

Structural Constraints and Strategic Trade-offs in India's Artificial Intelligence Strategy

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Abstract

This paper analyses India's artificial intelligence strategy using the Economic Survey 2025-26 and Budget 2026-27 as complementary policy texts. It conceptualises AI as a strategic economic variable influencing productivity, employment and industrial structure. The paper identifies structural constraints in the global AI ecosystem, particularly the concentration of compute and capital and evaluates key trade-offs between productivity and employment, openness and autonomy, and innovation and regulation. It finds that while policy intent is evolving, implementation gaps persist. The paper argues that a bottom up, application driven and development-oriented approach offers the most viable pathway for aligning AI with India's economic realities.

Keywords: Artificial Intelligence, Economic Survey 2025-26, AI Policy, Budget 2026-27.

1 Introduction

Artificial Intelligence is emerging as a general purpose technology that has the potential to transform economies in the same way as electricity, the internet and industrial machinery did in previous eras. It is expected to influence productivity, employment patterns, industrial organisation, global value chains and even the strategic balance between nations. As AI adoption increases across sectors such as services, manufacturing, healthcare, education and governance countries are no longer only discussing whether AI should be adopted but how it should be adopted and who will control its development, deployment and economic benefits. For a

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country like India, which is a labour abundant economy with resource constraints but strong human capital and digital infrastructure the way AI is adopted will determine whether it becomes a tool for inclusive growth and employment generation or a source of jobless growth and technological dependence. Therefore, understanding the economic implications of AI and designing an appropriate national strategy has become an important policy priority.

In this context, Chapter 14 of the Economic Survey 2025-26, titled “Evolution of the AI Ecosystem in India: The Way Forward” becomes important because it does not look at AI merely as a technological innovation but as an economic and strategic policy issue. The chapter examines the structure of the global AI ecosystem, the constraints and trade-offs that India faces in adopting AI and the need for a development oriented and bottom up approach to AI adoption that aligns with India's economic realities. It argues that India should not attempt to replicate the frontier AI model of advanced economies, which is capital and resource intensive but should instead focus on application driven AI development, open and interoperable systems and human capital development. The chapter therefore sets the direction for how India should position itself in the AI era and how AI can be used as a tool for productivity growth, employment generation and inclusive development.

2 Artificial Intelligence in India's Economic Context

The chapter begins by explaining how the global conversation around AI has evolved from speculation about future possibilities to actual adoption across firms and sectors. Earlier discussions on AI focused largely on preparedness in terms of skills, infrastructure and institutional readiness but the current phase is characterised by actual deployment and experimentation across organisations. Evidence presented in the chapter shows that a large proportion of firms globally are already using AI in at least one business function and many are in the process of scaling their use across their organisations. This shift indicates that AI is no longer a distant technology but an active economic force that is beginning to influence productivity, business processes and organisational structures.

However, the chapter makes an important distinction between AI usage and AI development. While AI adoption may become widespread, the development of

advanced foundational models remains highly concentrated because it requires large amounts of capital, computing power, data, energy and specialised talent. This creates structural imbalances in the global AI ecosystem where a few firms and countries control the frontier of AI development while many others participate primarily as users. This concentration raises concerns about technological dependence, market power and supply chain vulnerabilities which are particularly relevant for countries like India that must decide how to position themselves within this ecosystem.

The chapter also addresses the labour market implications of AI noting that early evidence does not show large-scale job losses due to AI adoption. Instead, the evidence suggests that AI initially complements labour as firms integrate new technologies into their workflows. However, the chapter warns that this does not eliminate long-term risks. The analysis presented shows that while employment levels may not fall immediately the responsiveness of employment to output growth may decline over time implying that economic growth may generate fewer jobs in the future. This suggests that AI may gradually reduce the labour intensity of growth rather than causing immediate unemployment which is a significant concern for a labour abundant country like India.

3 Asymmetries and Trade-offs in the AI Ecosystem

A major analytical contribution of the chapter is the identification of structural asymmetries and trade-offs that define the global AI ecosystem and constrain policy choices for India. The chapter argues that these asymmetries are structural outcomes of how AI is financed, developed and deployed and therefore India's AI strategy must be designed with these constraints in mind.

