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THE IMPACT OF ARTIFICIAL INTELLIGENCE ON THE EMERGING MARKET

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Abstract:

The rapid evolution of artificial intelligence (AI) has ushered in a transformative era across various industries, with its profound impact extending to the emerging market. This abstract explores the multifaceted implications of AI on the dynamics, growth, and sustainability of emerging markets. As AI technologies continue to advance, they offer unprecedented opportunities and challenges for these economies. On the positive side, AI has the potential to enhance efficiency, productivity, and innovation in emerging markets. Automation, driven by AI, can streamline processes, reduce costs, and catalyze economic growth. Moreover, AI-driven insights can empower businesses in these markets to make informed decisions, optimize resource allocation, and create new value propositions. The integration of AI technologies may also foster the development of cutting-edge industries and contribute to the overall modernization of emerging economies. However, the transformative power of AI in emerging markets is not without its challenges. Concerns about job displacement, ethical considerations, and the digital divide must be addressed to ensure inclusive and sustainable growth. Additionally, there is a need for regulatory frameworks that strike a balance between fostering innovation and safeguarding against potential risks. The impact of artificial intelligence on emerging markets is complex, offering both opportunities and challenges. A strategic and balanced approach is essential to harness the full potential of AI for the benefit of these economies while addressing the associated socio-economic implications. This abstract sets the stage for a comprehensive exploration of the interplay between AI and emerging markets, delving into specific sectors, policy considerations, and the long-term implications of this transformative force.

Key- Index: Artificial Intelligence, Emerging Markets, Benefits, Long-term implications, Innovatin

Introduction:

Stanley Kubrick depicted a dystopian future in 1968, when humanity have developed a space society that orbits Earth and explores the vastness of space. In this scenario, a state-of-the-art computer named HAL operated a space station and interacted with the crew. While we haven't reached the degree of intelligence shown by HAL in 2001: A Space Odyssey, significant progress has been made in the field of Artificial Intelligence (AI) due to the combination of increased computational capabilities and advancements in mathematical optimisation.

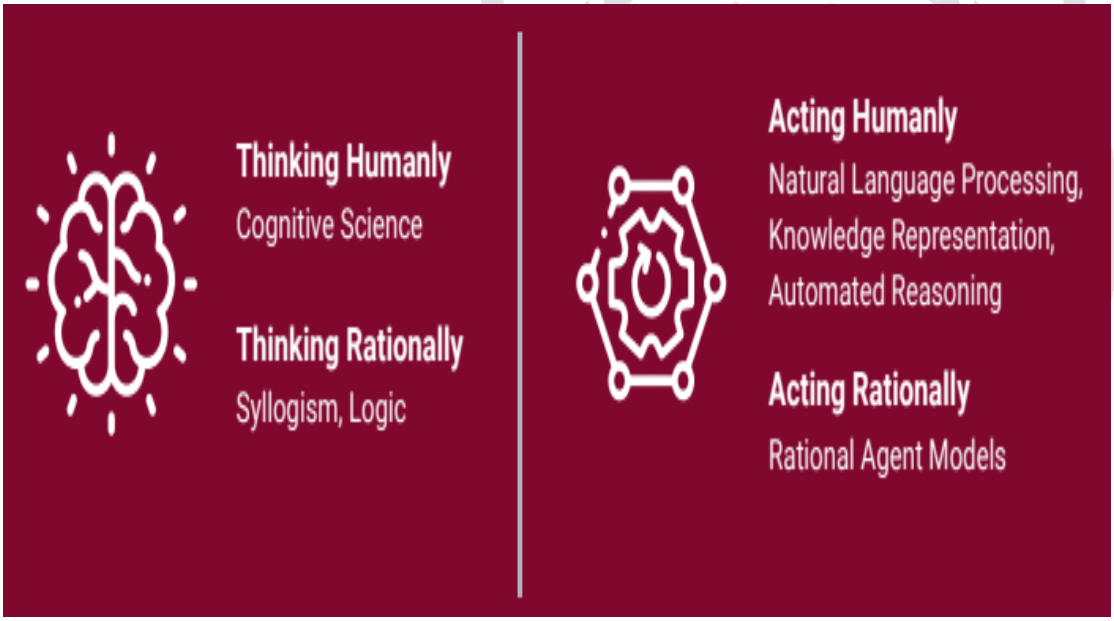
Governments worldwide have acknowledged this progress and are focusing on strategies to accelerate it for the benefit of everyone, both economically and socially. The national policy for artificial intelligence (AI) in India is called #AIFORALL (2018), and it has similarities with the AI strategies of other countries. A task team has been established to examine the appropriate applications of AI in India and the barriers hindering its extensive implementation. An analysis highlighting India's strong performance in terms of research papers published in peer-reviewed journals indicates significant progress in AI research inside the country. This is obvious from the growing participation and fervour of Indian researchers in the field of AI. Currently, AI is creating considerable enthusiasm in India's business sector. The growing state of the artificial intelligence startup market is clearly obvious due to the escalating investment. Both the aggregate sum and the frequency of funding rounds are on the rise. The estimated income for startups in India's artificial intelligence industry in 2019 is an astonishing USD 762.5 million. Governments are captivated by AI due to its immense potential to drive social and economic progress. The International Telecommunications Union (ITU) has conducted a research that demonstrated the extensive use of artificial intelligence (AI) technology by various United Nations (UN) agencies to support the achievement of the Sustainable Development Goals (SDGs). Amid several humanitarian crises in East Africa and the Middle East, the UN Global Pulse has used 'Neural Network Architectures,' a kind of artificial intelligence, to identify shelter structures using satellite data. The Indonesian government has created a crisis analysis tool with comparable capabilities to boost disaster management operations. Artificial intelligence is being used by public institutions and the Indian government to tackle intricate social issues. An instance of this is the use of satellite-based technology by the Arunachal Pradesh State Government for the purpose of overseeing infrastructure projects situated in distant and inaccessible areas. Several police agencies around the nation have collaborated with artificial intelligence companies in order to enhance the security of public areas. Indian railroads have embraced artificial intelligence to enhance their capacity in managing food and customer service. NITI Aayog has approved the use of AI in precision agriculture, early diagnosis of diabetic retinopathy, and a language processing platform for many Indian languages. The Robert-Bosch Centre for Data Science and Artificial Intelligence at IIT Madras is dedicated to doing research on the use of AI for societal welfare. The healthcare, agricultural, and educational sectors have shown great interest in the possible applications of AI. In addition, there has been robust private investment in the field of AI research and development, resulting in several compelling instances of AI-driven applications. Wadhwani AI is developing many applications aimed at addressing diverse challenges faced by rural areas. The list is extensive and includes activities such as evaluating the prevalence of TB patients at the district level, conducting screenings for underweight babies in rural households, and using integrated pest management techniques to minimise crop damage in cotton fields. Synerise, an AI firm based in Poland, intends to provide customised educational solutions powered by AI to students in India. When contemplating the wide range of possible results, there are no limits.India's growing prominence in the global AI ecosystem is a result of the remarkable enthusiasm shown by both the public and commercial sectors in the country. The development of AI-based applications, particularly those addressing essential challenges, is playing a significant role in India's unique position. The Indian government and business sector are unequivocally dedicated to establishing a robust ecosystem for artificial intelligence inside the country's economy. The primary rationale for this is the capacity of AI to enhance economic growth and improve societal well-being. In order to support the Indian government and economy in adopting this ecosystem, it is

