Progress of Artificial Intelligence - Whether it is Boon or Bane for India?

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Abstract: India is not far behind in coping with the challenges of digital transformation that is going in an unprecedented way throughout the world. This article mainly highlights the present status of India in terms of harnessing the power of Artificial Intelligence (AI) in different sectors of the economy. This article not only highlights the evolution of AI in India but also various types of AI and its uses in varied fields are vividly discussed. Lastly through various literature survey and secondary sources of information it has been established that for India AI can be a boon and not bane if India is prepared to accept the challenges and harness the power AI for the greatest advantages through training & upskilling of its workforce. By ensuring that individuals are prepared for the digital economy and to know how to cope with the challenges of AI, Indian work force can facilitate a smoother transition and reduce the risk of job loss.

Keywords: Digital Transformation, Artificial Intelligence, Upskilling

1. Introduction

Today digital transformation is going in an unprecedented rate throughout the world and India is also not far behind in the application of AI in various fields. But the question is whether AI will be a boon or bane for Indian organization need more vivid introspection and analysis. In this study an attempt has been made to find out briefly the benefit of adapting AI driven processes in various organization which can transform Indian corporate sector into a new height. This study is based purely on secondary sources and information collected from various articles and literature in the concerned area as well as summarize the advantages and disadvantages in using AI for the Indian Corporate Sector in the long run.

2. Objective of the Study

To find out the present status of Indian corporate sector in terms of development of AI and its application and to justify the impact of AI in the Indian job market.

3. Literature Review

Petkar (2024) explained the application of AI into India's corporate governance and compliance frameworks which would make the processes more efficient and innovative as well as ensure adherence to regulatory regimes. AI could help organizations automate tasks, boost decision - making, and match up with compliance requirements. Naythani (2023) examines the transformative role of Artificial Intelligence (AI) in redefining performance appraisals which is a critical component of Human Resources (HR) in the digital landscape. With the integration of AI, performance metrics have evolved from standardized measures to dynamic, personalized indicators that offer real - time feedback and foster unbiased assessments. Through the help of of AI driven analytics, the paper discusses the creation of tailored development plans and predictive management strategies that align with individual career paths and organizational goals. Malik et. al. (2021) attempts to develop a practical understanding of the positive and negative employee experiences due to adoption of artificial intelligence (AI) and the creation of technostress. It explores the human resource development - related challenges with the onset of Industry 4.0. The findings establish prominent adverse impacts of the adoption of AI, namely, information security, data privacy, drastic changes resulting from digital transformations and job risk and insecurity brewing in the employee psyche. This is followed by a hierarchy of factors comprising the positive impacts, namely, work - related flexibility and autonomy, creativity and innovation and overall enhancement in job performance. Further factors contributing to technostress (among employees): work overload, job insecurity and complexity were identified. NITI Aayog (2018, June) recognizes AI's potential to transform economies and the need for India to strategies its approach, Hon'ble Finance Minister, in his budget speech for 2018 - 2019, mandated NITI Aayog to establish the National Program on AI, with a view to guiding the research and development in new and emerging technologies. Accordingly, NITI Aayog has adopted a three - pronged approach - undertaking exploratory proof - of - concept AI projects in various areas, crafting a national strategy for building a vibrant AI ecosystem in India and collaborating with various experts and stakeholders. NITI Aayog has partnered with several leading AI technology players to implement AI projects in critical areas such as agriculture and health.

4. Definition, Types of AI:

Artificial Intelligence (AI) refers to the development of computer systems for performing activities and tasks that require human intelligence. AI helps in processing amounts of data identifying patterns and making decisions based on the collected information. This can be achieved through various techniques like **Machine Learning**, **Natural Language Processing, Computer Vision and Robotics.** The ultimate objectives AI is to create machines that can enhance capabilities and carry out diverse tasks, with great precision. The field of AI holds such a potential that it can revolutionize every sphere of our daily lives. Today everybody has to deal with enormous number of data and information every day, to

make correct decision choices. But interpretating and assimilating the selective data from this huge database is really difficult for any corporate managers. Sometimes in business to make complex and precision decision making requires higher cognitive skills which may not always be possible through human brain specially when a corporate manager is burdened with work overload. But through AI machines are made to think like humans who can work with high accuracy to perform the task. Data are fed into the machines which may be real life data and machines behave like human by observing and learning the signals from the human beings which is a subset of AI called **Machine Learning**. Sometimes human beings find repetitive tasks highly boring and lack accuracy. But machines are highly accurate to take risks than human beings.

