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Artificial Intelligence in Terms of Business Operations: A Comparative Study of the United States of America, India, and China

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ABSTRACT

Artificial intelligence significantly transforms businesses globally, enabling companies to improve their efficiency, enhance customer experience, and focus more on innovation. The data collected for various business operations needs to be protected as enshrined under Article 21 Which was reiterated in a landmark judgment Which expresses information about information security.

Artificial Intelligence refers to the use of computers & computer systems that can perform tasks that require human intelligence as learning, problem-solving solving and in terms of decision-making. It's better used in improving performance with the varied use of applications in different fields as healthcare, finance, transportation, etc. The countries as to India and China has made a significant development in terms of adoption of Artificial Intelligence in the business market wherein, China is regarded as the most advanced country in terms of use of artificial intelligence supported by government initiatives & Indian companies face a lot of challenges as to data protection, regulatory uncertainties etc. When looking at to US, it's the global leader in adopting AI, as many companies invest heavily in terms of research and development.

This paper provides an insight into navigating the complexities faced in the adoption of artificial intelligence in India, China, and the US by highlighting the need for strategies, investments in AI talent, infrastructure, and in bringing up efforts to drive towards AI adoption and innovation.

Keywords: *Artificial Intelligence, India, China, US, innovation, business operations*

I. INTRODUCTION

"I don't want to scare you, but it was alarming how many people I talked to who are highly placed people in AI who have retreats that are sort of 'bug out' houses, to which they could flee if it all hits the fan."[2]

With the advent of technology, we can witness that business operations are running smoothly.

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[2] James Barrat, "Our Final Invention: Artificial Intelligence and the end of the human era" (2013).

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Artificial intelligence literally mentions the use of machines and the application of different branches of computer science in developing AI technologies. A philosopher named John McCarthy first coined the term artificial intelligence in the year 1956 as a science and method of engineering used in making intelligent machines. We can collaborate on the functioning of humans and machines as it can be briefed into a single study of human intelligence that can be replicated or bought artificially. We can demarcate the concept of artificial intelligence into two systems: firstly, by thinking and acting like humans, and secondly, by thinking and acting rationally.[3]

There are different technologies or components used in artificial intelligence. Some of the relevant approaches used in AI are machine learning, which mainly focuses on computers that act in a way of learning from data and making decisions which is not backed up by programming. Another one is named deep learning, it's a type of machine learning which is also referred to as neural networks that mimics how a brain works, through these neural networks, researchers can solve complex problems. Then, we have natural language processing (NLP) that mainly focuses on interactions between computers and humans with the help of a natural language. The major component that is been adopted in today's world is the use of robotics, wherein AI technologies are been integrated into robotic systems that enabling systems to operate in solving complex issues more easily by adapting to new situations and making decisions based on data collected through sensors.[4]

When moving in-depth to artificial intelligence, we have come across various types of artificial intelligence, which are either based on the nature of operations or the basis of functions. Artificial narrow AI, also referred to as narrow AI, is trained to perform a single task, which can be done faster than a human mind can think. A great example is the use of Chat GPT, which is limited only to text-based tasks. Another one is on the basis of artificial super intelligence, which is generally termed as super AI, which helps in understanding human sentiments, experiments in order to understand emotions, etc. When considering AI in terms of functions, we have reactive machine AI's that don't carry any memory but are designed in such a way that they can perform specific tasks. An example that can be cited is an OTT platform like Netflix that shows recommendations on search engines whereby enabling customers to choose what they need at a faster pace.[5]

[3] Isharat Ali, Artificial life with Artificial Intelligence, IJESRT (November 28th, 2024, 8:00 pm), https://citeseerx.ist.psu.edu/pdf/b672d2cc7f33fe4e5a72185174b86738dddcd7ee.

[4] Javier Canales Luna, 'The role of AI in technology: How artificial intelligence Is transforming industries' data camp (November 28th, 2024, 8:00 pm), https://www.datacamp.com/blog/ai-in-technology.

[5] Understanding the different types of Artificial Intelligence, IBM, (November 29th, 2024),

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Another one is a limited memory AI, which is used in recalling past events and outcomes to monitor specific objects or situations. These are done to achieve a desired outcome. Most of the industries use this model of AI, which is similarly used in ChatGPTs, virtual assistants like Siri, Alexa, etc. Nowadays, it's also used in the automobile industry in developing self-driving cars that give out directions and even decisions as to when to apply speed, brakes, etc.[6]

There are numerous numbers of applications that use artificial intelligence in order to obtain speeder results. Some of the applications are AI used in business, where businesses use AI-powered business tools that help them in collecting data from various sources, including both structured and unstructured data. AI also helps businesses not only in collecting data but also in analysing and visualising, as well as in helping to make decisions. Another major sphere where AI is been applied is in the sector of health care, where it helps doctors to diagnose diseases as developing diseases, and for treatment options, etc. AI also helps in doctors' treatment plans, which helps them in identifying patients' specific needs. AI is also used immensely in the sector of education, which improves student management, and also in automating the administrative tasks of schools and organizations.[7]

Artificial Intelligence has also been used majorly in the sector of financial services, which helps in enabling transparency as well as in automating operations and in reducing costs. Many advantages are seen with the help of AI that helps businesses in detecting fraud and various risks, as well as in document processing, etc. Another major development that has been seen with the help of AI is seen in industries as retail, transportation, energy, and also in governmental services.[8]

II. ARTIFICIAL INTELLIGENCE IN INDIA

In India, artificial intelligence is growing rapidly in various industries, thereby promoting growth in the industry. The presence of artificial intelligence in the market is been projected to turn into an outcome of 8 million dollars by the year 2025. Therefore, with the use of AI in numerous industries, it has put forth onto the growing digital infrastructure, thereby leading to different government initiatives such as Digital India.

