

**Impact of Artificial Intelligence on the Indian Economy: A Comprehensive Review.****Dr. Annasaheb Shelke***Assistant Prof. Dept of Economics S.K. Gandhi College Kada, Tal. Ashti, Beed**Corresponding Author – Dr. Annasaheb Shelke***DOI - 10.5281/zenodo.18874530****Abstract:**

*Artificial Intelligence (AI) has emerged as a transformative force, reshaping global economies and technological landscapes. In India, AI adoption is influencing economic growth, productivity, labour markets, innovation ecosystems, and policy frameworks. This paper reviews the existing literature and empirical evidence on AI's multifaceted impact on the Indian economy. It examines both positive outcomes—such as productivity enhancements, new job creation, and sectoral modernization—and negatives including job displacement, skill gaps, and digital divides. The review draws upon academic research, industry reports, and policy documents to present a balanced assessment. Key findings reveal that while AI can significantly boost GDP and competitiveness, India's success will depend on targeted investments in skills, infrastructure, and regulatory frameworks. The paper concludes with recommendations for policymakers and stakeholders to harness AI for inclusive and sustainable economic growth.*

***Keywords: Artificial Intelligence, Economic Impact, Employment, Growth, Development, Digital.*****Introduction:**

Artificial Intelligence (AI) refers to computational systems capable of performing tasks that traditionally require human intelligence, such as pattern recognition, problem-solving, and decision-making. In recent years, AI has transitioned from academic research to widespread economic applications across sectors, ranging from services and manufacturing to agriculture and healthcare. India's economic landscape is marked by a dynamic combination of traditional industries and burgeoning digital sectors. The government's initiatives to promote digital inclusion, coupled with increased investments in technology infrastructure, have created a fertile environment for AI adoption. Additionally, the nation's demographic dividend, with a large proportion of its population engaged in the workforce, presents both opportunities and challenges in harnessing AI's full potential.

For developing economies like India, AI presents both opportunities and risks. With a population exceeding 1.4 billion and a large workforce, India stands at the cusp of a digital transformation. Yet, the diffusion of AI technologies could have uneven effects on growth, employment, and global competitiveness. This paper synthesizes current research on AI's impact on the Indian economy, offering a comprehensive overview for scholars, practitioners, and policymakers.

**Literature Review:**

A growing body of literature has examined AI's economic repercussions globally and within India. Varalakshmi et al. (2024) explore AI's influence on productivity, innovation, and employment across major sectors, noting substantial gains alongside emerging challenges. AI's role in improving resource

management in agriculture and manufacturing while acknowledging concerns about job displacement and inequality. AI is identified as a key driver for sustainable development, particularly through enhanced agricultural efficiency and healthcare outcomes. AI is widely described in academic and policy literature as a general-purpose technology (GPT) — akin to electricity and the internet — due to its pervasive potential across sectors. Studies emphasize AI's role in productivity enhancement, innovation, decision-making, and automation of routine cognitive tasks.

This foundational view underpins most economic impact assessments. The advent of artificial intelligence (AI) has emerged as a transformative force across global economies, with particular significance for developing nations such as India. Estimates suggest that AI could inject trillions into the global economy by 2030, with projections indicating GDP increases of up to 26% in China and 14.5% in North America, highlighting its profound economic implications (Busch et al., 2025). For India, AI is anticipated to contribute an additional \$957 billion to its economy by 2035, driven by its pervasive application across diverse sectors including healthcare, agriculture, and manufacturing. Policy-oriented reports also emphasize the need for strategic intervention to ensure ethical AI deployment and inclusive growth.

### **Theoretical Framework and Foundation:**

AI's economic impact can be analysed through several theoretical lenses: Policy frameworks must evolve to include ethical AI guidelines, data privacy regulations, and national AI innovation clusters. Infrastructure development, investment in AI research, and targeted reskilling initiatives are equally critical. Strengthening collaborations between

government, academia, and private industry will determine India's ability to leverage AI as a transformative economic catalyst. AI is classified as a GPT, akin to electricity and the internet, which has broad applications across industries and induces complementary innovations. Its diffusion alters production functions, raises total factor productivity, and reshapes labour demand.

