

# Artificial Intelligence

The trillion-dollar future

**OMNISCIENCE CAPITAL RESEARCH**

[www.omnisciencecapital.com](http://www.omnisciencecapital.com)

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# INVESTMENT THESIS



## Artificial Intelligence – The trillion-dollar future

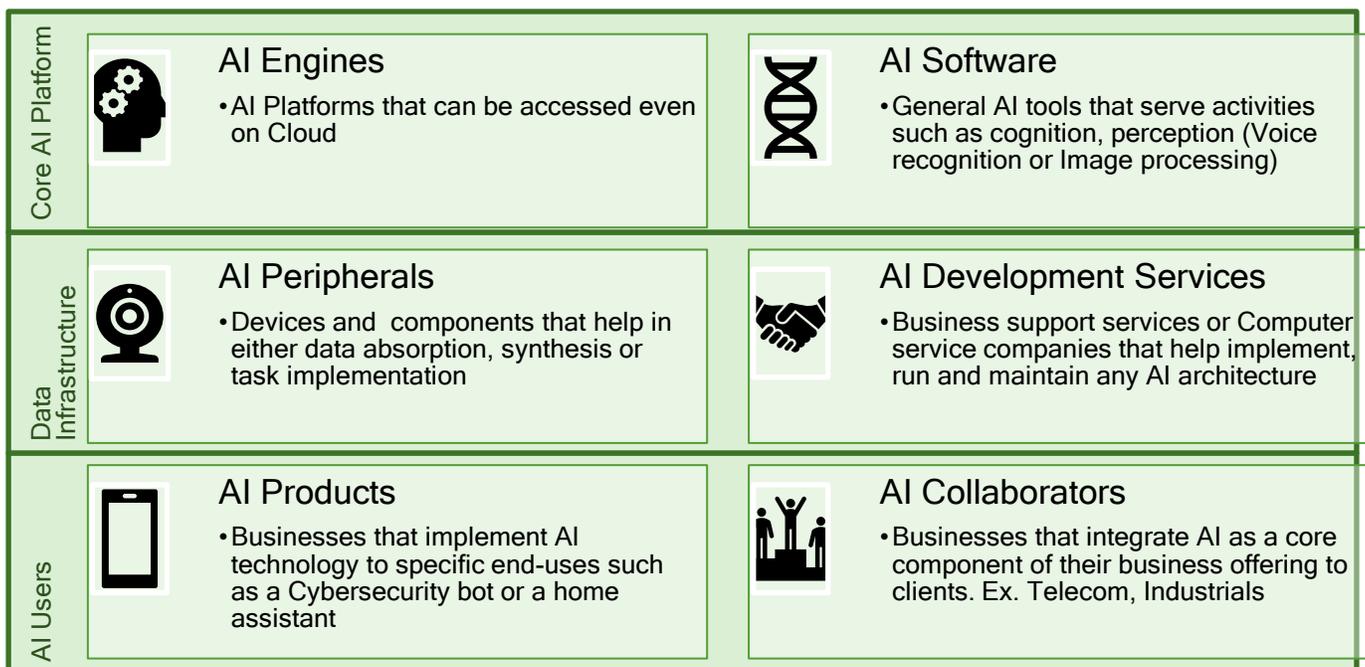
Artificial Intelligence (AI) is the fastest growing technology among all the new-age disruptive technologies. The estimates from leading consulting & research firms indicate multi-trillion-dollar economic impact in the next few years. Already thousands of companies are using AI across the globe but, it's impact in the next few years will be enormous as AI takes the centerstage from customer acquisition to service delivery in almost all industries including manufacturing, finance, education, entertainment, logistics, legal, insurance, healthcare and retail. AI could double the annual economic growth rates by 2035 and increase labor productivity by up to 40%<sup>1</sup>

\$5.7-6.5 trillion is the potential estimated economic impact by AI until 2025 by McKinsey<sup>2</sup>. The tech-tectonic shift has already started, and this is opening new business opportunities. The OmniScience strategy gives exposure to the core AI platforms and ancillaries which put together are the enablers of the whole AI ecosystem. The strategy takes exposure to the listed firms from the global developed equity markets.