crucial to elucidate the projected trajectory of the Indian economy's development and underscore the significant impact of AI on this progress. There is a conspicuous dearth of study endeavouring to estimate the influence of AI on productivity and economic development in India, despite the plethora of studies that investigate AI's potential to propel advancement and the endeavours to quantify and assess AI's impact on the economies of developed countries.

What is AI?

For a succinct elucidation of artificial intelligence (AI), you might go to the website of the Association for Advancement of Artificial Intelligence (AAAI). To define artificial intelligence, it is crucial to have a deep understanding of the intricate mechanisms behind intelligent conduct and concepts, as well as how they may be replicated in computer systems. An excellent resource for anyone who want to delve into this related topic is the book "Artificial Intelligence: A Modern Approach" authored by Russell and Norvig in 2009.Possessing a total of twelve Figure 1 provides a comprehensive definition of AI, including aspects like as reasoning, action, and human-like thinking and behaviour.

Figure1: A Framework for Understanding Artificial Intelligence



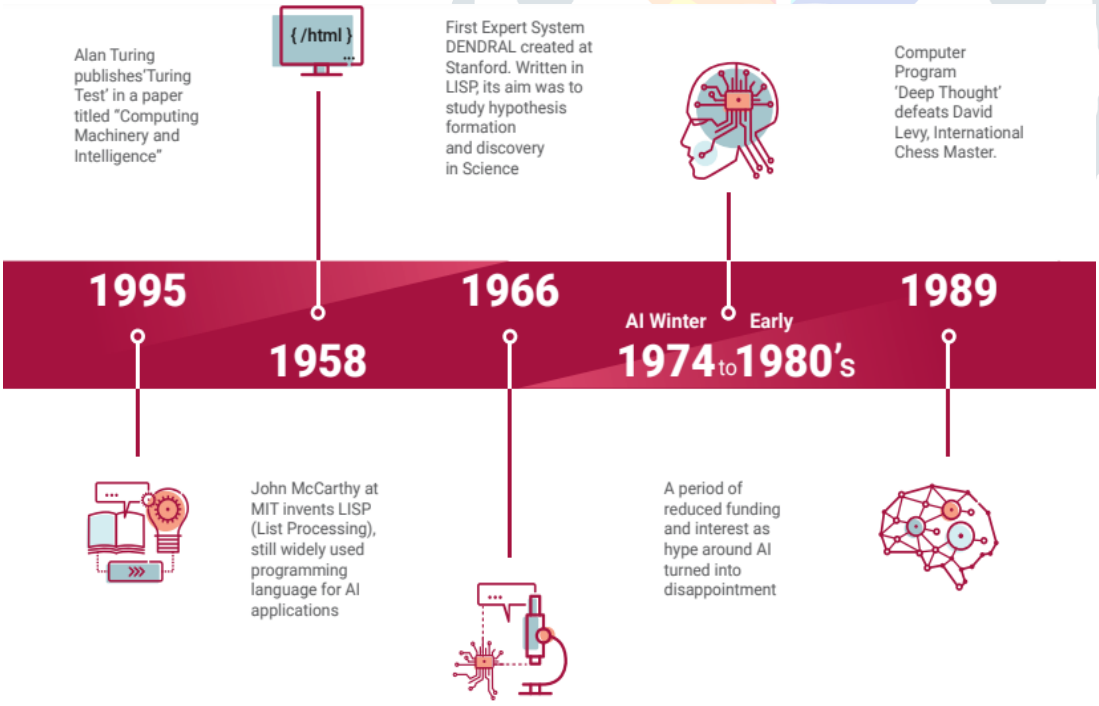
Source: Adapted from Russell and Norvig (2009)

