

# A Study on the Investment Trends in Artificial Intelligence

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## **Abstract**

The world has witnessed numerous breakthroughs and dramatic changes taken place over the last 50 years. One among such breakthroughs is Artificial intelligence. Tremendous efforts have been put into research and developing a practical application of AI since the year 2000. Growing awareness about the unimaginable advantages from AI has lured the attention of companies, both technological and non-technological, to channelize their investments beneficially. It is undeniable that AI is already the reality of today and will be way of future. This paper focuses at studying the investment trends of business world in the development and integration of Artificial Intelligence.

## **1. INTRODUCTION**

What is business without technology in today's world? Or how the world would be without technology? Hard to image, right! Technology has completely changed the way world functions today. Decades ago, the Internet was the biggest leap in the history of technology. It was considered as inaccessible and unaffordable one for the general public. But today Internet is in the hands of everyone. Technology doesn't stay constant. It keeps evolving, developing and improvising itself from time to time. The world has seen various advancements of technology that has reshaped the very lifestyle of mankind.

Over the years of development, business, politics and technology has become those super powers that decide the way the world functions. Business and technology are inseparable today. Businesses have transformed from their traditional ways and are seeking to integrate technology in every aspect of their functioning.

Technology has given the thrust for businesses to reach newer levels of excellence. Advancements in this field has lead to the creation of high-end technology which included Artificial Intelligence, Machine learning, Blockchain etc.

Previously, Business firms were focusing on developing the various departments of the organization, forecasting its environment, and funding its development operations. Business had too much to manage. AI has narrowed down all such burdens into just a single implementation. Be it data management, marketing, sale, targeting,

segmentation, inventory, customer service, analysis or anything AI can be applied to all areas of business. AI is not just robots; it is the intelligence that supersedes human intelligence.

Artificial Intelligence is the trend of today, business or entertainment, its everywhere. From grocery purchase to unmanned vehicles AI has made everything possible. This is just the beginning. AI has more surprises for the world.

## **2. WHAT IS ARTIFICIAL INTELLIGENCE**

The concept of Artificial intelligence is to bring in human intelligence into artificial machines. It is said that human brain is a super computer. But it has its own limitations. Tasks performed by humans are subject to human error and there is always a speed constrain. For a human mind to work effectively the IQ and EQ must be in sync. Moreover, the full potential of the human brain is not known yet. The prime motive of development of Artificial intelligence is to overcome these barriers.

Artificial intelligence is a blend of three advanced technology – cognitive computing, machine learning and natural language processing. Techs all around the world are aiming to make this Artificial intelligence more human like where Voice recognition AI and Duplex AI are the latest attraction.

Artificial intelligence is the reality today. It has started to impact our lives faster than we can imagine. From Siri to Netflix, AI is everywhere. The revolution brought by AI is the biggest in recent times. It is clearly visible that AI has already become an integral part our life.

### **AI, WHY IS IT IMPORTANT?**

Artificial Intelligence is so important for the basic fact that it does a job quicker and easier. Machine operations are programmed instructions being executed as commanded. Hence, AI has significant applications in various fields.

The most evident significant of AI is seen in the world of E-commerce, think about how extensive a company should work in order to bring in prospects, persuade them to become first time buyers, and the efforts put in to retain them and make them loyal and delighted customers. Companies pay heavily for advertisement, be it even a reminder ad for a 60 seconds slot in the prime time. Overall the amount spent on all these activities was large. But AI takes care of all these under one head. From SEO's to the recommended contents scrolling on the sides of the webpage, AI uses all possible ways to keep insisting customers to visit their page and persuade them to buy something when they leave. It keeps track of their visits and finds the preferences of the customers. It keeps them updated and informed about the varieties and offers available from time to time. AI has developed to that extent where, they know better about what we want than we know about ourselves.

On the other hand, AI makes the internal operations and management faster and efficient. It helps in the automation of regular and routine tasks, thus cutting cost, saving time and making labour force available to be used in areas which need more human attention. This time and cost can be invested in other areas of development. Automation helps in reducing human efforts and also making it error free.

AI is being used in research to obtain faster and accurate results. From science to business AI helps in analysis of data, interpretation and prediction and inventing all new avenues for progress and excellence. Apart from these AI is also used in the field of aviation, computer science, education, finance, government, heavy industry, medicine, human resource, media, music, news and publishing, sensors, transportation and much more.

### **Global Giants and their investments in AI**

**Google:** In 2014, Google bought an AI start-up called DeepMind for a sum of \$400 million. Since then DeepMind has been used extensively for various projects. From algorithms used in search engines to Google Assistant, AI plays an inevitable role in Google's functioning. The recent leap of Google in AI is its investment Duplex AI. The new Duplex AI can make restaurant reservations just as how a human would do and it's the first of its kind. Google has

invested in TensorFlow, an open-source software library is now Google's machine learning system. It has also come up with a project called PAIR (People + AI Research Initiative) to study and redesign the way people interact with AI.