One of the most important asymmetries discussed is between frontier model development and application based AI development. Frontier model development requires massive investments in computing infrastructure and specialised hardware, making it accessible only to a few large firms globally. For India, attempting to compete directly in frontier model development would require extremely high fiscal and infrastructural investments. Therefore, the policy trade-off lies between investing scarce resources in frontier AI development or focusing on application-specific AI systems that address domestic economic needs.

Another important trade-off discussed in the chapter is between productivity and employment. AI increases the productivity of capital relative to labour, which may encourage firms to automate tasks, especially in low-value service sectors. Rapid adoption of AI may therefore increase productivity but may also reduce employment absorption in certain sectors. On the other hand, delaying AI adoption to protect jobs may reduce competitiveness and trap firms in low productivity growth. Therefore, the policy challenge is not whether AI should be adopted, but how to pace its adoption in a way that allows labour markets to adjust.

The chapter also discusses the trade-off between open and proprietary AI models. Proprietary models provide high performance but create dependence and reduce transparency, while open-source models allow collaboration, adaptability and lower entry barriers but require coordination and quality control. The chapter suggests that India should promote open and interoperable systems so that innovation can be widely distributed and the value created from domestic data and innovation remains within the country.

Another key constraint discussed is the resource intensity of AI infrastructure. AI data centres require large amounts of electricity, water and capital investment and global experiences show that rapid expansion of AI infrastructure can strain energy systems and financial systems. For India where power, finance and water are limited resources, indiscriminate scaling of compute infrastructure would involve significant opportunity costs. This strengthens the argument for smaller, task specific AI models and decentralised computing systems rather than centralised, compute intensive AI development.

The chapter also highlights the trade-off between regulation and innovation and between strategic autonomy and global integration. Excessive regulation may stifle innovation, while lack of regulation may create risks and reduce trust in AI systems. Similarly, complete technological self sufficiency is neither feasible nor efficient but overdependence on foreign AI systems may create strategic vulnerabilities. Therefore, India must balance openness with strategic control.

4 A Development-Oriented Approach to AI

The chapter argues that AI should be treated as a strategic economic priority because it will influence not only productivity and growth but also labour markets,

foreign policy and national security. Indigenous AI development is therefore important not just for technological progress but also for economic resilience and strategic autonomy.

One of the central arguments of the chapter is that India should adopt a bottom-up approach to AI development rather than a top-down frontier model approach. The bottom-up approach focuses on sector-specific AI applications developed across sectors such as agriculture, healthcare, education, manufacturing and public administration. This approach aligns with India's strengths including a large pool of technical talent, a strong digital public infrastructure and diverse domestic datasets while also taking into account India's constraints in compute infrastructure and capital availability.

The chapter emphasises that small, application-specific AI models are more suitable for India because they are computationally efficient, easier to deploy and can run on existing hardware such as smartphones and personal computers. This allows AI adoption to spread across sectors without requiring massive investments in data centres and compute infrastructure. It also allows innovation to emerge from a wide range of actors including startups, research institutions, public agencies and local governments rather than being concentrated in a few large firms.

The chapter also emphasises the importance of open-source and open-weight AI models. Open innovation allows India to achieve more with limited resources, reduces dependence on foreign proprietary systems and lowers entry barriers for domestic developers. The government's role in this ecosystem should be that of an enabler and coordinator by providing shared infrastructure, datasets, standards and platforms for collaboration, similar to India's digital public infrastructure model.

5 Human Capital for AI

The chapter highlights that AI development requires both algorithmic knowledge and software engineering capability and much of this knowledge is tacit and gained through practical experience rather than formal education alone. Therefore, India's education and skilling systems must evolve to include industry

collaboration, apprenticeships, flexible degree structures and early exposure to work experience.

The chapter proposes integrating education and work experience through structured apprenticeship and fellowship programs so that students gain practical experience while studying. The broader argument is that education systems must adapt to the changing nature of work in an AI-driven economy.

The chapter also makes an important conceptual argument that AI will change the nature of human work. As AI takes over routine cognitive tasks such as information retrieval and summarisation, human workers will increasingly be valued for judgement, problem-solving, domain expertise and the ability to design and manage complex systems. Therefore, education policy should focus more on foundational skills such as reasoning, communication, problem-solving and adaptability rather than narrow technical specialisation.