The scope of AI can be three types. These are Narrow or Weak AI, General AI and Super Intelligent AI. Narrow AI is used for narrow range of task to be performed which are very specific. Characteristics of Narrow AI include specialised capabilities, limited scope and work on predefined algorithm or data input without understanding the purpose or context of the job. As for example virtual personal assistant like Siri, Alexa, Chatbots, Autonomous vehicles etc. But General AI has much deeper and enormous efficiency and a difference between a machine and human being is almost same in terms of cognitive abilities, adaptability & consciousness. This kind of General AI we observe in movies through robots. Thus, General AI aims to simulate human intelligence much effectively including reasoning, problem solving, learning and adaptation to new situations. Today more research is going on in the area of General AI as still yet 100% human level intelligence has not been achieved.

Super intelligent AI refers to artificial intelligence systems that much superior than human intelligence in virtually every aspect. This type of AI, also known as **Artificial Superintelligence** (ASI), representing the highest level of AI capabilities and may be a tool for significant development in society for the future. ASI has more cognitive superiority, rapid learning & adaptation, as well as ethical and existential risks. Super intelligent AI thus still remains a theoretical concept and no concrete examples exist as of now. However, researchers are actively exploring the development of ASI. Again, based on the functionalities, AI can be the following types:

a) Reactive machines: These are the most basic type of AI and are purely reactive as the only rely on the inputs from environment without relying on the internal storage or memory. An example would be *IBM's Deep Blue chess - playing supercomputer*. Deep Blue beat the international grandmaster Garry Kasparov in 1997. It can choose the most optimal of the chess moves and beat the opponent. Gaming AI, Traffic Management System, smart home devices, health monitoring devices are some of the examples of reactive machines.

b) Limited memory:

Limited Memory AI refers to algorithms or systems that consider historical data to inform ongoing operations, enabling better predictions and decisions. This is in contrasts with reactive machines, which have no memory or data storage capabilities and are limited to current experiences. For example, when we are typing on our phone, the predictive text feature isn't just guessing what we are texting but what we are going to type next. Instead, it's using Limited Memory AI to recall the words and phrases we have used before to suggest the most likely next word. This type of AI is used in many of the technologies we interact with daily. Self - driving cars, for instance, rely heavily on Limited Memory AI. They use data from past drives to understand and predict traffic patterns, recognize obstacles, and make driving decisions in real time.

c) Theory of mind:

This is currently the third level of AI and understands the needs of other intelligent entities - machines aim to have the capability to understand and remember other entities' emotions and needs and adjust their behaviour based on these. This capability is like humans in social interaction. These are types of machines that can understand that people have beliefs, emotions, empathy & expectations, etc. A **"theory of mind"** machine can think emotionally and can respond with emotions. Even though there are close examples of this kind of AI like Sophia, the research is not completed as yet.

d) Self - Awareness:

At this point, machines will have the same human - level consciousness and intelligence and are human equivalents. Of course, no such machines exist still now and the invention of them would be a milestone in the field of AI. This is the last level of AI, where machines have human - like intelligence and self - awareness.