In India, we celebrate a day named the AI appreciation day, which was currently celebrated on 16th July, 2024, in order to embrace a pivotal moment in reflecting the transformative impacts of AI across different industries that have shaped the country. When looking into the

https://www.ibm.com/think/topics/artificial-intelligence-types

[6] Ibid [5].

[7] What are AI applications?, Google Cloud (November 29th, 2024,9:00am), https://cloud.google.com/discover/ai-applications.

[8] Ibid [7].

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evolutionary aspect of artificial intelligence in India, it has started long back, starting from the year 1960 to the current year of 2024. In the early stage i.e. starting from 1960-1980, highly reputed institutions like IIT & IIS Bangalore started to lay out a groundwork for the development of artificial intelligence, thereafter in the year 1986 a knowledge-based computer systems (KBCS) a project was initiated which was marked as India's first major AI research program.[9]

In the year 1990, it laid down a foundation stone for the establishment of C-DAC, i.e., a Centre for Development of Advanced Computing, which indirectly supported AI research. Whereas, in the early 2000's India's giant IT companies like TCS, Infosys & Wipro had started to emphasize their focus more on emerging technologies that include artificial intelligence, even academic institutions have expanded their operations in AI, which also includes machine learning programmes. When looking into the era of 2010 and onwards, we have witnessed a significant development in the use of artificial intelligence, wherein an initiative named Digital India was launched that brought more importance to the field of artificial intelligence. The NITI Aayog has also released a national strategy for artificial intelligence that outlines India's approach to AI for economic growth, and is also seen as relevant in social inclusion. Later, in the year 2020's AI emerged as a focus area for both government and private sector initiatives as well as, and the government has also launched an initiative named "AI for All," which is an initiative that collaborates AI with various sectors that include education and governance.[10]

When looking at trends that have been observed with the help or use of artificial intelligence, we can clearly understand that with the help of AI has made a greater impact in India. The different trends that have been found out are the adoption of AI across different sectors, whereby, many initiatives have been launched as to national AI Strategies, National AI portals, etc, which were launched by the government of India. The use of AI has spread widely across different sectors like healthcare, finance, manufacturing, retail, etc. On the advent of artificial intelligence, we have slightly moved our focus onto data analytics, wherein companies use it in order to derive actionable insights, optimize operations, and bring out innovative ideas. This concept of data analytics is been brought out by the National Association of Software and Service Companies (NASSCOM). Artificial Intelligence has also made a larger impact in the field of research and development, wherein research institutions

[9] Artificial Intelligence Appreciation Day- celebrating the impact and future of AI, Press Information Bureau (Dec 7, 2024, 10:00), https://pib.gov.in/PressNoteDetails.aspx?NoteId=151932&ModuleId=3&reg=3&lang=1.
[10] Ibid [10].

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are been actively engaging in fields of AI research and development.[11]

The establishment of artificial intelligence has led to greater developments in India that have shaped the sectors widely in healthcare, education, road safety measures, etc. With advent use of artificial intelligence, we can say that artificial intelligence improves the health sector by solving medical errors as it's bought to our notice that around 5 million people die in India due to medical errors wherein, the staffs are not being educated to understand a disease therefore, with the use of artificial intelligence that includes a Clinical Decision Support system (CDS) that plays a major role in saving life's. The CDS systems help medical staff to better analyse diseases in detail and also help in giving out a precise diagnosis and thereby ensuring proper treatments. Another major aspect that has crept with the help of artificial intelligence is the ultimate goal of providing access to healthcare in rural areas, wherein, with the help of CDS systems or AI medical systems, it ensures that healthcare facilities are provided to the rural areas at affordable prices. Artificial intelligence also helps the education sector, thereby performing administrative tasks, as the ratios between teachers and students have been lowered due to the heavy load of administrative tasks. Therefore, with the help of AI, which has been powered with automation, can complete work easily within a short period, wherein the teachers can focus more on coursework. Artificial Intelligence also marks a track over the performance of students, whereby, cites areas that need to be improved.[12]

Another common issue faced in India is safety issues; therefore, in order to increase road safety, two technologies play a vital role, which are 5G technology and artificial intelligence. Now, we are all aware about autonomous vehicles wherein the technology inbuild is over to the way in introduction of 5G technology where it enables cars to move from autonomous vehicles to connected autonomous vehicles that allows vehicles to have an inbuilt collision detection system which analyses objects nearby and all items near the vehicle which results in fewer accidents wherein, a lot of data is required to be transferred therefore, that can be rectified with the use of 5G technology for speedy transfers within a short period.

India has also developed a unique approach for its national AI strategy that has been introduced not only in leveraging economic and military growth but also in promoting the aspects of social inclusion by bringing an initiative, 'AI for all'. With the help of this strategy, it shall aim to empower young Indians with skills to enhance and empower them in finding out quality jobs, investing in research, and also in sectors that maximise economic growth,

[11] India artificial intelligence, international trade administration (Dec 7th, 2024, 12:00 pm), https://www.trade .gov/market-intelligence/india-artificial-intelligence.
[12] Nandan Chebbi, The role of artificial intelligence in the development of India (Dec 7th, 2024, 3:00 pm), https://indiaai.gov.in/article/the-role-of-artificial-intelligence-in-the-development-of-india.

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and in considering the social impact that can be implemented in building a developing world. The NITI Aayog policy, 2018, also specifies the importance of various sectors wherein AI has built a great future upon. The policy also points out over 30 recommendations in order to invest in scientific research, by encouraging reskilling and training, and lastly, on accelerating the adoption of AI across the value chain and in promoting privacy, ethics, and security in AI. The government of India also wants to establish the country as an AI Garage, which considers companies in the picture, whereby companies can deploy AI technology in India, where it will be applicable for the whole developing world. [13]

Artificial Intelligence has also transformed business operations by automating tasks, analysing data's and enhancing decision-making. AI plays a vital role in boosting operational efficiency, in fostering data-driven decision support, cybersecurity, and last but not least, in fostering innovative ideas across industries. In India, as long as businesses are concerned, the integration of AI into Small and Medium Enterprises (SME) has enhanced their operations, driven innovative ideas, and gained a competitive edge. The usage of artificial intelligence by SME's has significantly improved their efficiency that streamlining repetitive tasks, reducing human errors, SME also enhancing decisions that facilitate decision-making processes, etc.