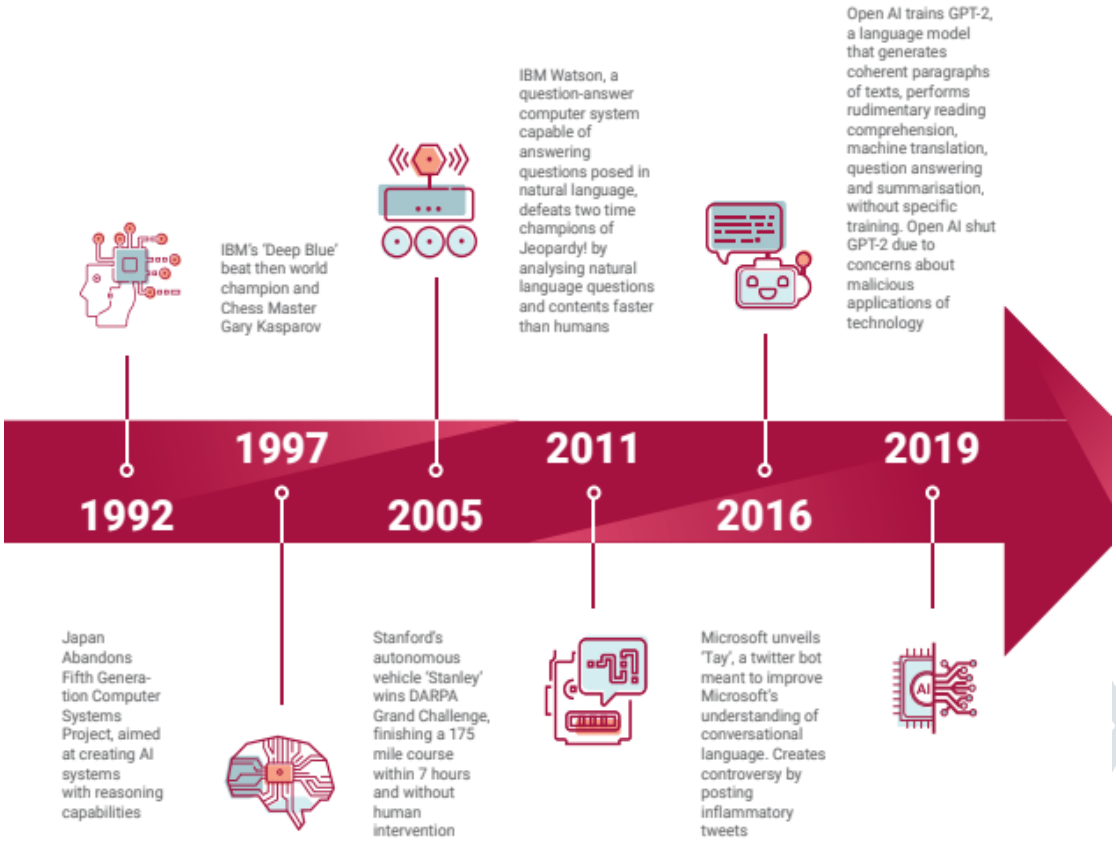
Evolution of AI Technologies:

Turing's 'Computing Machinery and Intelligence' (1950) poses the question, "Is it possible for a machine to imitate human intelligence?" The domain of artificial intelligence (AI) has made significant progress, spanning over fifty years. AI's evolution has been marked by several research cycles, including both successful and unsuccessful endeavours. The fascinating history of AI may be categorised into two distinct phases. The first phase occurred throughout the 1950s and 1960s, but the subsequent phase started around twenty years ago in the 1990s. The period in question is often known as the AI winter, since it saw a widespread decrease in enthusiasm for AI research due to several failures. Some instances of these obstacles include the ineffectiveness of machine translation, the dismissal of connectionism, and the termination of funding for several ambitious

efforts such as DARPA and the Strategic Computing Initiative. On the contrary, artificial intelligence has made significant progress during the 1990s. The domains of artificial intelligence (AI), particularly those pertaining to digital assistants, chatbots, and self-driving vehicles, have seen a rapid and significant growth in advancement over the last few years. These advances are often accompanied by narratives of being enslaved by technology. Numerous individuals in the IT sector have issued cautions on the perils of artificial intelligence (AI) and are urging nations to make necessary arrangements for the potential upheaval it may bring. Given the implementation of appropriate safety protocols, this technology has the potential to be efficacious while avoiding any detrimental effects on the environment. The prudent and principled use of AI is the focal point of a burgeoning scholarly discourse. Figure 2 illustrates some significant breakthroughs in artificial intelligence (AI) that occurred throughout the 1950s and beyond. Both knowledge representation and heuristic search and optimisation have seen a decrease in their prevalence from 1997 to 2017. On the other hand, progress in deep learning and reinforcement learning has led to an increase in machine learning. Additionally, the data reveals significant increases in other areas as well. During the 1990s, cognitive architectures such as ACT-R, EPIC, and SOAR gained popularity, coinciding with the peak of cognitive modelling. The use of multiagent systems reached its highest point in 2010, particularly in the domains of autonomous automobiles and video games. In the 1980s and 1990s, data mining, neural networks, and probabilistic reasoning gained significant popularity.

