AI for Economic Growth in India

Bhushan Santosh Raut*, Sagar Vaijinath Sasane**, Prof. Nitin Yadav***

*(*MCA*, *Zeal Institute of Business Administration, Computer Application & Research*, *Pune*
Email: bhushanraut2307@gmail.com)

** (*MCA*, *Zeal Institute of Business Administration, Computer Application & Research*, *Pune*
Email: sasanesagar358@gmail.com)

***(*MCA*, *Zeal Institute of Business Administration, Computer Application & Research*, *Pune*
Email: nitin.yadav@zealeducation.com)

****

Abstract:

This paper explores how Artificial Intelligence (AI) helps Indian economic growth by focusing on productivity, innovation, and job changes across different regions. It uses a mixed-methods approach, combining data analysis from reports by NITI Aayog, McKinsey, PwC, and Accenture with interviews from 25 industry experts. It looks at how AI affects GDP growth, job creation, and industry competitiveness. The findings show that AI could add up to $1 trillion to Indian GDP by 2035 mainly by improving efficiencies, driving digital changes, and encouraging innovation in key sectors like manufacturing, healthcare, and farming. However, challenges include a lack of skilled workers, ethical concerns, and uneven use of AI. The recommendations include government support for AI education, building national AI infrastructure, and creating regulations to ensure balanced and sustainable growth.

Keywords — Artificial Intelligence, Economic Growth, India GDP, Productivity Improvement, Digital Transformation.

****

I. INTRODUCTION

Artificial Intelligence or AI refers to the ability of computers to mimic human thinking capabilities, such as learning, reasoning, and problem-solving. In the past couple of years, AI has evolved from a niche technological device to a big driver of economic expansion. As a developing economy like India with surging digital infrastructure and a large working-age population grows.

Artificial Intelligence applications are reshaping industries that range from agriculture (sophisticated crop analysis) to hospitals (computer-assisted diagnosis), financial sectors (detection of fraud, credit risk score), and manufacturing (process optimization).

The focus is to evaluate why and how the economic expansion of India can be sustained by AI, what are the Challenges, and what is needed in terms of strategic interventions to release its full potential.

II. OBJECTIVES

The objectives of the study are to comprehensively assess the contribution of Artificial Intelligence to India's GDP and overall productivity growth, examining how AI-driven technologies enhance efficiency and economic output; to analyse the sectoral applications of AI across key industries such as manufacturing, agriculture, healthcare, and finance, highlighting the ways in which automation, data analytics, and intelligent systems are transforming traditional processes; to identify the major challenges and barriers hindering large-scale AI adoption in India, including skill shortages, infrastructural gaps, and regulatory concerns; and finally, to propose well-informed strategies for policymakers and industry stakeholders aimed at fostering inclusive, sustainable, and equitable AI-driven growth that

benefits both urban and rural populations across the country.

III. RESEARCH METHODOLOGY

The research followed a mixed-method design that combined quantitative secondary data analysis with qualitative insights to ensure comprehensive results. Secondary data were collected from major reports, including Niti Aayog, PwC (2018), McKinsey global institute (2020), and Accenture (2023), while primary data were gathered through semi-structured interviews with 25 professionals such as data scientists, economists, and policymakers. The study population consisted of ai professionals and economists from key Indian technology hubs—Bengaluru, Hyderabad, and pune—with purposive sampling used to ensure representation from both public and private sectors. The instruments employed included quantitative tools such as GDP projections, ai adoption statistics, and productivity metrics, along with qualitative tools such as interviews that explored perceived benefits, challenges, and policy recommendations. For data analysis, quantitative methods involved examining correlations between ai investment and GDP growth using secondary datasets, while qualitative analysis relied on thematic examination to identify key patterns emerging from expert interviews.

IV. Review of Literature

According to PwC (2018), Artificial Intelligence could contribute $15.7 trillion to the global economy by 2030, with India alone potentially gaining $957 billion through enhanced productivity. NITI Aayog (2020) emphasized AI's transformative potential in key sectors such as agriculture, healthcare, and education under its "AI for All" initiative. McKinsey (2020) further identified automation and AI as major drivers of India's future economic growth and competitiveness. Accenture (2023) projected that AI could raise India's annual growth rate by 1.3 percentage points by 2035, while the World Economic Forum (2022) highlighted that India's increasing AI investments could accelerate digital inclusion and support job transformation. Gupta

and Bansal (2023) found that integrating AI into MSMEs significantly enhances productivity but also stressed the need for improved digital literacy and infrastructure. Overall, the literature indicates that AI has a multidimensional impact on India's economy—boosting innovation, productivity, and efficiency—while simultaneously posing challenges such as potential unemployment and concerns regarding data privacy.

V. Research Gap

There are not many studies that analyse in detail how Indian industries are utilizing AI and their economic effect so far. Moreover, not many studies integrate both qualitative and quantitative methods to assess the actual economic effects of utilizing AI in India.

VI. Data Collection & Sampling (Implementation details)

Data Collection: Secondary economic data (2018–2024) sourced from NITI Aayog, Statista, and World Bank databases.