Artificial intelligence also serves a variety of purposes for SME that include customer relationship management, wherein the enterprises use AI-powered chatbots and virtual assistants that provide personalised customer support, and it also analyses customer data and predicts consumer behaviours. Another main impact of using AI is in supply-chain optimisation, wherein AI has driven demand forecasting and inventory management systems that help SME's in streamlining supply chains, reducing costs, etc. The applications of artificial intelligence can be deployed in various segments of SMEs such as operations, finance, human resources, and product development.[14]

When looking at recent developments of artificial intelligence in India, even in courts, robots will replace in place of lawyers. AI systems have also been introduced in the field of journalism, wherein the press news agencies have brought out strategies that automate the writing of a corporation with the help of an AI system named WordSmith. AI robots are been replacing each role that was once performed by humans. In the current scenario, India doesn't have any defined laws or regulations to govern the field of AI, as India is moving at a fast

[13] Young voices, AI policy analysis: AIDP of China v India's NITI Aayog AI policy paper (2019) (Dec 7th, 2024, 3:30 pm), https://www.orfonline.org/expert-speak/ai-policy-analysis-aidp-of-china-vs-indias-niti-aayog-ai-policy-paper-52935.

[14] Vishal Gupta, The importance of AI in small and medium businesses in India: A detailed explanation, India Gov (Dec 7th, 2024, 4:30 pm), https://indiaai.gov.in/article/the-importance-of-ai-for-small-and-medium-businesses-in-india-a-detailed-explanation.

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pace regarding technology, but there exist independent bodies with the sole aim of research and creating machinery that underlies the thought of intelligent behaviour.

There is a non-profit organisation named the Artificial Intelligence Association of India (AIAI), which is devoted to advancing a scientific understanding of the mechanisms. There is also a branch under DRDO named the Centre for Artificial Intelligence and Robotics, which has developed a network traffic analysis software that has the capability to intercept and analyse internet traffic. The software is currently under the control of RAW, IB, and all other state enforcement agencies, which is under the chairmanship of the Ministry of Home Affairs.[15]

It has also been witnessed that the rate of adoption of artificial intelligence in key industries across India has reached approximately 48% recorded in the financial year 2024, with expectations to expand operations with the help of AI by an additional 5-7% in the year 2025. Every industry is growing rapidly with the advent of artificial intelligence, such as while looking at the sector of banking and financial services industry, the AI adoption rate has been recorded at 68%, which is followed by the technology industry at 60-65%.

The use of artificial intelligence has grown rapidly not only in IT industries but also in non-IT, which holds more than 28% of the total AI market share in India. It was also quoted that the growth of artificial intelligence in India isn't mature when compared to global markets like the United States, where it signifies a gap of around 50%.[16]

There have also been observed advancements in the AI industry, which have been used by many leading AI companies like Anthropic, which was established in the year 2021, that basically uses various techniques in order to align the AI systems with human ethics and values. Another leading company is named Arya.ai, which has many aided businesses in the fields of automation processes and in gaining data-driven insights. One of the prominent AI companies in the field of health sector is Niramai, which aims to make cancer screening accessible to everyone and has also developed software that helps in detecting breast tumors.

When looking at various sectors that have been observed with the help of artificial intelligence, we have observed various case studies that have been added in India. In the field of healthcare, Practo, an Indian tech health startup, uses AI to connect patients with doctors and hospitals as well as, and GE Healthcare also utilises AI in early detecting diseases. When considering the field of agriculture, CropIn, an agtech startup, also employs the use of AI to

[15] Vineet Kumar, Need for laws on artificial intelligence in India, Ipleaders, (Dec 7th, 2024, 5:00 pm), https://blog.ipleaders.in/need-laws-artificial-intelligence-india/ .
[16] Annapurna Roy, 'AI adoption in key Indian sectors' The Economic Times (13th May 2024).

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help farmers in optimizing crop yield and thereby reducing resource usage. Even Indian manufacturing industries like Tata Steel and Hero MotoCorp use AI for process optimisations and quality controls.

Recently, in the year 2023, on July 15th, the Ministry of Skill Development and Entrepreneurship launched an initiative named the "AI for India 2.0" initiative. The main aim of the program is to bring out the government's efforts in promoting AI education and skill development, and also guarantees to provide online free training on artificial intelligence, and also in equipping youth with essential AI skills to prepare them for future job markets. The programme also emphasizes breaking language barriers in the field of technology education by offering them courses in multiple Indian languages.[17]

III. ARTIFICIAL INTELLIGENCE IN CHINA

While considering artificial intelligence in China, we have witnessed that it has emerged in the top position in terms of transformative technologies while compared to other countries' superiority in terms of technological advancements by using AI. It was also recorded that China was ranked first in terms of research articles published, as well as artificial intelligence used in patents. Therefore, due to this rapid progress in terms of artificial intelligence there raised a rivalry or competition arose with the United States.[18]

When looking onto the historical background of artificial intelligence we have seen that its establishment in the academic field traces back in 1950's where it has recorded to more than 60 years of theories, practice and even on development of various applications as well as, on comparing AI in terms of academic research even if it was grown late, it has embarked tremendous growth in the research industry. Different stages mark various developments in terms of artificial intelligence in China, they are categorised into three stages mainly.[19]: -

- Silent Stage (1950-1970): This was categorised or termed as the most critical and negative process in artificial intelligence. In this stage, AI perceived the form of pseudoscience and the concept of revisionism, which thereby denoted a lack of research in the field. In the year 1958, Qian, a researcher, released a Chinese edition of the work named engineering cybernetics, were its preface stated that the notion of individuals is being equipped with computers and machine intelligence in order to enhance their capabilities and,

[17] Ibid [10].
[18] Shaleen Khanal and others, Development of new generation of artificial intelligence in China: when Beijing's global ambitions meet local realities, volume 34 issue 151, Journal of Contemporary China (2024).
[19] Longjun Zhou, A historical overview of artificial intelligence in China, volume 42, no.6, Research Gate, (2023).

after all, to achieve superiority. Further, in 1961, the Chinese Association of Automation in Beijing embarked on the first inception of an academic organisation in China, which was solely dedicated to artificial intelligence.