5. Evolution & Uses of AI in India

Artificial Intelligence (AI) is rapidly expanding worldwide, and India is no exception to this technological transformation. The journey of AI in India can be traced back to the late 20th century when research and development in the field were in their nascent stages. Indian Institutes of Technology (IITs) played a pivotal role in nurturing talent and fostering AI research. However, it was only in the 21st century that AI began to gain significant traction in the country. The growth of AI in India is particularly important in the area of startups, institutions, academic government initiatives, and multinational corporations. Apollo Hospitals has partnered with India Medtronic to use AI - powered stroke treatment that will reduce diagnosis time from 60 min to 2 min. NIRAMAI Health Analytics has developed a novel breast cancer screening solution, the core technology of which is an artificial intelligence led diagnostic platform that uses patented thermal image processing and machine learning algorithms for reliable and accurate tumour detection. Wadhwani group is developing AI which is a innovative triaging tool that will combine an analysis of solicited cough sounds as an objective measurement along with self - reported symptoms to identify the probable COVID - 19 cases. Telangana Government has adopted Microsoft Intelligent Network for Eyecare (MINE) to address the high number of blindness and vision impairment cases occurred in children due to a lack of trained and skilled ophthalmologists. Aravind Hospital partnered with Google in 2013 to develop an algorithm that would help in the early detection of diabetic retinopathy.

Institutes like IITs, Indian Statistical Institute (ISI), and the Indian Institute of Science (IISc) have been at the forefront of AI research, collaborating with international counterparts and publishing groundbreaking research. The National Institution for Transforming India (NITI Aayog) released the National AI Strategy, outlining the government's vision for AI development in the country. Moreover, programs like the Digital India campaign and Startup India have indirectly contributed to the AI ecosystem's growth. Global technological giants like Google, Microsoft, and IBM have established a significant presence in India, setting up AI research centres and collaborating with Indian companies and institutions. These collaborations will not only lay the foundation of AI research but also will create employment opportunities for AI professionals in India. Let us briefly look into the areas where AI can be used in Indian Industrial sector:

- a) **Healthcare:** AI in healthcare can help address issues particularly in rural India where there are lot of obstacles to access to healthcare facilities due to poor connectivity and limited supply of healthcare professionals. AI driven diagnostics, personalised treatment, early identification of potential pandemics, and imaging diagnostics can help the development of health care facilities in remote rural areas.
- b) Agriculture: As per NITI Ayog there is a global need to produce 50% more food and cater to an additional 2 billion people by 2050 as compared to today. AI holds the promise of driving a food revolution and meeting the increased demand for food. It also has the potential to address challenges such as inadequate demand prediction, lack of assured irrigation, and overuse / misuse of pesticides and fertilisers.
- c) Smart Mobility, including Transports and Logistics: Potential use of AI include autonomous fleets for ride sharing, semi - autonomous features such as driver assist, and predictive engine monitoring and maintenance. Other areas that AI can impact include autonomous trucking and delivery, and improved traffic management.
- d) **Retail:** The retail sector is one of the first sector to use AI solutions, with applications such as improving user experience by providing personalised suggestions, preference - based browsing and image - based product search. Other use cases include customer demand anticipation, improved inventory management, and efficient delivery management.
- e) **Manufacturing:** Manufacturing industry is expected to be one of the biggest beneficiaries of AI based solutions by adapting flexible and adaptable technical systems to automate processes and machinery to respond to unfamiliar or unexpected situations by making smart decisions. Impact areas include engineering (AI for R&D efforts), supply chain management (demand forecasting), production (AI can achieve cost reduction and increase efficiency), maintenance (predictive maintenance and increased asset utilisation), quality assurance (e. g. vision systems with machine learning algorithms to identify defects and deviations in product features), and in - plant logistics and warehousing.
- f) Energy: Energy sector include energy system modelling and forecasting to decrease unpredictability and increase efficiency in power balancing and usage. In renewable energy systems, AI can enable storage of energy through

intelligent grids enabled by smart meters, and also improve the reliability and affordability of photovoltaic energy. Similar to the manufacturing sector, AI may also be deployed for predictive maintenance of grid infrastructure.

- g) **Smart Cities:** Integration of AI in newly developed smart cities and infrastructure could also help meet the demands of a rapidly urbanising population and providing them with enhanced quality of life like more development in the traffic control system to reduce congestion and enhanced security through improved crowd management.
- h) Education and Skilling: In academics AI include augmenting and enhancing the learning experience through personalised learning, automating and expediting administrative tasks, and predicting the need for student intervention to reduce dropouts or recommend vocational training.