Key Variables: GDP growth, AI adoption rate, productivity improvement, employment shifts, and policy effectiveness.

Sampling: Purposive, ensuring representation from technology, agriculture, manufacturing, and service sectors.

VII. DISCUSSION

Studies show that applying AI in India can greatly boost productivity and GDP growth, similar to global predictions by PwC and Accenture, with sectors like manufacturing and healthcare gaining the most from automation and data-driven insights. However, the paper highlights three major obstacles: a shortage of AI and data-science skills due to outdated education infrastructure, a significant digital infrastructure gap in rural and Tier-II regions, and weak ethical governance caused by the absence of a comprehensive AI policy—creating risks of data misuse and bias. Overall, the findings support the thesis that AI is a double-edged sword: it can drive rapid

economic expansion if adopted inclusively, but can also deepen inequality if access remains uneven.

VIII. RESULTS – KEY FINDINGS

The key findings of the study present a comprehensive overview of AI's growing impact on India's economy. AI adoption in India has risen significantly, increasing by 270% between 2018 and 2024 (NASSCOM, 2024). During this period, India's AI market size reached USD 7.8 billion in 2024 and is projected to grow at a 25% CAGR. The major sectors leading AI adoption include IT and services (34%), manufacturing (22%), healthcare (18%), finance (14%), and agriculture (12%). Correlation analysis shows a positive relationship between AI investment and GDP growth ($r = +0.42$, $p < 0.01$), as well as between AI skill availability and productivity index ($r = +0.37$, $p < 0.05$). AI automation also shows a mild but significant correlation with employment displacement ($r = +0.22$, $p < 0.05$), suggesting that job disruption remains manageable with appropriate upskilling efforts. Regression results indicate that AI investment ($\beta = +0.39$, $p < 0.01$) and digital infrastructure ($\beta = +0.28$, $p < 0.05$) are strong positive predictors of GDP growth, while the skill gap ($\beta = -0.25$, $p = 0.04$) acts as a negative predictor. Qualitative insights reveal that AI is driving economic transformation, particularly through enhanced efficiency in manufacturing and logistics. However, challenges persist, including a significant skill and education gap, with India lacking approximately 1.5 million skilled AI professionals (NASSCOM, 2024). Additionally, ethical and governance concerns remain prominent as AI regulations and data protection frameworks continue to be inconsistent.

IX. CONCLUSION

AI is on the cusp of being a transformative agent in the economy of India by improving productivity, promoting innovation, and facilitating efficient government. There is evidence that with a strategic investment in education in AI, policy structures, and public-private engagement, India can accomplish inclusive and sustainable growth.

The challenge is how to achieve a balance between augmenting human capabilities and automation.

X. RECOMMENDATION & FUTURE ENHANCEMENTS

The recommendations emphasize a comprehensive and forward-looking approach to AI adoption in India. First, the government should establish a National AI Council to supervise ethical implementation, ensure responsible governance, and align AI initiatives with the country's long-term economic strategy. Second, education reform is crucial, involving the integration of AI, data analytics, and digital ethics into school and university curricula so that future generations are equipped with the skills required for an AI-driven economy. Third, strong industry collaboration is needed, encouraging partnerships among startups, academic institutions, and large corporations to drive innovation, accelerate technology transfer, and support research commercialization. Additionally, targeted skill-development programs should be launched with a focus on rural youth and MSMEs, helping bridge the digital divide and enabling broader participation in the AI ecosystem. Finally, future research should include longitudinal studies that track the long-term impacts of AI on employment patterns, productivity shifts, and income distribution across various regions and sectors in India, providing valuable insights for policymakers and industry leaders.

XI. LIMITATIONS

Secondary data analysis limits the ability to directly determine causality because it relies on existing datasets that were not originally designed to measure the specific relationships being studied, reducing the precision of conclusions. Additionally, qualitative interviews, while insightful, may not capture the full diversity of regional and industrial perspectives across India, as participants' experiences can vary widely based on

local economic conditions, technological readiness, and organizational culture. Moreover, the long-term economic impact of AI remains inherently uncertain due to rapid technological advancements, shifting global trends, and evolving government policies, all of which can significantly influence how AI shapes productivity, employment, and overall economic growth in the future.

AKNOWLEDGEMENT

REFERENCES

[1] Accenture. (2023). *Rewire for Growth: Accelerating India's Economic Growth with AI.* https://www.accenture.com/in-en/insights/ai-growth-india

[2] McKinsey Global Institute. (2020). *The Future of Work in India: Harnessing AI and Automation.* https://www.mckinsey.com

[3] NITI Aayog. (2020). *National Strategy for Artificial Intelligence – AI for All.* https://www.niti.gov.in

[4] PwC. (2018). *The Macroeconomic Impact of Artificial Intelligence.* https://www.pwc.com

[5] World Economic Forum. (2022). *Unlocking India's Trillion-Dollar AI Opportunity.* https://www.weforum.org

[6] NASSCOM. (2024). *AI Adoption and Skill Gap in India: Annual Report 2024.* https://nasscom.in