- The second stage is called the Initial Stage (late 1970s to early 21st century): A campaign of ideological liberation began in this era whereby, in 1978, Deng Xiaoping delivered an address on the topic prioritizing modernisation of science and technology at an inauguration ceremony in a national science conference. Even, the department of computer science and technology adopted the department of automatic control and thereby including research fields of AI and intelligent control. The initial phase of AI research is basically dominated by topics relating to theorem proving, Chinese language comprehension, pattern recognition, etc.

- The last and final stage or the current one is the stage of rapid growth, which has highly expanded towards cloud computing, big data, Internet etc even, a lot of computer platforms like graphic processors also lead to advanced development of AI technologies such as image classification, speech recognition, automatic driving etc. In this phase, the Chinese government first identified the advancements in Chinese-based information processing, intelligence surveillance, etc[20]

The concept of artificial intelligence or the impact of AI in China started its progression in the year 2017, which marked a global number one in the year 2020, basically in terms of research papers and AI-related payments. China's contributions towards artificial intelligence have made significant contributions in the time of Covid pandemic which mainly focused on contribution towards resumption of business activities it was also later known in a study conducted by the Mercator Institute of China which confirmed China's social credit system that mainly uses AI technology which was deployed mainly in fulfilling functions therefore, AI in China is also used in a variety of business purposes like online shopping and various industries with a sole focus on promoting automation. In the year 2017, an AI plan was put forth that helps in promoting public safety as well as in the construction of public safety intelligence monitoring and control systems.[21] Artificial intelligence drastically changed in the 21st century, whereby it transformed the various facets globally. The surge of artificial intelligence was evident through the implementation of various policies and strategic plans, such as the new generation artificial intelligence development plan which came into existence

[20] Ibid [20].
[21] Ulrich Jochheim, China's ambition in artificial intelligence, European Parliament (Dec 26th, 2024, 10:00am), https://www.europarl.europa.eu/RegData/etudes/ATAG/2021/696206/EPRS_ATA(2021)696206_EN.pdf.

in 2017 wherein, China will become a global leader in the year 2030 thereby consisting of comprehensive strategies like research funding, talent recruitment and AI infrastructure development.[22]

The rise of AI in China is not only attributed to government support but also to its expanded contribution in leading AI research institutions and companies like Baidu, Tencent, Alibaba, etc. The nation's vast population has led to a crucial resource in terms of training as well as refining AI algorithms. The implementation of AI in China has also been spread across various sectors, that brought a significant impact in sectors like healthcare, transportation, education, etc. When looking into the sector of healthcare sector, AI has brought out significant advancements in the healthcare sector, thereby introducing early disease detectors, personalized treatments, as well as exemplifying companies like Ping An Healthcare, which used the impact of AI in early cancer diagnosis. The AI in transportation has been impacted evidently by companies like DiDi in terms of optimizing ride-sharing routes, as well as in autonomous vehicles. Even in the education sector, AI has been used by various personalized learning platforms as well as tutoring systems in reshaping the education sphere.[23]

It was witnessed that many business leaders across the world including China hasn't considered artificial intelligence as a priority as it's recorded that over 40% of traditional enterprises doesn't consider AI with much importance as well as, upon a survey it's also found that businesses who doesn't implement artificial intelligence was recorded at 43% of those who doesn't have a defined business whereas 39% of them who are unsure about it and the rest 33% doesn't have required skills for implementing artificial intelligence.[24] Artificial Intelligence is been vastly used in machine learning services which is regarded as another area that has an established market with various platforms, the efficiency of machine learning techniques benefits businesses in its applications in a wide variety of ways whereby, improving customer loyalty & retention by analysing typical user behaviours and optimisation of various provisions of services. Machine learning services are also been used in the industry of manufacturing, wherein the manufacturing plants integrate machine learning solutions to enhance efficiency. General Electric estimates equipment increase in the production capacity of up to 20%, wherein, predicts production capacity of finished goods it be up to 30%. It was also witnessed that many firms don't develop and run models locally in an open AI platform

[22] The AI development in China, e-commerce to China, (Dec 27th, 2024, 11:30 pm), https://ecommercetochina.com/the-ai-development-in-china.com.
[23] Ibid [23].
[24] Gidon Gautel, AI in China: How AI can optimize your operations, China briefing, (Dec 27th, 2024, 1:00 pm), https://www.china-briefing.com/news/ai-china-ai-can-optimize-operations/.