Source: <sup>1</sup><https://www.accenture.com/in-en/insight-artificial-intelligence-future-growth> | <sup>2</sup>McKinsey global institute analysis

# AI ECOSYSTEM EXPLAINED

AI technology has gained serious traction in last few years. The fast-paced development in AI is driven by three key elements - higher processing power, availability of data and smart algorithms to process the huge piles of data. The following three types of businesses are structurally important in the AI ecosystem: 1) Data Infrastructure: IOT, Data Farms, Big Data, Cloud, 2) Core AI Platforms and 3) AI Users - Products & Services developers



## AI Engines

AI Engines/Platforms are core to the AI ecosystem. AI engine is composed of a set of machine learning (ML) or deep learning software and specially designed chips that are generally based on GPU and more recently, on FPGA chip architecture. Open source machine learning library such as Theano or Tensor Flow, a ML framework from a tech giant have provided platforms for designing and building AI applications.

## AI Software

This includes general AI applications for cognition - machine learning/deep learning or big data tools, and other perception activities such as Voice recognition or Image processing.

## **AI Equipment/Peripherals**

Devices and components that help in either data absorption, synthesis or task implementation. This may also include activities such as data/network security.

## **AI Development Services**

Business support services or Computer service companies that help implement, run and maintain any AI architecture. These include use-case specific service offerings such as tools for human resource management, IOT, financial management, etc.

## **AI Products**

Businesses that implement AI technology to specific end-uses such as a Cybersecurity bot or a home assistant.

## **AI Collaborators**

Businesses that integrate AI as a core component of their business offering to clients. Ex. Fintech, Telecom or Industrials.

# OMNISCIENCE AI THEMATIC: INVESTMENT FRAMEWORK

## Universe Creation

There are hundreds of companies that are active in the AI ecosystem as explained earlier. From an investment perspective the task is to identify the businesses that are well entrenched and are significant contributors to the AI ecosystem, and buy them if they are available at the right valuation. To identify the businesses that have turned the table in their favor we have considered the 5 main parameters:



These factors are used as the first level screeners to identify business that are building capabilities in the AI space. The reasoning is that each of these factors not only show the intent to build a business around AI but also indicate the structural advantage and level of commitment in terms of resource allocation.

## Scientific Alpha Framework

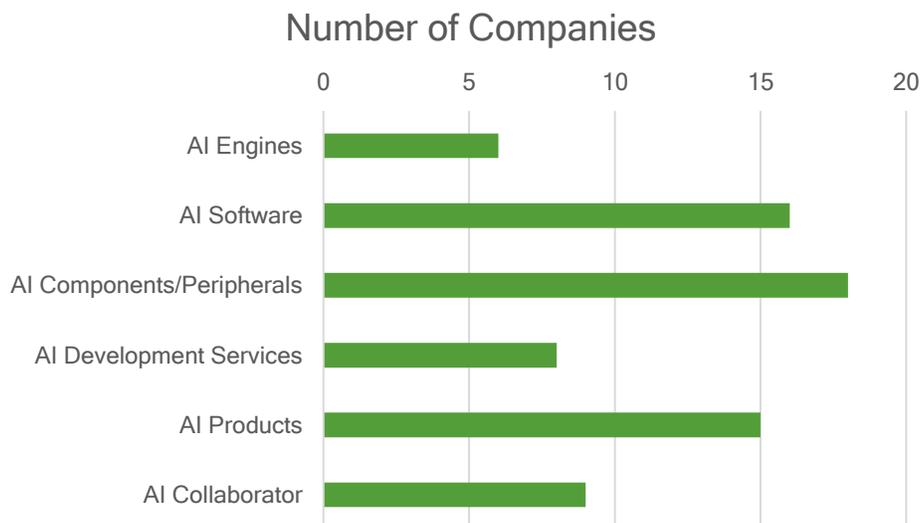
OmniScience Capital's Scientific Alpha investment framework is applied to the selected AI universe to create the portfolio. The framework helps to choose SuperNormal Companies - companies with stable business, strong balance sheet and have shown higher capital efficacy. Further, only the companies available at a discount to their intrinsic value, i.e. SuperNormal Prices, are bought in the portfolio.