Figure 2: The Evolution of Artificial Intelligence

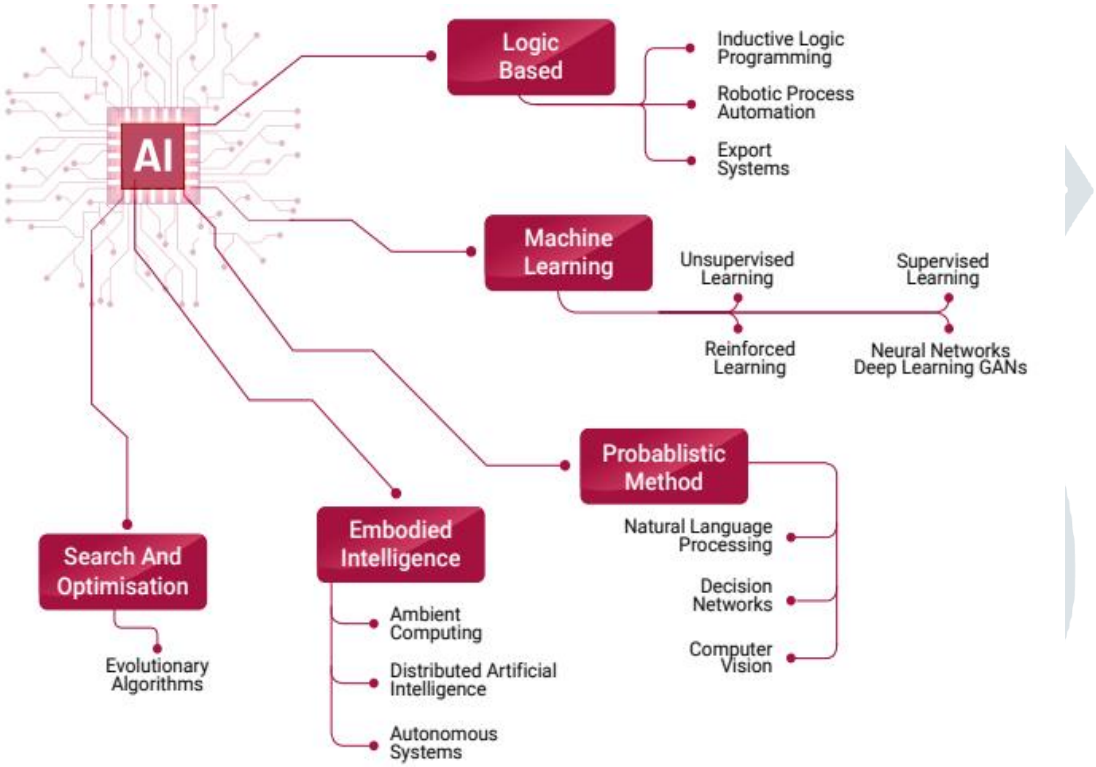




Source: Adapted from Digital Intelligence Today

Understanding all the principles of AI technologies is challenging because to their dynamic nature, akin to trying to catch a slippery fish. To get a clearer understanding of how machine intelligence is currently being used, an AI knowledge map may be used. This map illustrates how AI is being utilised and the specific problems it is being used to address. The fields of search, optimisation, embodied intelligence, logic-based tools, knowledge-based tools, probabilistic methods, machine learning, and the broader AI domain include a wide range of tools and methodologies. These paradigms are associated with several technologies, such as expert systems, computer vision, robotic process automation, neural networks, emotional computing, evolutionary algorithms, and natural language processing, among numerous others. A considerable majority, over 80%, of the resources are allocated to a few 20% of the technologies that have a notable influence on the current state of artificial intelligence. Currently, the most prevalent and extensively used technologies are computer vision, machine learning, and natural language processing. The main objectives of modern AI research are to decrease costs, enhance overall performance, and address the risks associated with AI. Currently, research comprehensively addresses all aspects of constructing systems. Encompassed under this category are apprehensions of granting human authority over a functional AI, preventing intentional manipulation, ensuring the system's proper construction, and determining the adequacy of the established system.

Figure 3: The AI Knowledge Map:



Source: Adapted from Francesco Corea (2018)

AI for Industry:

A convenient tool for assessing the widespread adoption of AI in various sectors is the 2018 report published by the McKinsey Global Institute. Several sectors, such as transportation and logistics, banking, consumer goods, healthcare, insurance, pharmaceuticals, retail, and autos, strongly depend on AI, as shown by the heat map in the research. In essence, artificial intelligence is poised to initiate a profound transformation, fueled by data, in any firm that substantially incorporates it. Due to its versatility, artificial intelligence (AI) has the capacity to drive significant transformations across several sectors. When effectively used, artificial intelligence (AI) has the capacity to enhance processes and provide better outcomes across several industries. Specifically, the automotive industry heavily relies on artificial intelligence (AI) in several operational procedures. The use of AI's prognostic capabilities leads to a substantial improvement in quality control within the field of industrial engineering. Audi uses advanced Computer Vision technologies and specialised cameras to identify minuscule