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instead of using cloud-based machine learning tools, thereby offering a higher degree of customization and allowing businesses to easily comply with the policies relating to data confidentiality, sovereignty, etc.[25]

Various policies were also implemented as to artificial intelligence in China which was traced back early in the year 1956 where the Chinese government started paying attention to technology since its 5year plan as well as, in the year 2015-16 there were many policies like the Made in China document that mainly focused on intelligent and autonomous systems. The first and foremost plan is the Internet Plus Action plan in the year 2015, which was considered as the first central-level long-term plan that recognised the concept of AI and the usage of AI in industries. The Chinese government introduced AI three- year activities as well as, an implementation programme in the year 2016 but, it got its existence only when the New Generation AI Development Plan (NGAIDP) which was introduced in the year 2017 whereby, treating it as the country's first long-term specific plan, it also identifies AI as a sector of strategic importance and in achieving specific targets in the following years of 2020, 2025 & 2030. It was also found that before the introduction of NGAIDP, many local governments had launched their sub-national AI-related policies and projects; even then, NGAIDP was considered as the starting point of the Chinese AI Planning at both its strategic and high levels, which provides a national focus towards AI.[26]

The evolution of artificial intelligence has put forth various opportunities both for businesses and for different organizations. It was also observed that in recent years, China has accelerated the development of AI-related technologies and capacities. In the year 2021, it was witnessed that China's AI market had a worth of around RMB 150 billion, which figures to around US$ $23.196 billion, whereas it's projected to be around RMB 400 billion, i.e., US$ $61.855 billion by the year 2025. When considering the regulatory regime of artificial intelligence in China it was the most leading country in terms of framing AI regulations as the country have broader schemes in stimulating the development of AI industry such as Made in China, 2025 as well as, the Action outline for promoting development of Big Data, 2015 and the next generation artificial intelligence development plan, 2017. It was also found out that China has fastened its pace in promulgating specific policies relating to AI, which are basically related to industry ethics and algorithms. In the year 2022, China passed its very first local regulation dedicated to boosting AI development, named Regulations on promoting artificial intelligence industry in the Shenzhen special economic zone, which will come into force in the month of

[25] Ibid [25].
[26] Ibid [19].

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November 2022. The sole objective of the Shenzhen regulations is to promote the AI industry, whereby encouraging governmental organizations to utilize related technologies and thereby increasing financial support in the ambit of AI research.[27]

It's been observed that China's three regulations are been considered as the most concrete and impacted regulations that were passed both on algorithms and in artificial intelligence, which are the 2021 regulation on recommendation algorithms, the 2022 rules for deep synthesis, and lastly, the 2023 draft rules for generative AI. These regulations passed target upon recommendation algorithms for disseminating contents, synthetically generating images, videos, etc, as well as in bringing out generative AI systems like OpenAI's Chat GPT. These rules create various new regulations or requirements in building up how algorithms are built, as well as what information the AI developers have to disclose to the government and to the public. Even if, China's political system is drastically different when compared to other countries these China's regulations create up new bureaucratic and technical tools such as disclosure requirements, model auditing mechanisms as well as, technical performance standards these can be also used by different countries ranging from authoritarian controls to democratic oversight of automated decision-making.[28]

In the year 2023, China issued their final version of generative AI measures which is the first in the world in regulating generative AI technology, these generative measures were jointly adopted by seven Chinese central governmental agencies that takes effect from 15th August 2023 however, when compared to the first draft of generative AI measures which was released for public consultation in April 2023 wherein, these generative AI measures sent a very positive signal in encouraging development and investment in generative AI technology and services. These generative AI measures aim in striking a balance between innovation and development of generative AI technologies and on security measures they also lay down a range of various legal requirements in providing generative AI services wherein their focus is on the privacy requirement of pre-training and in optimising data's, content screening as well as in other relevant areas.[29]

When looking at the current state of artificial intelligence in China, it was found that China's

[27] Yi Wu, AI in China: Regulations, market opportunities, challenges for investors, China briefing, Dec 28th, 2024, 11:30 am), https://www.china-briefing.com/news/ai-in-china-regulatory-updates-investment-opportunities-and-challenges/.

[28] Matt Sheehan, China's regulations and how they get made, Carnegie Endowment for International Peace,(Dec 28th, 2024, 2:00 pm),https://carnegieendowment.org/research/2023/07/chinas-ai-regulations-and-how-they-get-made?lang=en.

[29] Barbara Li 'and others', Navigating the complexities of AI regulation in China, Reed Smith, (Dec 28th, 2024, 3:00 pm), https://www.reedsmith.com/en/perspectives/2024/08/navigating-the-complexities-of-ai-regulation-in-china.

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AI ecosystem is one that is robust and dynamic, which has brought out significant advances and has expanded widely across different sectors. China has emerged as one of the major players in terms of AI research in contributing towards substantial advancements in AI algorithms, machine learning tools, as well as in different practical applications. China is regarded as the forefront in several AI developments like autonomous vehicles, wherein Baidu's Apollo Project is termed as a global leader in self-driving technology, healthcare AI, as well as in generative AI. The country is also considered a major contributor to global AI research and development, as well as participating actively in international AI forums, standard committees, etc.[30]

IV. ARTIFICIAL INTELLIGENCE IN THE UNITED STATES OF AMERICA

When looking at the ambit of artificial intelligence in the United States, we have witnessed that America is regarded as the global leader in terms of the new era in artificial intelligence and is been poised to maintain its leadership forward. The US administration is also working on developing different policies and in terms of implementing different strategies in order to accelerate AI innovation in the United States.[31] When looking into the historical background of AI, we discovered that the idea of AI traces back thousands of years in pointing towards ancient philosophers who considered both questions of life and death. Back in the ancient times, the word named automation was introduced by the ancient Greek that simply means acting of one's own will therefore, the idea of machine functioning on its own is pointing towards ancient times but, now when considering the 20th century, we can see that engineers and scientists began to strike towards artificial intelligence. The different phases of AI in the United States are[32]:-

- This phase is commonly known as the Birth of AI, an era that began from 1950-1956, wherein the interest in artificial intelligence emerged when Alan Turing published his work titled Computer Machinery and Intelligence which is also known as the Turing test, whereby experts started using this test to measure computer intelligence. Further, in 1955, John McCarthy held a workshop at Dartmouth on Artificial Intelligence, where the term was used firstly and now, in the current phase, it has become popular.