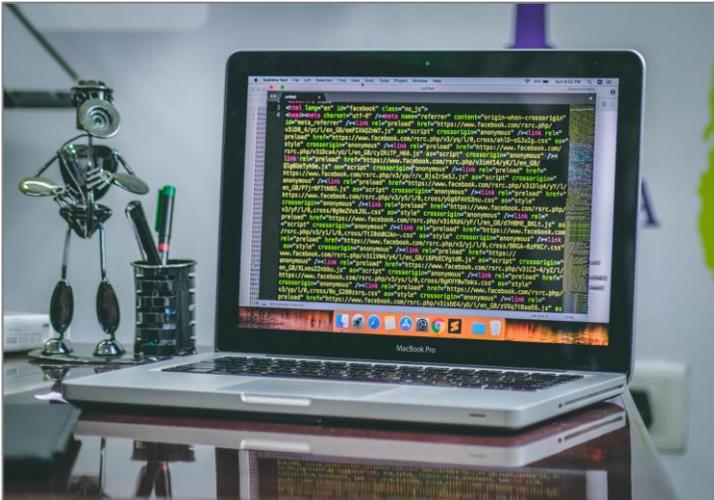
The exhibit above illustrates the scientific alpha framework. The capital efficacy is evaluated on various counts including the effectiveness of the R&D spend.

## Current AI Universe

OmniScience has curated a universe of 72 companies that are part of the AI ecosystem under one or more classifications as discussed in the above section. More will be added as new players enter the market with significant AI capabilities.



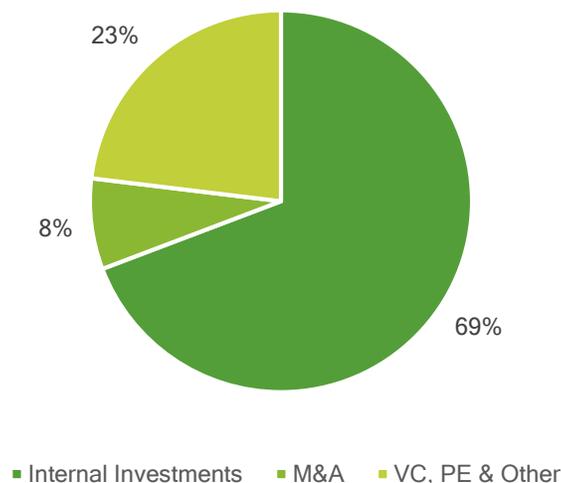
# INVESTMENTS IN AI: FASTEST GROWING TECHNOLOGY



"AI is one of the most important things humanity is working on. It is more profound than, I dunno, Electricity or Fire,"  
- Sundar Pichai

Companies are spending heavily to prepare for the big revolution unleashed by AI. Tech giants and other digital firms are leading the spending with billions of dollars committed on AI every year. Forrester had predicted that investments in AI will grow 300% in 2017. For the year 2016, McKinsey's discussion paper on AI estimates the R&D budgets to be around \$18bn to \$27bn<sup>3</sup>. IDC's Spending Guide has forecasted that worldwide spending on Cognitive and Artificial Intelligence Systems will reach \$57.6 Billion in 2021 at a CAGR of 50.1% between 2016 and 2021.

AI investments by Technology giants in 2016



Internal investments form the biggest pool of investment among the different forms of investments on AI including M&A activity and VC, PE and other external funding. The exhibit above<sup>3</sup> shows that more than 2/3<sup>rd</sup> of the investments in 2016 in AI came from the internal commitments of the large tech giants globally. This data further emphasizes the fact that the global listed firms from the developed markets are the most important pool to take exposure to when you are developing your investment strategy for AI.

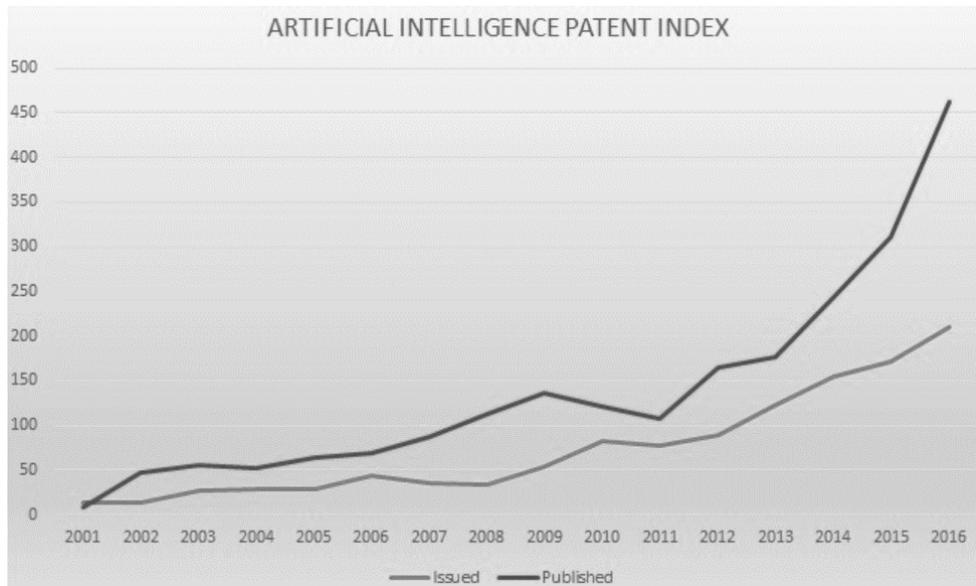
Source: <sup>3</sup><https://tinyurl.com/yapjawqd>