**Amazon:** Amazon is the best example for how conventional business practices can be made online. Kiva systems, a Massachusetts company that manufactures robotic fulfillment systems, was acquired by Amazon for \$775 million. This was Amazon's second largest acquisition in the history. Kiva had warehouses that were managed by Robots. After acquisition Amazon has about 1,00,000 robots working in the warehouse. Also it has spent huge sums in SEO and Recommendations for search engines. Other notable investments of Amazon include natural language processing for Alexa, an AI powered shop at Seattle called AmazonGo, AWS (Amazon Web Service Inc) which provides cloud computing platforms for companies, Amazon LEX for building conversational interface, Amazon Polly turning text into lifelike speech and creating applications to talk, Amazon Rekognition that helps in adding image and video analysis to applications, Amazon Comprehend a natural language processing service platform, Amazon SageMaker, a machine learning platform for developers and data scientists.

**Microsoft:** In September 2016, Microsoft created an Artificial Intelligence and research group. Alongside, Microsoft ventures launched new funds for acquisition of AI startups. First of such acquisition was Element AI a Montreal based AI incubator which delivers AI software products to help decision making. Other investments include AI powered chat bots for Skype and Office365 and Cortana.

**Apple:** Apple has integrated AI into its App store identify frauds in App store. Apple bought a San-Diego based AI Startup Emotient, facial recognition technology that can detect how customers react to ads. It also acquired Vocal IQ a speech related AI company for Voice interfaces and also acquired Silk Labs an AI based personal assistant for consumer devices.

**Facebook:** In 2013, Facebook invested in the development of the FAIR group (Facebook AI research). Today it chooses the contents that appear on Facebook newsfeed, automatically tag photos and powers ad-targeting software. AI is also used to provide blind people with audio description of photo identify signs of suicide risk, and to flag fake news.

**IBM:** IBM's investment was in the development of Watson, a cognitive computing platform that can answer questions posed in natural language

**Uber:** Uber uses AI to compute its car fares depending on the routes that it takes, helps in opting out the best route, calculate the kilometers to be travelled, calculate fares according to the timing of the travel to know the traffic status of the hour. It also matches drivers with passengers using the OTP generated and providing real time tracking of the movement of the vehicle. Uber also acquired a startup Geometric Intelligence to help in setting up AI Labs in various countries.

**SalesForce:** SalesForce acquired MetaMind in 2016, a Start-up specializing in deep learning. SalesForce has also developed its own AI application known as Einstein, CRM software.

### **3. FUTURE SCENARIO**

Stanford University has undertaken a one hundred year study on Artificial Intelligence (AI100). The study focuses on the effects of AI on people's life. The study posts its up to date finding in an index called AI Index.

The initial finding has revealed that venture capitalists investments towards AI projects are showing an increasing trend. It was found that the annual investments by venture capitalists towards US based AI start-ups in this area have risen by 6 times since 2000. Also the number of AI start-up firms across the globe has increased 14 times since 2000's. Most fascinating finding of the study was that the import of industrial robots have increased from 1,00,000 in 2000 to 2,50,000 in 2015. International data corporation (IDC) expects that the robotics spending would increase by 22.8% (CAGR) in the next five years.

Companies are keen in implementing AI technology in various fields of business application. With the help of such application, companies expect their Global Revenues to grow from \$62 billion in 2012 to \$31.2 billion in 2025. More than 84% of the globally performing enterprises believe that investing in AI will give them a competitive advantage.

While Global Giants like Google and Microsoft are investing huge sum of money in developing and upgrading to the next level of technological advancements, on the other side start-ups are becoming early adopters of AI. They have started investing millions of dollars in integrating AI into their business stream. Meanwhile, during the last few years, China is pumping in massive investments to

achieve global leadership in AI, expecting to invest upto 150 billion dollars by 2030.

A study conducted by Constellation Research 2018 showed that developing firms are ready to invest in AI to help improve customer retention and accelerate the company's growth potential. A survey taken by them indicated that 70% of the enterprises have already been using AI at least at a basic level. When asked about the future AI plans, 92% responded that they were ready to spend up to \$5 million in AI. The study was conducted in 12 different sectors of the US. Most companies showed interest in implementing AI in areas of customer service, marketing, IT, data management etc.

The above studies showed that AI investment by these enterprises showed a significantly increasing trend year by year.

According to a forecast given by Gartner, an American advisory company, investments in AI across businesses is expected to grow by 4.5% when compared to the previous years. The investments are mainly channelized into two streams. One is Digital Transformation which involves Blockchain technology, Internet of Thing, Artificial Intelligence, Natural Language Processing, Big Data and Machine learning while the other being Hardware.