[30] China's AI Policy & Development: What you need to know, Fiscal note, (Dec 28th, 2024, 5:15 pm), https://fiscalnote.com/blog/china-ai-policy-development-what-you-need-to-know#.
[31] Artificial Intelligence for the American people, Trump white house, (Dec 29th, 2024, 11:15 am), https://trumpwhitehouse.archives.gov/ai/.
[32] What is the history of artificial intelligence?,Tableau (Dec 29th, 2024, 1:30 pm), https://www.tableau.com/data-insights/ai/history#.

- The next phase is the AI maturation period from 1957 to 1979, which is a period that depicts both rapid growth and struggle in terms of AI research. In the late 1950s to 1960, it's regarded as the era of creation of programming languages that are seen in books to exploration of ideas such as robots; however, in 1970 it showed similar improvements like building up their first anthropomorphic robot in Japan which was regarded as the very first example towards autonomous vehicles. In the year 1966, they created a chat box named ELIZA, a mock psychotherapist that uses natural language processing to converse with humans. Another mathematician published a work named the group method of data handling in a journal named Avtomatika, which brought a new approach to AI known as deep learning. As well as An association for the advancement of artificial intelligence was also founded in the year 1979.

- This era is named as AI bloom, which starts from 1980 - 1987, where it put forth a breakthrough in the field of research and gave additional government funding to support researchers. In 1980, the very first conference of AAAI was held at Stanford as well as, and in 1980 Japanese government allocated 850 million dollars to the fifth-generation computer project that created computers that can translate and converse in human language. In 1986, Ernst Dickmann and their team at Bundeswehr University of Munich demonstrated as well as created their first driverless car, which could drive up to 55mph on roads that don't have any obstacles.

- AI winter phase that began from 1987 -1993. This is a phase that describes a period of low consumer and public as well as private interest in AI, which thereby leads to fewer breakthroughs. This phase brought out fewer setbacks both in machine markets and expert systems, which also include the fifth-generation project. It was also found that in the year 1987, a market for specialised LISP hardware collapsed as a result; accessible competitors could run this software.

- The second last era is regarded as AI agents starting from 1993- 2011, which showed impressive strides in the medium of AI research, it also introduced AI into everyday life such as innovations which is named as Roomba, introduced in 2000 and regarded it as the first commercially- available speech recognition software on Windows platform. As well as In the year 2011, Apple released Siri, which was considered the first popular virtual assistant.

- The last era is called as artificial general intelligence era from the year 2012 to the current scenario, most of the iconic recent developments happened in this era. In the year 2015, prominent people like Elon Musk, Stephan Hawkings etc signed up an open letter in the

world's government system in terms of banning the development of autonomous weapons for the sole purpose of performing war's as well as, in 2016 Hanson robotics created a robot named Sophia which was termed as the first robot citizen as it was the very first one that could see, communicate and even replicate emotions just like a human being.[33]

Now, when looking at the industries, it's been observed that artificial intelligence is infiltrating every industry wherein allowing vehicles to navigate freely without drivers, assisting doctors in their medical diagnosis, etc. Many US-based companies started to use artificial intelligence in a meaningful way, whereby creating robots that can help workers in restocking, another in scanning/ recruiting pitches for unconscious bias, and lastly, by analysing massive amounts of data in making weather predictions. In order to show that companies use AI, they have to prove that such companies use different techniques like machine learning, natural language processing, or the use of computer versions, which is regarded as the core part of businesses. It was also seen that even startups started to use artificial intelligence, wherein startups started to receive a record of 7.4 billion dollars in the second quarter of 2019, only by using artificial intelligence. [34]However, when observing a survey performed by the US Census Bureau, it has been observed that AI technology is yet to be widely adopted by businesses, as it was reported that only 3.8% of businesses use AI in producing goods and services, as it is widely used in industries like the information and technology sectors. It was also found out that businesses in the information sector report a greater level of artificial intelligence that accounting for up to 13.8% of businesses using technology, whereas businesses dealing with professional, scientific, and technical services report a larger share in AI, denoting up to 9.1% when compared to other sectors.[35]

In the United States, AI's role in business and various industries is transforming vastly in nature, estimated to reach around 15.7 trillion dollars in the year 2030. The companies are leveraging AI in order to stay more competitive in nature as well as in offering smarter and faster solutions to problems; however, it was observed that by adopting AI technologies, it can lead to ethical concerns like privacy issues, workplace displacements, etc. When looking onto different sectors we can observe that AI has transformed vastly some of them can be in healthcare we can witness in terms of improved patient outcomes, streamlining operations etc AI also helped in diagnostic processes like in terms of using various tools like AI- driven

[33] Ibid [33].
[34] Jillian D Onfro, AI 50: America's most promising artificial intelligence companies, Forbes (Dec 29th, 2024, 3:15 pm), https://www.forbes.com/sites/jilliandonfro/2019/09/17/ai-50-americas-most-promising-artificial-intelligence-companies/.
[35] Cory Breaux and others, How many US businesses use artificial intelligence, US Census Bureau, (Dec 29th, 2024, 4:40 pm), https://www.census.gov/library/stories/2023/11/businesses-use-ai.html.

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radiology in analysing medical images such as X- rays & CT scans, General AI also helps in reshaping finance and the banking sectors thereby improving efficiency, security features etc, its commonly suitable in terms of combating financial frauds.[36]

In the transportation sector as well as, in the logistics sector AI has bought significant advancements whereby using AI-powered systems in analysing traffic data, weather conditions etc Prominent companies like FedEx & UPS use these in optimizing delivery routes, reducing fuel consumptions etc AI is also significantly used in self - driving cars like Tesla and Waymo which acts as a forefront in developing autonomous vehicles that can make out real-time decisions without any human interventions. AI also plays a vast role in the field of education by developing AI-powered chatbots to assist students with common administrative tasks like enrollment, scheduling, etc.