cracks in metal sheets that are often imperceptible to the naked eye. AI systems have a 90% higher level of accuracy in identifying vulnerabilities, as compared to humans. Financial institutions are increasingly recognising the many ways in which artificial intelligence (AI) may revolutionise both customer service and internal operations. Through the analysis of the user's payment history, artificial intelligence may ascertain their favoured payment method and propose it to them. Utilising artificial intelligence (AI) is a highly efficient method to ensure client retention in the banking sector by providing a personalised and distinctive banking experience. Healthcare institutions are using artificial intelligence (AI) to conduct screenings for diabetic retinopathy and identify early-stage breast cancer via the use of advanced algorithms based on deep neural networks and machine learning techniques. Several research have shown that artificial intelligence (AI) has the potential to enhance health outcomes and simultaneously reduce healthcare costs. The adoption of AI in an economy is determined by the composition of its structure and the amount of technological advancement in various areas. There are several opportunities available in various sectors and firm operations. Businesses without enough IT infrastructure and skilled personnel are less inclined to use AI, while those that have already adopted digitalization are more inclined to do so. Different sectors and types of businesses in India's industry exhibit varied levels of automation. Locating proficient individuals to handle novel technology may be challenging, and the equipment itself may entail a substantial cost. Dealing with outdated infrastructure may sometimes be burdensome.

AI for Governance and Social Development:

Governments and international groups are embracing AI-powered solutions to handle a variety of public policy and welfare challenges. Artificial intelligence is well-suited to handle many societal challenges owing to its predictive and flexible nature. Governments may boost efficiency and target vulnerable groups by incorporating AI into their operations. A task-based analysis suggests that governments may save $3.3 billion owing to AI's 20% efficiency improvement in governance responsibilities, which frees up to 96.7 million hours of employment. Within the sphere of public utilities, AI has proved itself competent in many amazing ways. The Australian government-owned utility Melbourne Water, for instance, is regulating the varied pump speeds using Machine Learning algorithms to improve the performance of its water distribution system. Deep Learning-based applications, including facial recognition systems, are helping Indian law enforcement officials better track missing children, highlighting AI's potential to boost law enforcement abilities. Crime Mapping Analytics and Predictive Systems (CAMPS) is a cutting-edge analytical system that the Delhi Police and ISRO have partnered on. In terms of internal security and criminal management, this state-of-the-art technology is a big aid. Similar schemes are also being implemented in other states, such as Jharkhand and Karnataka. In order to exploit Staqu's cutting-edge predictive policing technology, the Dubai police department has recently partnered up with the Indian startup. Rajasthan, Punjab, and Uttarakhand are just a handful of the Indian states where these principles have been tried and proven. For intelligence and surveillance objectives, the Indian Defence Services have completely embraced the use of AI. A number of these efforts, meantime, are merely beginning out and are in the testing or pilot phases. A full report on UN activities in AI was been issued by the ITU. In order to attain the Sustainable Development Goals (SDGs), this article examines the vast diversity of tactics adopted by various

United Nations entities. An example of this is a project that the International employment Organisation (ILO) has undertaken in Kyrgyzstan that combines Big Data and powerful AI algorithms to track incidents of child employment. UNICEF is utilising the promise of AI to acquire important insights into the spread of illnesses and employing Deep Learning technologies to generate stronger empathy for individuals touched by natural disasters. In India, there are many AI applications that are geared on giving developmental effects. According to a recent media story, a significant 11% of AI startups in India have set their sights on the education market. Some of the solutions supplied are Toppr, Edu Gorilla, Embibe, and so on. Securing the lives of the disabled, healthcare, and infant feeding are only a few of the vital areas where this technology finds helpful application. IIT Kharagpur has come up with a smart system that can filter through the deluge of misinformation and keep people informed during times of crisis. GnoSys, a cutting-edge smartphone application built for persons who are deaf and mute, uses the power of contemporary technologies such as natural language processing, neural networks, and computer vision to seamlessly transform gestures and sign language into spoken words. The programme is anticipated to enhance the lives of roughly 18 million folks in India who have hearing impairments. AI is regarded to be vital for governance in the 21st century. In today's age of advanced technology and data analysis, AI technologies like sensors and Machine Learning have the capacity to give immediate insights regarding the effectiveness of government policies and any vulnerabilities in regulatory oversight. The Indian government has openly emphasised the value of AI in building effective administration and enforcing suitable norms in the country.

AI for Households/ Individual:

Similar to the advanced societies depicted in futuristic literature and movies, AI-powered applications have already become essential to both our online and offline existence in the contemporary period. The impact of AI-driven developments is expected to bring about a significant and transformative shift in human connections. Regarding the impact of AI on individuals, several notable figures and experts have expressed their views. While AI has the capacity to enhance human productivity, there are concerns over its ability to undermine human autonomy, agency, and proficiency.

Unbeknownst to them, the majority of folks rely on AI applications in their daily routines. Siri and Alexa, both exemplifying AI assistants, may assist you in setting an alarm and even track your sleep patterns to enhance the quality of your sleep. Meanwhile, an autonomous vehicle has the capability to transport individuals to their desired destinations without any danger, while an NLP-powered AI assistant examines their daily schedule. The location of students throughout their time at school will be monitored using Machine Learning and other AI techniques, with the aim of analysing the gathered data to enhance instruction and evaluate their advancement. The use of AI-powered product recommendation systems, as shown by online retailers such as Amazon, has revolutionised the process of browsing and purchasing, fundamentally altering the way consumers engage with these activities. 'Just walk out' companies, which eliminate the need for traditional checkout queues, are a direct result of the significant change in customer behaviour caused by machine vision-based technologies. Merely a few hours have elapsed, and this person has already had several encounters with AI.