Banking and Financial Services sector has been one of the leading sectors globally when it comes to AI adoption, and India has also seen a steep increase in AI based implementation in recent times. Existing and potential use of Artificial Intelligence in this sector include improved customer interaction through personalised engagement, virtual customer assistance, and chatbots; improved processes through deployment of intelligent automation in rule based back - office operations; development of credit scores through analysis of bank history or social media data; and fraud analytics for proactive monitoring and prevention of various instances of fraud, money laundering, malpractice, and the prediction of potential risks. AI in this sector has also been employed in wealth management. Similarly, manufacturing sector, primarily automotive and assembly, has been one of the first sectors to implement advanced robotics at scale. The manufacturing sector in India hasn't been far behind, as reflected in a recent study by BCG, where India was ranked 3rd in the world in AI implementation in manufacturing, ahead of nations such as Germany, with 19% of companies in the sector already using AI to a significant extent. These trends have also been reflected in the nature of investment in research in India, with private sector initiatives such as the Robert Bosch Centre for Data Science and Artificial Intelligence (RBC - DSAI), choosing to focus their efforts in applied research on sectors such as manufacturing analytics and financial analytics.

In India however Healthcare and Education have quite a lot of ground to cover as far as AI adoption is concerned. Healthcare, despite being one of the hottest areas of AI startup investments, is risky especially in the Indian context. Another analysis by McKinsey Global Institute indicates that potential value of AI for agriculture was not showing that much improvement in India and could be a possible explanation for diminished private sector led AI adoption in agriculture. In sectors such as these, externalities from adoption of AI far exceeded the economic returns realised by private initiatives, and hence the role of government is very important in future for ensuring large scale AI intervention in agriculture.

NITI Aayog has evaluated various sectors that will be impacted by AI and has taken a conscious decision to focus on a select set of sectors where only private sector led

initiatives will not lead to achieving desired societal outcomes. In addition to Healthcare and Agriculture, focus sectors include Education, Smart Cities and Infrastructure and Smart Mobility and Transportation (solving for challenges congestion, pollution, high rates of road accidents leading to economic inefficiency and enormous human cost).

6. Challenges for Adoption of AI driven technologies - Impact on Indian Job market:

India with its developing population and growing technology is also facing the challenge of Artificial Intelligence (AI) integration and its impact on job creation. As industries adopt AI technologies like machine learning and robotics to boost efficiency, concerns arise about employment. While AI can create new roles and transform existing ones, there are fears of job loss and redundancy. An IMF analysis reveals that nearly 40% of global employment is exposed to AI. In advanced economies, around 60% of jobs could be affected, with half benefiting from AI integration and the other half facing reduced labour demand, potentially leading to job losses and lower wages. Again, emerging markets and low income countries have lower AI exposure rates of 40% and 26%, respectively, suggesting fewer immediate disruptions. However, these nations often lack the infrastructure and skilled workforce to harness AI's benefits, which could worsen global inequality over time. Overall, AI can be both boon and bane for the future workforce in India and abroad.

Recent reports from Goldman Sachs indicate that AI could threaten up to 300 million jobs globally, with two - thirds of roles in the US and Europe at risk. In the UK, a survey of 22, 000 job types suggests AI could impact around eight million jobs, with 11% of tasks already exposed to automation. White - collar workers earning around USD 80, 000 are particularly vulnerable, as highlighted by a University of Pennsylvania report. Roles in customer service, accounting, sales, research, and retail face significant disruptions and job loss. The McKinsey Global Institute predicts that by 2023, 14% of employees may need to change careers due to AI advancements and both employees and employers in the job market must adapt to these changes, focusing on reskilling and embracing new opportunities in an increasingly automated world.