### **Labour Market Disruption Models:**

Technological change theory predicts that automation displaces routine tasks while creating new, higher-order job opportunities. In India, this dual effect manifests in contrasting trends: the loss of routine IT and BPO jobs with simultaneous creation of new roles in AI management and development.

The task-based model, advanced by Autor, Levy, and Murnane (2003), argues that technology does not replace jobs wholesale but rather automates specific tasks within occupations. Tasks are classified as: Routine vs. non-routine and Cognitive vs. manual. AI excels at automating routine cognitive tasks, such as data processing, customer support, and basic analytics.

### **Impact on Indian Economy:**

In India, a large share of employment—particularly in IT services, BPOs, banking back-office operations, and clerical government work—is heavily task-oriented. Literature indicates that AI-driven automation is reshaping these sectors by reducing demand for low- and mid-skilled routine workers and increasing demand for workers who can supervise, integrate, or complement AI systems. This model explains why AI threatens job functions rather than entire professions, leading to task reconfiguration rather than outright unemployment in many cases.

**Skill-Biased Technological Change (SBTC) Model:**

The SBTC model posits that technological progress disproportionately benefits high-skilled workers, increasing wage inequality and demand for advanced skills. AI intensifies this bias by rewarding: Data science, Machine learning, Algorithm design, Strategic decision-making India's labour market exhibits a sharp divide between: A relatively small, high-skilled digital workforce and a vast low- and medium-skilled workforce. This leads to raises wages and employment opportunities for highly skilled professionals, suppresses wage growth and job security for routine-skilled workers. This model highlights the risk of widening income inequality, especially between urban tech hubs and rural or informal employment zones.

**Job Polarization Model:**

This model suggests that technology reduces middle-skill jobs while expanding:

High-skill, high-wage jobs, Low-skill, low-wage service jobs and AI accelerates this trend by hollowing out roles that involve predictable decision-making. Indian labour market studies indicate decline in mid-level IT services, accounting, and administrative roles, Growth in high-end AI, analytics, and platform-based jobs, Expansion of low-wage service roles (delivery, gig work, caregiving). This polarization is particularly significant in India because of its large informal sector, where displaced workers often move into precarious employment rather than unemployment.

**Creative Destruction Model:**

Rooted in Schumpeterian economics, this model views technological change as a process of creative destruction, where old jobs and industries are destroyed while new ones emerge. Creating new occupations such as AI trainers, prompt

engineers, data annotators, and AI ethics specialists. However, unlike historical industrial transitions, AI's pace of change is much faster, raising concerns about whether labour markets can adjust quickly enough—particularly in developing economies like India.

**Structural Transformation and Sectoral Shift Model:**

This model examines how technological change shifts labour across sectors—from agriculture to manufacturing to services. From development economics, AI can either accelerate traditional structural transformation (shifting labour to high-productivity sectors) or reinforce existing inequalities if access is uneven.

**GDP and Productivity Impacts and Employment Dynamics:**

AI has the potential to significantly contribute to India's GDP. Acute ratings estimates that strategic AI adoption could add up to USD 500 billion by 2035. Moreover, EY India reports suggest AI integration could enhance productivity by 43–45% in the IT services sector over the next five years. Artificial Intelligence (AI) is increasingly recognized in economic literature as a key driver of productivity growth, structural transformation, and long-term GDP expansion. For India, where sustained high growth is essential for absorbing a large and youthful workforce, AI presents both significant opportunities and complex employment challenges. The literature conceptualizes AI's macroeconomic impact through productivity enhancement, sectoral reallocation, and dynamic labour market adjustments.