Surprisingly, a significant number of Indians were oblivious to their use of artificial intelligence in their everyday activities, as shown by the PAIR survey. Undoubtedly, AI has shown to be very useful and applicable across several domains of society, including both private residences and public governance. Given the wide range of their applications, it is hardly unexpected that they have become deeply ingrained in our everyday existence. The aforementioned attributes of AI provide support for the notion that it is a "General Purpose Technology," a concept that has historically triggered economic growth and social change, as I will elaborate upon subsequently.

AI as a General-Purpose Technology:

The remarkable progress of artificial intelligence stands as one of the most significant achievements of civilization. In 2015, Andrew Ng made a confident prediction that artificial intelligence (AI) will have a transformative impact on almost every industry, similar to how electricity revolutionised the world a hundred years ago. This remark highlights the unintentional clarification of a widely accepted theoretical framework: artificial intelligence (AI), similar to electricity, functions as a general-purpose technology (GPT). In essence, GPTs revolutionise individuals' lifestyles and corporate operations, thereby exerting a substantial impact on economic progress. Three crucial aspects of GPTs are their ubiquity and widespread use, their continuous technological advancements, and their pivotal role in enabling further progress.

The concept of energy, particularly as shown in Figure 4, is worth contemplating. Considering AI as a general purpose technology (GPT), progress driven by AI would not only directly impact specific enterprises but also have a positive effect on other sectors of the economy.

Figure 4: Historical Instantiations of GPTs

Source: Compilation from various reports.

Although there is a dearth of particular empirical methodologies to discover GPTs, we may evaluate the extent to which AI meets three fundamental requirements for GPTs. Perpetual Existence: The World Intellectual Property Organisation (WIPO) has highlighted the widespread use of artificial intelligence (AI) across several sectors in its recent report, Technology Trends 2019: Artificial Intelligence. AI may provide significant advantages to several sectors, including as education, document management, publishing, energy management, social and behavioural sciences, agriculture, and the military. According to a recent report conducted by Deloitte, artificial intelligence (AI) is undergoing tremendous development and expansion. Predictions indicate that the quantity of AI-powered devices is expected to reach a remarkable 1.2 billion by 2023, a significant increase from the projected 79 million in 2018.

Recent advancements in technology: Artificial intelligence (AI) is an advancing field that is quickly progressing in terms of both efficiency and applicability. Constantly emerging and diminishing trends, such as the 'Turing Test' and Machine Learning techniques powered by Big Data, are continuously present. From 1997 to 2017, there was a decline in academic interest on cognitive modelling, knowledge representation, and heuristic search and optimisation. Game theory, machine learning, and natural language processing have all shown consistent growth in research effort. Based on patent filings, the primary industries where technology is used include transportation, computers, human-computer interfaces (HCI), personal gadgets, life and medical sciences, and telecommunications. Fostering an environment conducive to the development of groundbreaking ideas: Prior to the widespread use of AI, all things were within the realm of possibility. Currently, all things are achievable. The United Nations has actively worked on creating cloud-based geospatial solutions to enhance resource management, safeguard the environment in Mongolia, and enhance disaster preparedness in the Maldives via the use of Machine Learning techniques. The financial services business has seen a significant transformation due to the use of predictive algorithms and natural language processing. These tasks include customer communication, insurance claim processing, and detection of fraudulent activity. The predictive capabilities of AI are driving cost reductions and organisational restructuring. The widespread use of AI technology has significantly enhanced several sectors such as networked turbines, intelligent power distribution, and automated manufacturing. Certain technologies have had a profound impact in the past, creating opportunities for economic growth and offering valuable insights on a country's wealth. AI has been argued to embody fundamental characteristics of General-Purpose Technologies, supporting the notion that AI might potentially stimulate economic growth in the future. Assessing whether AI qualifies as a GPT by comparing it to the fundamental characteristics of GPTs in general may not be the most effective method. History is the one dependable source capable of verifying or refuting such claims. However, these comparisons make it evident that AI has certain attributes of a General-Purpose Technology. Nevertheless, the shift towards an AI-driven economic system is not a coincidental occurrence. Gaining a comprehensive understanding of the immediate potential and enduring impacts of AI is crucial for properly harnessing its capacity. It is equally crucial to acknowledge the difficulties and possibilities of integrating AI into communities for the betterment of all individuals. This research employs the GPT technique in AI to demonstrate its potential contribution to economic expansion. By integrating our understanding of GPTs with AI, we may enhance our comprehension of the economic ramifications of AI and the particular regulatory challenges it presents.