6 Governance, Institutional Architecture and Data

The chapter argues that AI governance must be phased and adaptive. Instead of imposing strict regulations immediately, policymakers should allow experimentation, then scale successful applications and introduce binding regulations where risks are high. The government's role should be to enable and coordinate rather than directly control innovation.

The chapter proposes the creation of an AI Economic Council that would monitor AI adoption, assess labour market impacts and guide the pace of AI deployment so that economic disruption is minimised and the benefits of AI are widely distributed. The underlying principle is that AI should serve human welfare and economic inclusion rather than replace labour indiscriminately.

The chapter also treats data as a strategic economic resource. India's large digital population generates significant amounts of data which can become a major source of economic value in the AI economy. However, the chapter argues that data governance should not focus only on data localisation but on ensuring that the economic value generated from domestic data benefits the country. Therefore, India's data governance framework should allow cross-border data flows while ensuring accountability, regulatory visibility and domestic value retention.

India's AI ecosystem is characterised by a striking paradox enormous human capital on one side and thin institutional and infrastructure depth on the other. The country contributes roughly 20% of the world's semiconductor design engineers and hosts over 1,700 Global Capability Centres. Nearly 90% of startups launched in 2024-25 incorporated AI into their products or services and the broader IT/ITeS sector generates revenues of approximately \$283 billion annually, accounting for around 7% of GDP. The domestic semiconductor design ecosystem generates cumulative annual revenue of less than ₹150 crore a figure that is almost incongruent with the talent it is built upon. Most intellectual property generated by Indian design engineers is owned by foreign corporations rather than Indian companies. This structural gap between talent and ownership defines the challenge that the 2026-27 budget attempts, in part, to address.

7 Budget Allocation Towards the India AI Mission

The India AI Mission launched in March 2024 with an approved outlay of ₹10,300 crore, received an allocation of ₹1,000 crore in Budget 2026-27, an increase from the revised estimate of ₹800 crore in the preceding year. On paper, this signal continued commitment. In practice, the mission has struggled with a persistent utilisation problem fund usage has remained below 50% since inception, a pattern that raises serious questions about absorptive capacity rather than financial intent. The mission is structured around seven pillars: compute capacity, a datasets platform, applications development, startup financing, an AI Innovation Centre for indigenous model development, the FutureSkills programme and a Safe and Trusted AI governance framework. The compute pillar is the most tangible in progress terms. India's national GPU capacity crossed 38,000 units by December 2025 and a further addition of 20,000 GPUs was announced in February 2026. While this represents real infrastructure growth it must be contextualised against the fact that training a single frontier AI model today can require tens of thousands of GPUs running for weeks meaning India's compute base, while growing, remains well below the threshold for sovereign foundational model development.

The underutilisation of funds is not simply an administrative failure. It reflects a structural design issue common to several MeITY schemes: incentives are disbursed only after predefined targets are met, which means money remains unspent not

because projects are absent but because the disbursement architecture is back loaded. Addressing this mechanism is as important as increasing the allocation itself.

8 The Data Centre Tax Holiday: A Long Horizon Structural Intervention

The most consequential AI-related provision in Budget 2026-27 is arguably not a direct expenditure but a tax policy decision, namely the proposal to extend a tax holiday until 2047 for eligible foreign cloud service providers that operate through India based data centre infrastructure. This exemption covers income from global cloud operations routed through Indian data centres, provided that services to Indian customers are delivered through an Indian reseller entity, thereby keeping domestic economic activity within the tax net.

The reasoning behind this measure is grounded in the nature of AI infrastructure itself. Data centres are the physical layer on which all AI computation rests training models, running inference, storing datasets and serving applications all depend on data centre capacity. India's current data centre capacity stands at approximately 1,280 MW with projections pointing to a four to five times increase by 2030. Investments of nearly USD 70 billion are already underway in the sector, with an additional USD 90 billion in announced projects. The 2047 tax horizon is designed to match the long capital cycles and high upfront costs that characterise this sector, giving global cloud providers the investment certainty needed to commit infrastructure to India.

The United States has issued executive orders to accelerate data centre permitting. Chinese firms are aggressively building overseas data centre capacity. In this environment, India's tax framework is intended to make the country a credible long-term destination for digital infrastructure that would otherwise flow to Singapore, Malaysia or the Gulf.

