Economic impacts of artificial intelligence in India

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Abstract.

The application of knowledge and technology has proved to be a new horizon in economics also. The current economy is technology based economy. In today's globalized and digitalized economy, there has been a progressive advancement in artificial intelligence. From the perspective of economics, artificial intelligence is cost efficient as along with decreasing the cost it increases the efficiency as well. It has opened the doors with ample opportunities for trade both at national and international level. This paper is an attempt to identify the focus areas of artificial intelligence and explores the economic impacts of artificial intelligence in India and also discuss about the Policy initiatives to support the AI segment in India.

Keywords.artificial intelligence, economy, economic impact, knowledge and technology, AI segment

1. INTRODUCTION

In the recent years, there has been an increasing trend towards the knowledge based technology that is the result of innovation. Artificial Intelligence deals with the innovations that act like human being [1]. In today's life artificial intelligence is all around us. It has become a part of our daily life.

AI has its roots in many disciplines including Math, Psychology, Biology, Logics. Although the field of logic and math, philosophy and psychology are interrelated.

The impacts of artificial intelligence [2] can be seen in all economic sectors. The integration of economies during the process of globalization has promoted international trade. The use of artificial intelligence in all the economic sectors have shown tremendous

growth in terms of international trade. India is 6th largest economy in the world. According to the report published by [3] World Bank, India's trade as a percentage of GDP in 2020 will be 37.87%. Being the largest exporter of technology-based services, the service sector has contributed higher to its economic growth. Artificial intelligence has transformative impact on international trade. It has encouraged the skill based employment along with significant investments to make the economies more developed, enhancing the productivity by accelerating the international trade [4].

2. MAJOR FOCUS AREAS OF ARTIFICIAL INTELLIGENCE

All the leading technological based industries are using artificial intelligence to expand their size in market. There are exciting potentials of economic boost due to reshaping of the industries with artificial intelligence. Even during the recent COVID-19 pandemic, the economies throughout the world were blessed [5] for not facing the stationary state just because of artificial intelligence. According to the report of Artificial Intelligence Index 2021, produced by Human-Centered Artificial Intelligence [6] of Stanford University, there was a tremendous growth of conferences based on artificial intelligence as the conferences held on virtual mode and the participation number was overwhelming. As per this report the private artificial intelligence investment has shown [7] significant increase in drug design and discovery (i.e. USD 13.8 billion).

2.1. Sub-fields of Artificial Intelligence

The sub field of artificial intelligence include Robotics, techniques using time series analysis for predictions, algorithms, expert support systems, Natural Language Processing, Planning, Machine learning, Vision, speech recognition, brain modelling, vision space learning, image based, gaming techniques and many more [8].

2.1.1 Focus areas of AI in India:

According to a published report on Discussion paper on the National [9] Artificial Intelligence Strategy (AI for All) by Niti Ayog, the focus areas of AI in India are:

• Health care

• Agriculture

• Education

• Smart Cities and Infrastructure

• Smart mobility and Transportation

3. ARTIFICIAL INTELLIGENCE AND ECONOMICS

All Artificial Intelligence driven technology is fundamentally based on innovations [10] that have economic incentives too. Like natural Science, economics is not a pure science because the theories and models are based on assumptions. Economic forecasting has many challenges.

In economics, there are many challenges in business forecasting as it is all based on assumptions and also in the absence of evidence based data, the forecasting is not authentic. AI uses algorithms to predict, so this issue of business forecasting can be [11] better sorted out. For Business purpose, data require predictions based on human behaviour and first information is based on qualitative analysis, thereby implementing AI techniques in behavioural economics can be better judged to find out human perceptions. The use of statistical data will be more authenticated as well. Government authorities may use this data to frame better policies by a proper analysis that is based on evidences and correct predictions in behavioural economics. The economic downturn can be better predicted by the use of algorithms that can track recession, predict business cycles, predict the changes in consumer behaviour and many more. This may be helpful to frame [12] Monetary and Fiscal Policies accordingly. The emergence of AI in economics will be helpful for the government to formulate and analyse the policies and these policies will be evidence based economic policies and with the involvement of AI, economics will come closer to natural science.

