regulatory sandbox model (Chauriha, 2024).

The [Draft National Strategy on Robotics](#) (pp. 34-35) advocates the use of regulatory sandboxes.

To illustrate some trends in how AI is currently being used in India, consider the following examples.

### *Agriculture*

The AI Sowing App sends advisories to over 3,000 farmers in villages in Karnataka and Andhra Pradesh. This app provides farmers information on ideal sowing dates and depths and also soil-test-based fertilizer application schedules that are critical for crop output and sustainable farming. Working in tandem with dashboards personalized for each village, the app helped farmers boost crop yields by 10%-30% and was able to do this without farmers having to invest in advanced sensors or other equipment. All they needed was a phone that could receive messages (Ghose, 2023).

### *Petrochemicals*

Indian Oil has AI-driven predictive maintenance systems to optimize refinery processes and improve supply chain logistics. This has substantially reduced downtime and enhanced operational efficiency (George, 2024).

### *Health care*

MyGov Sathi is an AI-enabled chatbot created to get key healthcare information across to Indian citizens during the COVID-19 pandemic (Ghose, 2023). Apollo Hospitals is developing a cardiac prognosis model that will help its users predict the risk of a cardiac event in South Asian populations and will be available to all hospitals (Ghose, 2023).

## **3. Governance**

There is a broad consensus that increases in the use of AI will have profound social and economic effects. The question of whether these effects are largely beneficial or detrimental depends to a significant extent on the way in which the use of AI is governed and regulated. The purpose of this section is to analyse how India's governance structures affect the use of AI and to discuss their consequences for different social groups.

Government commissioned reports on the future of AI in India are optimistic that the technology will have largely beneficial effects, provided that obstacles related to access, expertise, and privacy can be surmounted. The reports expect that the areas of healthcare, agriculture, education, infrastructure, and mobility are particularly likely to benefit from an increased use of AI (NITI Aayog 2018a; 2021a; 2021b). As we will explain below, we think that there is reason to temper the optimistic outlook of these reports.

Before we begin to describe some of the likely effects of increased AI adoption in India, it is helpful to distinguish between regulatory regimes that rely on tight regulation and stringent transparency rules and regulatory regimes that are more lenient and rely mainly on self-regulation. This means that there is a spectrum of regulatory approaches that ranges from 'highly directive' to 'little directive'. To illustrate, the European Union is in the process of designing a set of relatively stringent legal rules that impose significant limits on how different

kinds of AI can be used in different contexts. These rules come on top of a set of strict existing laws and regulations regarding privacy and other basic rights that apply to the use of AI. The EU thus lies relatively close to the 'highly directive' end of the regulatory spectrum. India, by contrast, lies relatively close to the 'little directive' end of the spectrum.

There are two main reasons for this. One reason is that India has not yet implemented various rules and policies that are in the process of being drafted. Two important pieces of legislation, the Digital India Act 2023 and the National Data Governance Framework Policy are still in the process of consultation. This means that the use of AI in India is at the moment mainly regulated by a set of general laws and legal rules that apply to AI but that have not been issued specifically with a view to regulating AI. Examples of this are the Information Technology Act 2000 and the Digital Personal Data Protection Act, each of which have implications regarding the use of AI, while not having been designed to regulate AI specifically. The second reason why India lies close to the 'little directive' end of the regulatory spectrum is that even those rules that are being drafted are quite permissive, in the sense that they impose few strict and sanction-backed rules on corporations, so that corporations will have a large degree of discretion regarding their use of AI (Joshi 2024). Moreover, the planned rules do not impose tough restrictions on the government's capacity to gather and process sensitive personal data. The upshot of this is that India's corporations and government will be subject to significantly fewer constraints than those of other jurisdictions, such as the EU.

We can begin to understand the importance of governance structures by observing some general ways in which the social and economic effects of AI are determined by governance and regulation. As an example, consider the contentious question of whether AI will create jobs or displace workers. Academic predictions vary, with some anticipating mass unemployment, and others being cautiously optimistic about the job-creating potential of AI (Autor 2015; Frey and Osborne 2017; Gironde et al 2019; Brynjolfsson and Syverson 2017). What is sometimes overlooked is that these predictions are based on a range of premises regarding the design of basic social and economic institutions, and the distribution of wealth and power across different social groups. Predictions regarding the effects of AI often ask a narrow question: "given the existence of current governance structures, basic institutions and distributions of power and wealth, what will be the effect of introducing AI?" When these assumptions are not made explicit, it can appear that the nature of the consequences of AI is fixed, predetermined, or unalterable.

However, the answer to questions such as whether AI will create or destroy jobs depends on the backdrop of governance structures against which AI is introduced. According to Acemoglu (1998, 2002) and Autor (2011) political power and legal frameworks shape the impact of technology on employment and welfare. Technology's influence on the labour market is not deterministic but contingent on the societal context within which it is deployed. These scholars posit two main scenarios: complementing workers or displacing them.

When AI complements workers, it enhances their productivity by automating routine tasks, thereby allowing them to focus on more complex, creative, or interpersonal activities. Inclusive political institutions and well-crafted laws can steer the use of technology to complement and augment human labour. In such contexts, technology can lead to the creation of jobs and to economic growth (Webb 2020). Conversely, in societies where political power is concentrated

in the hands of elites or where laws are poorly designed or enforced, technology may primarily serve to displace jobs (Seamans and Raj 2018; Mani et al 2020). This scenario can lead to increased inequality and reduced welfare, as the benefits of technological progress are captured by a small segment of the population. Moreover, it matters who owns AI databases and tools. Autor (2020) and Korinek and Stiglitz (2021, 2) worry that AI tends “to give rise to natural monopolies, creating a small set of so-called superstar firms that are located in a few powerful countries but serve the entire world economy”.