Many AI initiatives are been brought out by the US government, which were passed by the US president in their executive order in 2023 that brings out a safe, secure, and trustworthy development of artificial intelligence. Many primary directives are been passed by the US president in establishing safety and security standards, privacy issues, promoting innovations and competition, as well as in advancing American AI leadership[37]. The US government has passed a total of eight directives they are: -

- New standards for AI safety and security, wherein the executive order of the US is to ensure a robust, reliable, standardized testing and validation of AI systems.
- Promoting innovation and competition whereby AI has been used in education, training, capacity investments, etc, the agencies also promote competition whereby providing small developers access to technical assistance and by encouraging the Federal Trade Commission (FTC) in exercising their authority by enforcing competition and in protecting consumers.
- The government must also develop principles and bring up practices in mitigating harms and in maximising benefits with the help of AI for the workers. The main aim is to address job displacement, labour standards, health and safety, etc.
- Standing up for consumers, patients, and students, whereby protecting consumers and in terms of promoting AI in different domains like healthcare, education, and

[36] Prismetric Technologies pvt ltd, How AI is revolutionizing various industries in the USA, LinkedIn, (Dec 29th, 2024, 6:15 pm), https://www.linkedin.com/pulse/how-ai-revolutionizing-various-industries-usa-dlblf/.
[37] Jim Probasco, 'US government uses for artificial intelligence, Investopedia (Dec 29th, 2024, 7:30pm), https://www.investopedia.com/artificial-intelligence-in-us-government-8406703.

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administrative work in enforcing existing consumer protection laws and in enacting safeguards against fraud, privacy violations, etc.[38]

- The lawful collection and retention of data must promote privacy by directing federal agencies to bring out privacy-enhancing technologies.
- The Agencies also have to ensure that the responsible government deploys AI in modernising AI infrastructure in various domains like regulations, governance, security, etc.
- Lastly, in advancing American leadership abroad, they have to engage with international partners in developing a framework for managing AI risks in terms of safety, security, and AI development.

As we have come across that artificial intelligence is a technology that allows digital computers or even computer-controlled robots in performing tasks which are associated with intelligent beings that also results in a wide variety of generative AI models in 2023, United Staes as we all know is regarded as the largest economy in the world even though, we have human-like androids the applications such as smartphone virtual assistants, industrial robots are deemed to be widespread in the US society. It's also observed that very few nations in the world have a concept termed as investment pull, which commonly denotes a stronger leverage in terms of artificial intelligence. The country has so far as the largest number of AI startup fundings, which had increased significantly in the following years of 2020 and 2021, which was later followed by a slump in 2022 however, at the end of 2022 the funding system started to slowly recover and regain back its position in the early 2023. Even though, US leads the race in terms of AI, it's difficult to comprehend whether maintainability as to AI is definite or not, as it's imperative for the side of United States to build upon its advantages in continuing the process of producing, recruiting, and developing skilled AI talents.[39]

The United States relies on existing federal laws and guidelines in order to regulate artificial intelligence, thereby aiming to introduce AI legislation and a federal regulatory authority. Until then, the AI systems operate on their state laws enacted by different states of the United States. Since, there is no federal legislation for regulating artificial intelligence, the country has passed around more than 120 AI bills mainly by the US congress that covers a wide ambit of areas including AI education, copyright disclosure, AI's role in national security measures as well as, in prohibiting AI in launching nuclear weapons. It's also been observed that these

[38] Ibid [38].
[39] Bergur Thormundsson, Artificial Intelligence in the US - Statistics and facts, Statista,(Dec 30th, 2024, 11:30 am), https://www.statista.com/topics/7923/artificial-intelligence-ai-in-the-us/#editorsPicks.

AI bills emphasize more on developing voluntary guidelines and bringing out best practices that solely aim towards innovation. It's also been found out that there are existing regulations for artificial intelligence, but, are currently been rendered inexhaustive. Some of them include the Federal Aviation Administration Reauthorization Act, which gives a review of AI in aviation, the National AI Initiative Act, 2020, which basically focuses on expanding AI research and development, etc.[40]

Even though we have certain existing regulations to guide artificial intelligence, there are: -

- The white house executive order, which aims to regulate AI across numerous fields and to understand AI in its good benefits and mitigate substantial risks. The executive order calls on the Department of Commerce to guide the authentication of content received through artificial intelligence.
- The White House blueprint for an AI bill of rights, which asserts in provide guidance and to provide equitable access to the use of AI systems. The AI bill of rights brings out 5 principles and practices in helping guide designs, use, and deploy automated systems, data privacy, etc.
- The Federal Trade Commission (FTC) has also signed up to bring back its existing authority in regulating AI. They also issued a warning to market participants about violating the act to use AI tools that have discriminatory impacts or to deploy AI to assess and mitigate risks.

In the year 2018, the White House hosted a summit on artificial intelligence, particularly in the American industry, in order to discuss the promise of AI and policies required to maintain the US leadership in the age of AI. This summit also brought together 100 government officials as well as technical experts from top institutions who are using AI technologies to benefit customers, workers, and shareholders. One of the nation's AI strategies was announced in the month of February 2020 that doubled nondefense AI & R&D for over two years, wherein their AI investments grew to emphasize broader challenges in terms of AI, including research, applied AI R&D, cyberinfrastructure, etc. This AI investment focused mainly on a wide range of applications such as science, medicine, communication, transportation, agriculture and security issues therefore, to improve coordination of federal efforts relating to AI the white house also chartered a select committee on AI in 2018 constituted under the chairmanship of national, science and technology council, the selected

[40] AI Watch: Global regulatory tracker- United States, White & Case, (Dec 30th, 2024, 12:15 am), https://www.whitecase.com/insight-our-thinking/ai-watch-global-regulatory-tracker-united-states.