AI-Driven Productivity Growth, Micro-Level Productivity Effects, At the firm level, AI adoption improves productivity by Automating routine and repetitive tasks, enhancing decision-making through predictive analytics, reducing

operational inefficiencies and transaction costs. Empirical studies focusing on Indian firms find that AI adoption leads to higher total factor productivity (TFP), particularly in information technology, finance, logistics, and manufacturing. However, productivity gains are uneven, favouring large firms with better access to capital, data, and digital infrastructure.

### **AI as a Growth Multiplier:**

Macroeconomic modelling studies suggest that AI can significantly raise India's GDP by, increasing labour productivity, enhancing capital efficiency, enabling new products, services, and business models. The study consistently frames AI as a long-term growth engine, capable of sustaining India's transition toward a higher-value, knowledge-based economy. In the Indian context, short-run disruptions may be more pronounced due to labour market rigidities and informality, potentially dampening immediate GDP gains if not managed effectively. One of the central concerns in Indian economic literature is whether AI-driven GDP growth will remain employment-elastic. Studies suggest that, AI-led growth may be less labour-intensive and Output can rise without proportional job creation. This raises the risk of jobless growth, particularly if productivity gains are not complemented by new labour-absorbing sectors. High-skill workers experience wage premiums due to increased productivity and low- and mid-skill workers face wage stagnation or decline

In India, where wage inequality is already significant, AI risks exacerbating income disparities unless inclusive growth mechanisms are implemented. India's large informal sector shapes how AI impacts employment, displaced formal workers often transition into informal or gig work and informal employment absorbs labour but offers lower productivity and job

security. Thus, while headline unemployment rates may not rise sharply, job quality deterioration becomes a key concern.

For India, balancing this trade-off is critical. Policies that promote AI augmentation rather than pure automation are viewed as essential to sustaining both GDP growth and employment. AI will reshape the labour market, with both displacement and new job generation. McKinsey-style studies predict displacement of routine roles but creation of service-management positions. Sector-specific projections suggest that jobs like customer service agents, data entry clerks, and technical support are highly exposed to automation. However, industry surveys indicate that AI could redeploy millions of workers into new digital roles by 2035.

### **Sectoral Effects IT and Services;**

India's IT sector is a prime beneficiary of AI adoption. Generative AI is catalysing productivity gains in software development, BPO services, and consulting. Conversely, legacy roles in IT services are being restructured, leading to layoffs and changing hiring patterns.

### **Agriculture:**

AI's applications in predictive analytics and precision farming can improve crop yields, resource allocation, and market forecasting. Workshops and field initiatives are beginning to integrate AI tools at grassroots levels. Why Agriculture Matters in the AI-Indian Economy Story. Agriculture is a cornerstone of India's socio-economic fabric. Nearly half of the population relies on farming. It is vital for food security, rural incomes, and reducing poverty. Yet the sector faces structural challenges: heavy reliance on monsoon, small fragmented landholdings, low mechanisation, supply chain inefficiencies, and climate risks. AI's entry into

agriculture aims to transform these long-standing constraints into opportunities.

### **Key AI Applications Transforming Indian Agriculture:**

#### **a. Precision Farming:**

AI leverages data — from satellite imagery, drones, sensors, and weather patterns — to advise farmers on optimal irrigation, fertiliser use, and crop choices. This reduces waste and enhances yields.

It impacts on Optimised use of water and inputs. Higher yields and lower production costs. Better soil nutrient management.

#### **b. Crop Health & Pest Management:**

AI systems detect crop diseases and pest infestations early using computer vision and machine learning. Predictive models forecast outbreaks, enabling preventative measures. It reduces crop losses and lower pesticide usage, promoting environmental sustainability. AI models forecast weather conditions, pest risk, and market demand using historical and real-time data. This helps farmers make informed decisions on sowing, harvesting, or selling produce. It reduces dependence on uncertain weather patterns. AI helps match farm produce to markets through data analytics and digital platforms, reducing wastage and improving price realisation for farmers.

#### **c. Healthcare and Education:**

AI-driven diagnostics, personalized treatment planning, and adaptive learning systems can address infrastructure limitations and quality disparities. AI enhances quality control, supply chain efficiency, and robotics automation, strengthening India's manufacturing competitiveness—but integration remains limited relative to advanced economies.