The upshot of this is that understanding the likely effects of AI in India requires understanding those governance structures that steer the effects of AI. In particular, it is helpful to ask how much control members of different social classes have over the process of shaping AI regulation and implementation. The interests that low-income earners and otherwise disadvantaged groups have in designing AI regulation are distinct from the interests that wealthy individuals have. The reason for this misalignment of interests has to do with the above-mentioned distinction between the complementing effect and the displacing effect of AI. Members of the working class have an interest in rising wages and high employment rates. Firm owners, on the other hand, might benefit more from replacing workers with AI.

This means that we should expect differences in the design of AI regulation, depending on how power is distributed across social classes and who can bring their interests to bear on the design of regulation most effectively (Alonso et al 2020; Bhattacharyya and 2019). When workers, labour unions, and social movements have significant bargaining power, they can lobby for incentives and regulations to use AI to complement their work. When these groups have little bargaining power, we can expect that AI is more likely to be used to displace workers. More broadly, we can expect that the extent to which a society is democratic has an effect on how AI is used. The more democratic a society is, the more likely it is that the interests of a majority of workers prevail over the interest of small groups of social elites.

It is therefore crucial to take into account how wealth and power are distributed in India, as well as how strong democratic institutions are to determine the likely effects of AI. Measuring the distribution of income and wealth in India faces several methodological challenges. However, recent work of Bharti et al (2024, 3) has improved the accuracy of estimates regarding material inequality in India. The results of a recent study

“point to extreme levels of inequality in India compared to international standards. In 2022-23, 22.6% of national income went to just the top 1%, the highest level recorded in our series since 1922, higher than even during the inter-war colonial period. The top 1% wealth share stood at 40.1% in 2022-23, also at its highest level since 1961 when our wealth series begins. In other words, the ‘Billionaire Raj’ headed by India’s modern bourgeoisie is now more unequal than the British Raj headed by the colonialist forces.”

Apart from inequalities in wealth, India is characterised by other deep inequalities, such as in gender, land ownership, and caste membership (Sengupta and Guchhait 2021; Anand 2021). To illustrate, India occupies rank 127 out of 146 on the Global Gender Gap Index (World Economic Forum 2023).

Recent findings emphasise that in the absence of redistributive policies the increased availability of AI cannot be expected to improve the plight of those at the losing end of these

inequalities (Saraswati, 2012). On the contrary, it is likely that AI will exacerbate these inequalities. According to one study of the Indian labour market, “AI jobs pay a substantial wage premium, but these opportunities are highly concentrated in certain industries, cities and large firms. AI adoption within an establishment reduces both the number of other job vacancies posted on the platform and the corresponding wage offers. Such net displacement effects within the firm could have important negative consequences if they are not balanced out by positive effects elsewhere in the economy” (Copestake et al, 36). These findings give us reason to suspect that the above mentioned optimistic outlook of government reports is misguided.

As Korinek and Stiglitz (2021, 2) emphasize, “Developing countries and emerging market economies have even more reason to be concerned than high-income countries, as their comparative advantage in the world economy relies on abundant labor and natural resources. Declining returns to labor and natural resources as well as the winner-takes-all dynamics brought on by new information technologies could lead to further immiseration in the developing world. This would undermine the rapid gains that have been the hallmark of success in development over the past fifty years, and threaten the progress made in reducing poverty and inequality”. According to another study, an increased uptake of AI in India means that “some opportunities will be created, but the spread of new technologies is likely to reproduce informal and precarious work rather than transform existing trends” (Hammer and Karmakar 2021, 1337).

To realize AI’s potential to benefit the entire population, a range of redistributive policies would be required (Korinek and Stiglitz 2021). However, India’s current government does not have plans to implement wide ranging redistributive measures that have the potential to spread the anticipated gains of AI across India’s population.

What is more, the capacity of labour unions and social movements to pressure the government into adopting such measures is severely limited (Hammer 2010). To some extent this is because this is because the overwhelming majority of India’s workers are not members of a trade union or covered by collective bargaining agreements (Hensman 2011). Another part of the explanation is that India’s democracy has experienced a steady trend toward authoritarianism over the past years.

According to the Global State of Democracy Initiative (2024), India has “experienced significant five-year declines in Free Political Parties, Civic Engagement, Civil Liberties and six other measures of democracy.” Freedom House (2024) reaches a similar conclusion, stating that “the government led by Prime Minister Narendra Modi and the Hindu nationalist Bharatiya Janata Party (BJP) has presided over discriminatory policies and a rise in persecution affecting Muslims. The constitution guarantees civil liberties including freedom of expression and freedom of religion, but harassment of journalists, nongovernmental organizations (NGOs), and other government critics has increased significantly under Modi.” According to reporters without borders (2024), “violence against journalists, highly concentrated media ownership, and political alignment” mean that press freedom is severely limited in what is still considered the world’s largest democracy.

The upshot of this is, in our view, that we should temper our expectations regarding the potential of AI to boost welfare in India. When AI is implemented within a little directive regulatory regime and against a backdrop of extreme inequality and weakened democracy, it cannot be expected to generate broad based gains in prosperity.

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