committee also expanded largely and became a permanent body which references to National AI Initiative Act, 2020.[41]

Many state legislatures have also enacted several bills that aims in regulating AI wherein, in May 2024, Colorado enacted their first comprehensive AI legislation i.e. The Colorado AI Act that expresses duties which has to be followed by the developers who deploy AI as well as, California has also enacted various AI bills which are relating to transparency, privacy, government accountability etc. We have also come across many laws that affect AI which including both privacy and intellectual property laws, which are generally applicable to AI technologies. Several states have also enacted comprehensive privacy legislations that are enacted in regulating AI, which include the California Privacy Protection Act that helps in regulating automated decision-making, the Biometric Information Privacy Act, which is a pending legislation relating to AI matters, etc.[42]

V. Comparison of AI in business operations: India, China, & United States of America

As we have seen various operations or applications wherein artificial intelligence has been used in countries like India, China, and the US, in a very few aspects, the performance of artificial intelligence in the above countries differs. We have also taken a glance at regulations passed by the countries in using artificial intelligence and also found that India is a country wherein the concept of artificial intelligence is still in its early stage, when considering the other countries.

Talent is one of the key aspects of AI where it's observed that in India, the number of engineering graduates' performance is far better when compared to most of the other countries as well as, the Centre for Security and Emerging Technology (CSET) data's record that the number of PHD holders in India when compared to US and China. We can also see lack of research opportunities and funding support wherein, India has relatively poor index as per the Global AI talent 2020 report whereas, when looking onto the feature of research we can see that India, stands on the third position as in publishing highest number of AI- related articles but, it has to grow more further to reach the position of China and US.

When looking onto the ambit of AI companies and investments, new startups have started forming part of artificial intelligence in India wherein, experts predict to expand more on 2025 but when compared to AI investments, we have observed that as per the CSET report the

[41] Ibid [32].
[42] Ibid [41].

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private equity investments in Indian AI companies in 2019 was falling between 900 million to 1.2 million dollars whereas on looking onto the other side, investments are way lesser in China and US.[43]

It's also been recorded that, as per the Stanford AI Index Report, 2023, there has been a sudden rise in AI technology and has also reported a lot of misuses by using AI technologies that range from deep fakes to facial recognition and over to surveillance efforts. It's also been witnessed that India plays an important role in the AI ecosystem, thereby ranking in the top position. In the US, only 35% of Americans are acting positively towards emerging technological products. Even though, as per the report, it specifies that India ranks first in terms of developing AI, China has been in the dominating position in terms of the installation of robots since 2021. The study also portrays that both countries, India and China, are leading an optimistic approach in terms of AI, and on the other hand, the US is in terms of adopting AI tools.[44]

We have also seen the regulations that has been passed by China and India, and when analysing the two regulations we can see that the Chinese government's AI frequently cite upon US national security think tank publications as well as their leadership in terms of military efforts are inevitable but, when looking onto the other hand as to India it seems to be nowhere close to China as its focused on specific fields but due to totalitarian control and as China has more population it thereby, gives rise to more number of companies. We can also see that the focus on China is in terms of competing with the West, but on India, it's in terms of social development and growth. It has also been found that China focuses on local markets, whereas India focuses on global initiatives, thereby fostering international cooperation.[45]

When looking at the international artificial intelligence maturity model as published by the International Business Institute, it specifies that both countries, China and India, are integrating AI as well as educating people about it. This model also specifies the organization's expectation on AI feasibility, It is also found that the most progressive market is India, which is ranked at 4.58 when compared to China at 4.25. However, when comparing business engagement with AI, it's relatively higher, as we can see a striking balance rate of 96% and 94 % respectively in India and China when compared to other countries.[46] When

[43] AI ecosystem: Where does India stand when compared to the US and China, Centre for Security and emerging technology, (Dec 30th, 2024, 7:00 pm), https://cset.georgetown.edu/article/ai-ecosystem-where-does-india-stand-compared-to-the-us-china/#.
[44] Bidisha Saha, India, China more positive about AI products than US: Stanford Report India Today, April 6th, 2023.
[45] Ibid [14].
[46] Indian Companies top AI integration readiness, outpacing China and global peers, Manufacturing Today, July

looking at the ambit of the United States, we can see that AI has revolutionized business operations, thereby enabling companies to enhance their productivity levels. It's been reported that a substantial number of businesses, i.e., around 53%, are leveraging AI in streamlining production processes, while the rest 51% are employed towards automating workflows.[47]

VI. CONCLUSION AND SUGGESTIONS

The impact of Artificial Intelligence is undeniable, whereby it transforms how organisations operate and interact with their stakeholders, but when comparing artificial intelligence operations in India, China, and the US, we have got a clearer idea that US is one of the greatest leaders in terms of AI when compared to China and India. It has also been found that the future implications of AI in business operations are in a promising stage, which has brought out significant advancements in revolutionizing organisational functioning.[48]

It's also been seen that artificial intelligence has transformed businesses rapidly in India, China, and the US which thereby offering numerous benefits like improved efficiency, enhanced customer experiences, and also in terms of innovative ideas. Some of the suggestions that can be bought out are that governments and organizations have to focus more on developing AI talent pools in terms of addressing demands of AI professionals, to develop more comprehensive regulations in ensuring AI development and lastly in terms of pointing towards liability as who becomes accountable for the consequences of AI systems.

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30th, 2024.

[47] Bergur Thormundsson, 'Internal processes business owners in the US use artificial intelligence (AI) to Improve in 2023, Statista, (Dec 31st, 2024, 11:00pm), https://www.statista.com/statistics/1425420/internal-process-improved-by-ai/.

[48] Dr. Mohammed Abdul Raffey 'and others', The impact of artificial intelligence in business operations: Investigating the current state and future implications of AI technologies, Vol 13 Issue 10, Journal of Pharmaceutical negative results (2022).

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