4.   ARTIFICIAL INTELLIGENCE'S ECONOMIC IMPACT IN INDIA

As per the Report of 'The India Express', around 20 million jobs are to be added by 2025 around artificial intelligence. Due to recent innovations in the technology based industries all the spheres of mankind will be touched and explored by AI. There are many spheres like mental health, agriculture, planning of smart cities, disaster management, counselling on education and health, planning about traffic system, AI will develop all. Government of India had set a target to achieve 20 million jobs by 2025.

The major impacts of Artificial Intelligence on economy can be seen from the Artificial Index Report 2021, where it was reported that the highest private AI investment has been found to be of more than USD 13.8 billion in the areas of Drugs, Cancer, Molecular, Drug Discovery.

It was also reported that during recent pandemic, the AI [13] hiring have shown the remarkable growth in the countries like Brazil, India and Singapore.

•   The major industries to get benefits from AI are: Information and Communication Technology, Professional, Scientific and tech services, Manufacturing, hunting, Public Administration, Education, Banking and Finance, Mining.

•   As per the LinkedIn data published in AI Index Report, 2020 India is second in terms of highest growth in AI hiring (Fig. 1) and second in terms of AI skill penetration (Fig. 2).

The use of artificial intelligence will be significant in analysing the GDP over the years. As the predictions of macroeconomic variables may be useful to know the causes behind the slow or fast growth rate of the economy or the GDP as a percentage and it will also enable the economies to make a reliable and unbiased comparisons in the economies. The application of macroeconomic theories can be better applied if based on predictions made by artificial intelligence. The relationship among economic variables can be useful for policy makers and the errors in forecasting macroeconomics and other areas may be minimised. More technologies like IoT, cloud [14-16] will work for the development for the development of india
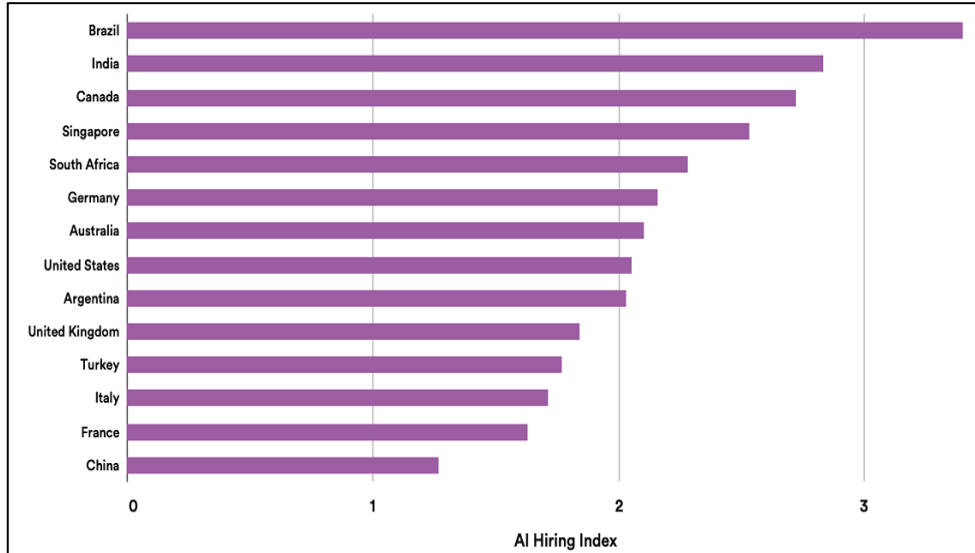
Fig. 1: Country wise AI employment index, 2020
Source: LinkedIn, 2020 | Chart: 2021 AI Index Report
(Retrieved from-https://datascience.fm/2021-ai-index-report-newsletter/)
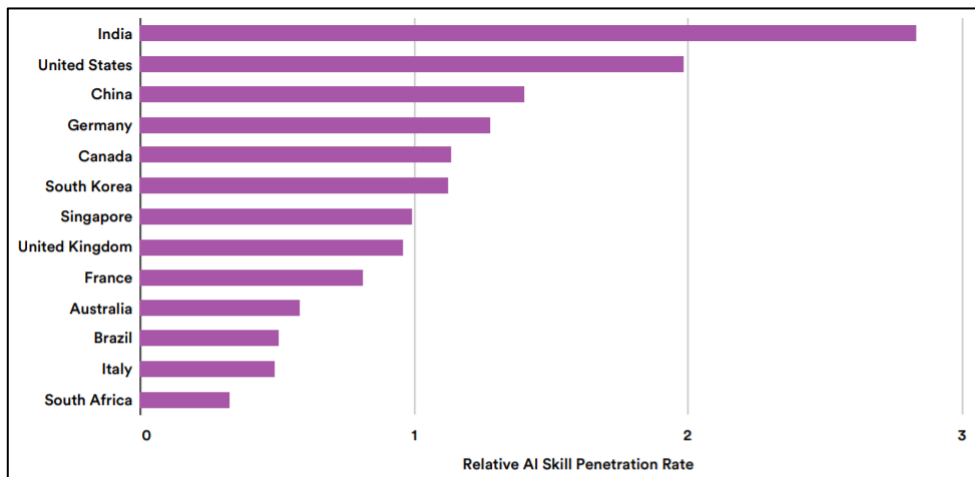