### **INDIA'S INVESTMENT IN AI**

The world is growing rapidly on the technological arena, but where are we? India is already late to adapt into the realm of next generation technology. But it's better to be late than never. However India is dominated by MNC's such as Microsoft, Accenture and IBM who have their AI research labs set in already. The Chinese government spends 2% of its GDP on research and development whereas India spends about 0.6%. Large scale real world applications of AI will take time.

India is the third largest country in the Asian continent, with high potential and scope for implementing AI. Venture capitalists globally are targeting on bringing in their investments for AI start-ups in India next to China and USA.

The government of India had started paying attention to AI and the rising need to upgrade to the next level of technology. Government's latest budget allocated Rs.3,073 crores for Digital India project which encompasses AI and Machine learning.

India's self developed AI technology will help reduce its dependency on silicon valley giants. Meanwhile NitiAayog, the government think-tank has taken up initiatives to promote biometric and Aadhaar system.

Accenture's analysis states the AI implementation can hike the Indian economy to \$957 billion by 2035. Reports also say that India has witnessed, a never before online population during the recent decades, especially the millennial. Manufacturing, Media and Entertainment, Logistics, Education and Healthcare are the fastest developing sectors in our country encompassing wide range of activities. These sectors will benefit significantly from AI implications. The prevailing trend shows that by 2020, almost 50% of the retail industry will be AI driven.

#### **4. TRAITS OF AI DEVELOPMENT IN INDIA**

Nearly about 400 AI based start-ups have been launched in India over the past few decades, catering innovations and AI based solutions at its best. Haptik is a conversational AI- platform based in Mumbai. Founded in 2013 this platform works as a combination of Artificial intelligence, natural language processing and machine learning. They are one of the world's leading platforms in building chatbots. Haptik's clientele includes Coca-cola, HDFC life, Samsung, Edelweiss Tokio, Goibibo, Amazon pay, ClubMahindra and ICICI Bank. Similarly, pune based JetSynthesys is developing in-house technology for AI in gaming. These start-ups have signaled the favorable situation prevailing the industry for AI. AI start-ups in India have jumped to \$100 million from 2014 to 2017. About \$150 million dollar has been invested in India's AI by private players.

#### **HOW FAR ARE WE?**

The world is being driven by technology and innovations. Developed nations have equipped themselves with the latest technology. India is one of those fast developing economies of the world. But as regards technology India is not on par with the developed nations.

The study shows that there are various reasons for the delayed progress of the nation towards tech upgradation. Primarily India has been negligent in noting the fact that the world economies were stepping into the next level of robust technologies. When America and china started noticing the opportunities available with AI, we were way behind them. Also India has a huge drawback of investment issues. AI demands heavy investment for its implementation. It was not until the recent NitiAayog, that the government of India actually invested a concrete sum of money for the promotion and implementation of AI.

Another hurdle is the size of the nation. India is the third largest country in the Asian continent and also ranks second after china for its human wealth. Injecting any kind of change is quite difficult for such a large landscape. But, how is China able to achieve the same with ease, even when they are bigger than us? Well, efficient utilization of human resource takes the credit. Touching upon human resource, china has a well skilled and equipped labor force. China had implemented various AI related courses and training programmes in its universities and colleges, as they started investing in it. This matched their expertise need also. China has experts who can support, supervise and guide it's AI base. In India, courses and study programmes related to AI were included during the recent years. Still majority of our colleges do not have AI as part of their under graduate or post graduate programme. Lack of experts and technical knowhow is another drawback. Countries like America and China have developed infrastructure to assist such technological developments. India is still lacking in the area of infrastructural development.

India has started to set up AI research labs, which is part of the digital India plan of the NitiAayog. However India is dominated with MNC's, who have already invested huge sum in AI. These organizations have begun to set up AI labs for their research and development purposes, which will also benefit the nation to a large extend. As stated above, the success of few AI start-ups have given momentum for many other start-ups to venture into this field. Start-ups are showing a positive trend towards AI development. Also such start-ups have gained the attention of venture capitalists whose investing ground will be India, after America and China.

#### **5. CONCLUSION**

Gone are the days when everything was done manually and it is now taken over by machines and automation. Globally, a new race has taken place to achieve leadership in AI and other disruptive technology. We are quite late in joining the global tech heads. For a country like India whose population is immense, operations like storage and maintenance of data, targeting and customization is very difficult. This is where AI comes handy. The seeds of AI have started being sown in India. There are significant signs in the nation, signaling the entry of AI into most parts of the nation. Products and services based on these technologies are already making entry into our homes, offices, institutions, hospitals, banks and

shops. Also extensive training programmes on AI have been developed by the India Institute of Technology and Indian Institute of Information Technology. India has joined the race now, all that it has to do is gain momentum.

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