For domestic operations, the framework retains taxability Indian data centre company and the Indian reseller entity continue to be taxed as normal domestic companies. Where the Indian data centre is a related entity of the foreign company operating as a cost-plus centre, a 15% margin on cost has been proposed, offering transfer pricing clarity that had previously created uncertainty.

9 India Semiconductor Mission 2.0 and the Component Manufacturing Push

Semiconductors are the physical substrate of all AI computing every GPU, memory chip and AI accelerator traces back to the semiconductor supply chain. India's position in this chain remains marginal. Chips represent the country's single largest electronics trade deficit at approximately \$23.5 billion in 2024. It is within this context that the Budget announces India Semiconductor Mission 2.0 with an allocation of ₹1,000 crore for 2026-27.

ISM 2.0 is oriented differently from its predecessor. While the original ISM focused on attracting semiconductor fabs and assembly facilities with ten projects now approved representing a cumulative investment of ₹1.6 lakh crore the second phase turns attention toward the upstream: semiconductor equipment manufacturing within India, production of materials used in semiconductor fabrication, development of full-stack Indian semiconductor intellectual property and talent ecosystem strengthening.

This upstream orientation is strategically sound because equipment and materials represent higher value addition and greater strategic leverage than assembly. Taiwan's dominance in semiconductor manufacturing is underpinned not just by its fabs but by decades of accumulated equipment and materials capability. However, the ₹1,000 crore allocation is modest relative to the scale of investment required and returns from this phase will take years to materialise.

Complementing this is the expanded Electronics Component Manufacturing Scheme, whose total outlay was raised from approximately ₹22,000 crore to ₹40,000 crore in this budget, with ₹1,500 crore allocated for 2026-27. Components account for 42% of global electronics production value but only 9% of India's. The scheme targets sub-assemblies, bare components and capital equipment precisely the categories that India must develop to reduce its import dependence and increase the domestic value added in electronics that underpin AI hardware.

10 IT Services Simplification and the Safe Harbour Reforms

India's IT services sector the largest immediate interface between the Indian economy and AI received a set of tax simplification measures in Budget 2026-27 that are significant both in their practical effect and in their signal. All categories

of IT services, including software development, IT enabled services, knowledge process outsourcing and contract R&D, have been consolidated under a single category with a common safe harbour margin of 15.5%. The threshold for availing safe harbour has been raised from ₹300 crore to ₹2,000 crore, substantially expanding the number of companies that can benefit without extensive transfer pricing documentation. The Unilateral Advance Pricing Agreement process for IT services has also been fast tracked.

These measures address a structural vulnerability of the IT sector that the budget context makes acute. India's software exports are concentrated in the US and EU 70% of exports flow to these two markets and AI driven automation is disrupting the entry level and mid level service segments that form the base of the pyramid. Geopolitical tensions, stricter visa regimes and data localisation pressures compound this exposure. Reducing the compliance and tax burden on IT companies is a form of defensive support preserving competitiveness in a sector undergoing structural stress while it adapts to an AI augmented service model.

11 Future Plans and the Direction of India's AI Strategy

India appears to be pursuing a layered approach building physical infrastructure through data centres and semiconductor fabs, strengthening the component and material base through Electronics Components Manufacturing Scheme (ECMS) and ISM 2.0 developing indigenous AI capability through the India AI Mission and preserving the IT services sector's competitiveness through tax simplification while the 2047 tax horizon signals that policymakers understand this is a generational effort, not a five year plan.

The Economic Survey 2025-26's advocacy for open source AI models is particularly significant as a forward looking orientation. Proprietary models concentrate AI power in a handful of global firms and create strategic dependence precisely the pattern India has experienced in semiconductors and must not repeat in AI. Open models offer lower entry barriers, greater adaptability and align well with India's large open source developer community. The India AI Innovation Centre's mandate to develop indigenous Large Multimodal Models trained on Indian datasets is the institutional expression of this orientation, though it remains nascent.

The most consequential unresolved question for India's AI future is whether the country can transition from being a deployer of AI applying foreign models to domestic problems to being a developer of foundational AI systems. The budget's investments in compute, data platforms and indigenous model development are necessary conditions for that transition. But they are not sufficient as long as the gap between allocation and utilisation persists, the talent pipeline remains misaligned with industry needs and the regulatory framework around AI privacy, security and intellectual property remains undefined.

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