Fig. 2: Relative AI Skill Penetration Rate by Country, 2015-20

Source: LinkedIn, 2020 | Chart: 2021 AI Index Report
(Retrieved from-https://digiscorp.com/blog/industries-technologies/state-of-artificial-
intelligence-in-europe- statistics-2021/)

INDIAai is the pivot for all small details AI in India and even beyond. It is a collaboration between MeitY, NeGD, and NASSCOM. According to a report by NASSCOM and INDIAai, In India, AI patents account 6% of all developing technology patents. Some of the key trends in AI patent filing in India are:

• From 2015-20, appx. 92% patents are from AI

• MNCs have contributed appx 60% of patents that have been granted

• It was also reported that India has shown a growth in patents (about 64% newly originated)

• Personal health care and Consumer Electronics have shown remarkable progress in patents.

• The report explored that major sector that is leading in patents belong to IT sector. The development of AI has macroeconomic impacts. With increased AI investments the skill based service sector is the emerging sector and it is transforming the economy towards services economies. AI based industries have opened the doors for small businesses to enter in to trade at international level via digital platforms.

5.   POLICY INITIATIVES TO SUPPORT THE AI SEGMENT IN INDIA

According to Government of India Report, to share the ideas and experiences, US and India have launched, US-India Artificial Intelligence initiative on March 18, 2021 and to have application based research, on the same day it was also announced to create Centres of Excellence at national level for Transformation AI.

To encourage and motivate students and make them compatible with AI, Government of India has adopted the incorporation of AI in the new National Education Policy (NEP) 2020 and National Research Foundation has been constituted for the same. To encourage research and development there is a strong need to bring together academia and industry. To incorporate AI in the syllabus, Secondary level education has been opted for the same. To promote AI, the Indian government increased the Expenditure to $477 million. Although AI has some challenges also that includes, ethical issues, environmental issues, misuse of social media, cyber security, data privacy is another significant issue, but we can't deny the fact that the next age is of AI.

In India, AI can play a significant role in Social Development with inclusive growth. Inclusive growth will provide a quality life to the individuals and also improve the productivity of factors thus enhance the industrial growth as well. Artificial intelligence in education will create interest among students to come forward with new ideas to make innovations and self-reliance. Although the potential of artificial intelligence in the Indian economy is very high but along with opportunities it has many challenges as well. Lack of ethical policy norms, financial support, Strong Research and Development, technology transfer and many such. But this can be made possible by the government support to the private sectors. The framework of opportunities should not be limited to only a limited institutes or sectors rather it should be openly accessible to all.

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