So far, the IT sector in India has been a major employer, providing over 5.4 million jobs and creating numerous opportunities for fresh engineering graduates. However, the rise of AI poses challenges to this landscape. As companies work to become "AI - ready" through employee reskilling, technologists warn of a potential white - collar recession in India by 2027. AI will also affect blue - collar jobs in India, impacting about 300 million workers in sectors like manufacturing and healthcare. While advanced robotics may automate some tasks, mass job losses are unlikely, as AI is expected to enhance productivity rather than replace workers entirely.

Again, some of the sectors that AI will be reshaping in India are services, healthcare, industry and finance. The **Economic Survey 2023 - 24** highlights the varying impacts of AI across different sectors of the economy. The manufacturing sector is relatively less affected by AI, as industrial robots lack the

flexibility and cost - effectiveness of human labour while automation is needed but it does not significantly displaced workers.

The service sector is witnessing substantial AI adoption, particularly in customer service through the use of chatbots and virtual assistants. AI - powered chatbots such as Amazon India's Alexa - powered voice assistant are revolutionizing customer support by providing instant responses and personalized interactions enabling customers to shop, track orders, and get product recommendations through voice commands. This not only improves customer experiences and satisfaction but also streamlines operations and optimizes resource allocation, allowing businesses to operate more efficiently. As mentioned earlier the Indian healthcare industry, AI is making significant strides. AI - driven diagnostic tools, medical imaging analysis, and predictive analytics are enhancing the accuracy and efficiency of healthcare services. Moreover, AI - powered telemedicine platforms are improving access to healthcare in rural and remote areas, addressing the challenge of healthcare delivery in a vast and diverse country like India. By leveraging AI, the healthcare sector can provide timely and effective services, ultimately benefiting patients and practitioners alike. An Indian government - developed app Aarogya Setu using AI that provided COVID - 19 information. The financial sector is rapidly embracing AI technologies such as HDFC Bank's Eva AI powered - chatbot, for various applications, including fraud detection, risk assessment, credit underwriting, and personalized financial services. AI algorithms can analyse vast amounts of data in real - time, enabling financial institutions to make informed decisions quickly and efficiently. The Economic Survey 2024 - 25 presents AI as a double - edged sword—a challenge and an opportunity.

7. Recommendation

A crucial step in coping with the challenges of job displacement is investing in education and training initiatives focused on upskilling and reskilling the workforce. Both Government and industry have to collaborate to develop programs that equip workers with the necessary skills in emerging technologies, including AI. By ensuring that individuals are prepared for the digital economy, we can facilitate a smoother transition and reduce the risk of job loss. Skill India Mission, launched in 2015 aims to equip workers with the skills necessary for the evolving job market. One of its flagship programs, the Pradhan Mantri Kaushal Vikas Yojana (PMKVY), offers training in crucial areas such as AI, machine learning, robotics, and data analytics. By focusing on these emerging technologies, the mission seeks to enhance the employability of the Indian workforce. Digital India Mission focuses on digital literacy and promoting technology adoption across sectors. A strong social security framework in both informal and formal sector in terms of unemployment support, health insurance and pension can be safety net for them in case of dynamic and evolving job market.

Public - private partnerships can further stimulate growth in sectors like healthcare, agriculture, and manufacturing. Promoting inclusive growth is crucial. Targeted policies must bridge the urban - rural divide, ensuring that the benefits of

automation reach rural areas and focusing on sectors such as agriculture and Micro, Small, and Medium Enterprises (MSMEs), which employ a significant portion of the workforce. Creating new job opportunities by encouraging entrepreneurship and innovation and giving support in terms of mentorship and funding for aspiring entrepreneur can lead to innovative solutions and flexible business model that adapt to changing landscape. The **Atal Innovation Mission (AIM)** is a key initiative promoted by Central Government for innovation and entrepreneurship in AI and automation. It has set up Atal Tinkering Labs in schools to inspire creativity and problem - solving among students, along with Atal Incubation Centres to support AI - driven start - ups. In 2018, **NITI Aayog launched the National Strategy for Artificial Intelligence**, focusing on using AI for inclusive growth.