#### **d. Infrastructure and R&D Investment:**

Digital Infrastructure as a Foundation for AI-Led Growth. AI systems require substantial

computational power, cloud infrastructure, and high-quality data. Studies highlight that, Advanced AI adoption is concentrated in regions with access to high-performance computing (HPC), cloud services, and data centres. Countries with inadequate digital infrastructure face slower AI diffusion and limited productivity gains rural connectivity gaps constrain AI's transformative potential in agriculture and MSMEs

Thus, infrastructure deficits can limit AI's ability to enhance productivity in labour-intensive and rural sectors—where employment generation is most critical for India.

### **AI Infrastructure and Labour Market Outcomes:**

It increasingly links infrastructure availability with labour market resilience:

Regions with stronger digital infrastructure experience lower displacement effects and higher job creation. Workers in digitally connected regions have better access to online learning, remote work, and AI-complementary jobs. In India, inadequate infrastructure increases the risk that AI adoption. Concentrates economic gains among a small, urban, high-skilled workforce. Pushes displaced workers into informal employment rather than reskilled roles

Hence, infrastructure investment acts as a mediating variable between AI adoption and labour market disruption.

Economic literature consistently identifies R&D investment as a key determinant of technological leadership and long-term growth. In the AI context. It drives innovation, adaptation, and localization of AI technologies. Countries with higher AI R&D spending capture greater value from AI rather than merely importing technology. India's AI ecosystem is characterized by Strong private-sector innovation in IT services and startups and relatively modest public-sector

R&D spending compared to advanced economies. This imbalance raises concerns about India becoming a technology adopter rather than a technology creator, limiting domestic value addition.

#### **Academic and Institutional Research:**

Universities and public research institutions play a critical role in Fundamental AI research, Development of indigenous algorithms and Training future AI talent. R&D intensity influences not just innovation outcomes but also the quality of employment generated. It supports creation of high-skilled, knowledge-intensive jobs. Low R&D environments tend to generate fewer AI-complementary roles and more job displacement. Limited growth of frontier research positions such as AI scientists and system architects. Thus, R&D investment directly affects whether AI leads to job polarization or skill upgrading. Innovation Ecosystems and Spillover Effects the literature emphasizes that AI-driven growth depends on innovation ecosystems rather than isolated investments. Key components include, Startup ecosystems, Venture capital, Incubation centres etc.

#### **Open data platforms:**

In India, AI startups benefit from digital public infrastructure (e.g., identity and payments systems), but their scalability is constrained by limited access to advanced research infrastructure, Dependence on foreign AI models and platforms and without strong domestic R&D, spillover benefits to the wider economy and labour market remain limited.

#### **To harness AI's benefits sustainably, the following strategies are recommended:**

Strengthen AI Education and Skills and expand AI education across undergraduate and vocational programs; establish interdisciplinary

AI centres and scholarship initiatives. Promote Inclusive Digital Infrastructure and Invest in rural connectivity, affordable computing, and AI-ready platforms for small enterprises. Support R&D and Innovation Ecosystems. Increase public and private funding for AI research; incentivize industry-academia collaboration. Develop clear AI governance policies addressing data privacy, algorithmic fairness, intellectual property, and ethical applications.

#### **Conclusion:**

Artificial Intelligence stands as a pivotal economic force with transformative potential for India. It offers opportunities for enhanced productivity, innovation, and new job creation while also presenting formidable challenges such as labour displacement, skill deficits, and infrastructural bottlenecks. A forward-looking policy approach that integrates education, infrastructure, regulation, and inclusive growth strategies will enable India to leverage AI for sustainable economic development. As India transitions toward a knowledge-driven economy, AI's integration into national development strategies will be central to achieving sustained, inclusive growth. AI can increase India's economic competitiveness and resilience globally. It's potential to significantly boost productivity, expand employment possibilities, and drive development in India's GDP.

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