Economic Implications for Businesses Adopting AI:

Given the wide range of possible applications for AI, its financial effects may be seen across several aspects of production and organisation, including both essential and supplementary functions. Throughout the years, we have seen several industries enhance their quality testing and control protocols via the use of artificial intelligence (AI). An instance is the grain analyzer developed by Nebulaa, which utilises data from many Indian agricultural markets and is driven by convolutional neural networks. This approach enables rapid, precise, and cost-effective quality testing. Their continuous efforts have significantly reduced the testing time for grains from 30 minutes to almost instantaneous results, leading to a cost savings of 75 percent. Their objective is to exploit the untapped agricultural markets in India. Companies that used AI technology saw cost savings due to improved efficiency in various operations, resulting in faster response times. Consider vPhrase as an example. An app has been developed that utilises advanced natural language processing (NLP) to create presentations that seamlessly integrate storytelling with data analytics and statistics. Numerous banks and financial services firms have used and expressed great satisfaction with this application. The initiative has significantly enhanced the efficiency and efficacy of these businesses' analytical and personalised report generating procedures, resulting in time and cost savings.Furthermore, we directly saw the capacity of AI to enhance the efficiency of back-end operations across many industries. Take into account the utilisation of solutions for the HR and recruitment operations as an example. Aspiring Minds has created an advanced system that utilises cutting-edge technologies like Machine Learning, Computer Vision, and Natural Language Processing to assist organisations in efficiently assessing applicants via video interview analytics and pre-employment exams. Companies use the service were thrilled to discover that their formerly arduous three-month recruitment procedure had been condensed to only one week. AI-driven applications have enhanced the effectiveness of onboarding processes. VideoKen, a company, has developed an application that uses state-of-the-art technology to categorise educational videos. Users are empowered to customise their learning experience and enhance their overall learning achievements. The majority of current clients are consulting organisations, since they see onboarding videos as an effective method for introducing new employees.

Implications on the Labour Market:

The technological advancements, such as AI, bring about significant social and economic consequences via alterations in the structure. The labour market will undergo a transformation due to task automation, necessitating individuals to acquire new skills in order to get employment. The long-term impact on the employment market will be determined by the allocation of potentially automatable occupations and other fundamental economic considerations. Nevertheless, our case studies illustrate the immediate implications of AI solutions on the workforce. An instance of this is vPhrase, a platform that utilises artificial intelligence to facilitate data analytics and narrative creation. The majority of the company's clientele, who mostly operate within the services industry, saw the opportunity to mechanise tasks associated with presentations. Genesis AI, a supplier of AI-powered solutions for action-recommendation and document processing, emphasised that their

customer firms saw the potential to enhance worker productivity via job automation. Consequently, there will be an increase in productivity per employee. Companies who used Artivatic Data Labs' automated applications saw a shift in the allocation of tasks among their employees. Contemporary AI applications are incapable of completely replacing human workers in their occupations, but they excel at managing routine, non-cognitive tasks. Furthermore, several firms have raised the prospect of potential future job growth as a result of the emergence of AI-driven applications, despite the initial displacement of particular vocations by these apps. An exceptional opportunity has emerged for recent high school graduates in the Indian suburbs, courtesy of the widespread growth of data annotation and tagging enterprises. Employment opportunities that are readily available to India's growing workforce and may be rapidly acquired.There is a substantial body of research indicating that AI has the potential to enhance economic growth and enhance social outcomes, as we have previously shown. This section emphasises the significant impact of AI-based applications on many sectors and commercial operations, highlighting the impressive potential for development that AI offers. In addition, in order to provide India with insight into the necessary conditions for cultivating a conducive atmosphere for development, we examine Indian businesses that have successfully created artificial intelligence applications. The knowledge acquired from this experiment might potentially contribute to the development of a structured system that provides enterprises with the necessary resources to overcome obstacles, expand their solutions, and accelerate the widespread use of artificial intelligence in the economy.

Conclusions and Recommendations:

The influence of artificial intelligence on India's GDP growth has been significant, as shown in this research. Both the case study research and econometric calculation demonstrate that several sectors of the Indian economy have used AI applications. Ample data substantiates the claim that AI enhances company efficiency, notwithstanding its gradual adoption. According to a recent survey conducted by IDC, the majority of firms have recognised the potential of artificial intelligence (AI) to enhance their operational efficiency. However, study indicated that only a small fraction of these individuals have really used artificial intelligence in their operational procedures. According to the analysis, these organisations are expected to enhance their competitiveness by 2.3 times in 2021. To achieve future advantages, the report suggests that organisations should enhance their investments in research, establish data governance protocols, and cultivate the expertise of developers and data engineers inside their own workforce. This study focuses on doing an economic analysis to examine the influence of AI on the productivity of Indian enterprises. Assessing software investments is a prevalent method for quantifying artificial intelligence. When there are no other direct indicators of AI available, this is the closest comparable indication of AI at the organisational level. We contend that AI plays a pivotal role in a company's total factor productivity (TFP). Total factor productivity (TFP) is an additional element that influences growth independently of capital and labour inputs. This arrangement is predicated on the assumption that AI is a versatile technology that impacts several aspects of an organization's management, economics, and general structure. The most suitable metric for measuring the impact of AI on economic growth is Total Factor Productivity. The econometric model indicates that businesses that use AI have a substantial increase in total