While National Education Policy 2020 suggests greater use of technologies such as AI, it must be aligned with the demand of the job market. Considering the risk of job loss across industries, the government must embark on a life - long learning platform. Initiatives such as "Future - Skills PRIME" cover emerging technologies, including AI, which must be strengthened. YUVAI (Youth for Unnati and Vikas with AI), an initiative for familiarizing school students from classes 8–12 with AI technologies launched by Government of India should be expanded.

8. Conclusion

The next few years will be critical for AI in India. The focus should be on creating a balanced ecosystem where innovation can thrive, but ethical considerations are also addressed. Public - private partnerships will play a vital role in this journey. The government's continued support and investment in AI will be crucial for sustaining momentum. India's future with AI looks promising. The country has the talent and the ambition to become a global leader in AI. With the right policies, investments, and partnerships, AI can drive economic growth, create new job opportunities, and solve pressing social challenges. The goal should be to build an AI - powered future that benefits everyone. The journey won't be easy. But with a clear strategy and collaborative efforts, India can harness AI's full potential by 2025 and beyond. One big question that often haunt us is what will be the impact of AI on job market & employment? People are still hesitant around adopting AI with a fear of an all - new exquisite infrastructure, and people fear it to be eating up the jobs that we humans had been doing. According to The India Express, around 20 million jobs are to be added by 2025 around artificial intelligence. These numbers are due to the promising response and latest innovations in technology in every imaginable field. From disease detection, mental health counselling, weather forecasting, crop predictions, studies, designing, urban city planning, sewage systems, traffic planning, disaster management, and fashion and space research, AI has touched almost all areas. According to World Economic Forum, AI will create specific job roles in the coming decades, such as AI and Machine Learning Specialists, Data Scientists, Information and Security Analysts, IOT Specialists, Big Data Specialists. There are various training programs and initiatives by governments to skill and prepare people for upcoming job roles around AI. Few jobs that might become redundant in the coming times are Administrative and Executive Secretaries, General and Operations Managers, Assembly and Factory Workers, Accounting, Bookkeeping, and Payroll Clerks, and Data Entry Clerks. According to NASSCOM, the domestic IT sector employs around 16 million, of which around 9 million are employed in low - skilled services and BPO roles. While NASSCOM estimates that 1.5 - 1.6 million people are employed in low - skilled or BPO jobs, independent research by Bank of America states that there will be a 30% reduction in low - skilled jobs globally due to Robotic Process Automation (RPA) by 2022. While such numbers may vary in due course of time, automation will definitely have some impact on jobs. These numbers make it evident that AI is going to create more job opportunities than it will erase. AI skilling and training is the need of the hour, as this technology will increase efficient working and use human expertise only for specialized tasks and for supervising the usage of AI enabled technologies for the greater good. Human supervision is required to make this technology be used responsibly and ethically is our prime agenda today.

Lastly Microsoft Founder Bill Gates very recently pointed out that though AI will continue to reshape the job market but no profession is completely immune towards technological disruption like AI. From the age of industrial revolution to the rise of internet – we have seen jobs are transformed instead of eliminating them from the system outright. While profession like coding, energy management & biology may have some kind of job security today but others jobs need upskilling or transforming into roles that complement AI.

While AI has made strides in generating code and automating programming tasks, it still lacks the logical reasoning, precision, and problem - solving abilities needed to develop complex software. Gates believes human programmers will remain essential for debugging, refining, and improving AI systems where tools like ChatGPT, Copilot, and Alpha Code assist in coding but require human oversight to ensure accuracy, optimize performance, and address unforeseen challenges. Additionally, AI - driven coding assistants rely on existing datasets, meaning they cannot independently innovate or create entirely new programming paradigms. Though AI may take a greater role in the work force but the demand for human expertise in creative thinking, ethical decision making and problem solving will always be vital at every point of time. So, AI can be boon for India rather than bane when India is prepared to accept the challenges and harness the power AI for the greatest advantages through training & upskilling of its workforce.

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