factor productivity (TFP). This is quite encouraging information. Research has shown a favourable correlation between TFP increase and AI intensity. Regarding TFP growth, it is expected that there will be a 0.05% increase for each additional unit of AI intensity. We rely on the output of the TFP growth model to determine the effects on GVA, which elucidates the econometric calculations. The calculation involves using a basic regression model with fixed effects. Our model's findings indicate that a 50% rise in the rate of growth of Gross Value Added (GVA) due to Total Factor Productivity (TFP) growth is a common occurrence. If AI-using firms in India increase their AI intensity by one unit, the immediate effect on the Indian economy might be a significant USD 67.25 billion, according to the growth coefficient. Nevertheless, there is no noticeable escalation in the level of artificial intelligence (AI) in the data spanning from 2008 to 2017. An example of these inclinations is the current widespread use of AI in India. The industry stands to get a substantial surge, and the effects of expansion might be magnified if diffusion hits a critical threshold. The government's approval of investments up to Rs. 7,000 crores may result in a substantial surge in AI investments, surpassing the average growth rate significantly. This investment surge is projected to result in a 1.3-fold rise in AI intensity, which would have significant spill-over impacts on the Indian economy, amounting to an impressive USD 85.77 billion. We conducted an in-depth analysis of thirteen Indian enterprises engaged in AI research and development in order to get a comprehensive understanding of their operational mechanisms and the resulting impacts. A wide range of emerging enterprises are now creating applications with diverse functionalities that may be used across many industries. The areas included are agriculture, manufacturing, banking and finance, healthcare, and law enforcement. Common artificial intelligence (AI) technologies include Machine Learning and its associated subfields, such as convolutional neural networks, deep learning, and deep neural networks. The case studies also included other instances of AI technology, such as computer vision, voice recognition, and natural language processing. The applications built by these firms have had a significant impact on several aspects of society, including health, education, agriculture, law enforcement, and more. These applications are seen throughout several industries, but with little influence and still lacking widespread adoption. Only a limited number of applications are currently undergoing development and testing. Scalability is also influenced by variables such as the exorbitant expense of new technology and the absence of user trust.However, there are significant reasons for being cautious about allowing it to proceed without supervision. Contemplate the latest breakthroughs in artificial intelligence, which have sparked worries over the confidentiality of the data used for training and the algorithm that underlies the decision-making process in intricate AI systems. Unjust and inaccurate outcomes may arise from using such applications in unforeseen situations.This phenomenon poses a challenge in assessing the reliability of an AI system. Moreover, it raises concerns over the capacity of algorithms to perpetuate biassed assumptions derived from both human biases and concealed biases included in the training data87. Starting at the stage of problem formulation, data collecting, and data processing, bias might enter an algorithm via many channels. It is essential that you be vigilant about these potential hazards. Addressing algorithmic discrimination has been a challenging endeavour. The whole magnitude of bias can only be understood in hindsight and after a period of time. Furthermore, the development process of an algorithm may fail to adequately consider the social environment in which it will be used, resulting in unforeseen repercussions for society. Even minor alterations to the data, such as scenarios that were not included in the training, might potentially lead to mistakes in AI systems. Take, for example, the Inception-v3 classifier created by Google. While it excelled at

differentiating items in common positions, it struggled when confronted with objects in more unconventional postures. Essentially, the AI often encounters several issues when operating outside of its well regulated training environment. Autonomous systems, such as self-driving cars and military applications, are impacted by this phenomenon, which also poses challenges in achieving widespread adoption of such applications. The concerns about the safety of AI extend beyond the particular issues of brittleness or failure. According to Dafoe (2018), AI systems are prone to accidents and unpredictable behaviour. Inequality is a significant policy issue that emerges as a result of the proliferation of AI. AI's capacity to replace human workers is already generating disparities in both income distribution and labour allocation within the workforce, especially within occupations requiring varying degrees of skill. However, the form and influence of AI on human employment ultimately depend on the companies that use AI technology and provide training. In order to mitigate the effects of AI on inequality, the economy has to address the automation or displacement of many professions by AI, while simultaneously enhancing educational options, skill sets, and employment prospects. Between 1983 and 2011, research on the skill requirements of activities in India revealed a decline in the need for manual tasks, while there was a rise in the demand for 'Non-routine Cognitive Analytical' and 'Non-routine Cognitive Interactive' occupations. This development may be attributed to the influence of advancing technology. The disparity in skill within India's artificial intelligence ecosystem is poised to significantly increase. Policymakers should provide primary importance to the widespread implementation of AI while also addressing problems related to employment, skill training, and education. In order to provide the foundation for the development of an artificial intelligence ecosystem in India, the government has already established a Task Force on Artificial Intelligence91. The implementation of a comprehensive AI plan in India has commenced with the submission of the Task Force's report and the unveiling of the National plan for AI by NITI Aayog. The NITI Aayog study presents many ideas on how India might effectively use artificial intelligence (AI) to address its numerous difficulties. These ideas include a broad spectrum of subjects, such as research, data availability, promoting faster implementation, and improving skills, while prioritising intellectual property rights, privacy, security, and ethics in the proposed initiatives. In July 2019, the recently appointed finance minister introduced a reform package that including augmented financing for artificial intelligence (AI) and initiatives to enhance understanding of AI, big data, and robotics. Various nations have used distinct approaches when developing AI policy. Consider the United States and China as an illustrative case. The AI policies of these two prominent nations exhibit stark contrasts. In the absence of a government policy, the private sector plays a crucial role in driving the growth of the AI environment in the US, which is now thriving. Conversely, the Chinese government has been actively engaged in assisting enterprises and other organisations in developing their AI ecosystem. This contrast demonstrates the distinction between the government's function as a facilitator and its position as a participant. The policy trend in India seems to be a blend of both. Through our extensive study, we have discerned five underlying themes that encapsulate the policy ideas. The successful execution of a large-scale AI project necessitates the incorporation of practical concepts from various disciplines. The aforementioned government efforts have already started the implementation of these measures, however, they still need more impetus.

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