# AI PATENTS: RACE TO IPR LEADERSHIP



“Just as electricity transformed almost everything 100 years ago, today I actually have a hard time thinking of an industry that I don’t think AI will transform in the next several years,”  
- Andrew Ng

IP activity in AI has risen as research & investments have stepped up. ClearViewIP data shows that in 2016 over 1600 different entities filed AI-related patents, four times the amount of 20 years ago. More than 12,000 patents were filed in the US, just in the year 2016, as per Teqmine. The chart below from Hoffman Warnik shows the heightened patent activity in the US, especially after 2012-13:



Patent filings reflect the technological advancements any firm has made in terms of core capability building and patents help protect their invention and secure investments. So, patent information is important not only for accessing the depth of technological capabilities but also to sense the strength of the IP portfolio.

# RECRUITMENTS IN AI: BATTLE FOR NATURAL INTELLIGENCE

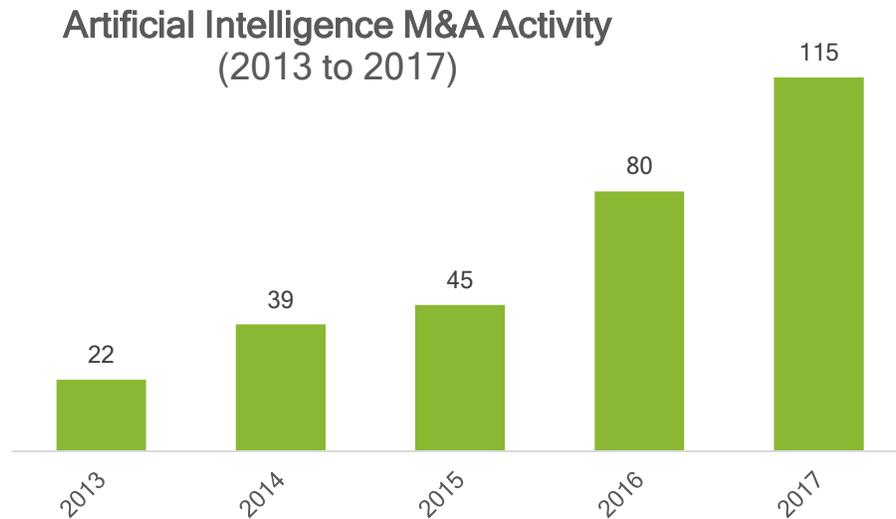


## Human talent to power AI

The fundamental approach to creating software has changed under AI or machine learning. The new approach is to make machine learn from example, rather than coding for an exact result. The challenge is that most of the knowledge that we have cannot be explained precisely. For instance, we learn how to ride a bicycle very early in life, but it is extremely difficult to put down precise instructions to teach someone how to balance a bicycle. Therefore, AI re-defined the task of IT professionals and coders. Abhijit Bhaduri, columnist and author of "The Digital Tsunami" says, "Engineers will have to solve business problems, not just write code, that means they have to work in small cross-functional teams that include designers, anthropologists, and other specialists." Right type of talent is in scarcity. As per Element AI, not even 10,000 people in the World have the skillset to conduct AI research. AI specialists in the US are commanding a compensation in the range of USD 300,000 - 500,000 per annum<sup>5</sup>. Recruitment firm Glassdoor ranked data scientist as the No. 1 job in the U.S. in 2016 and 17, based on job openings, salary and job satisfaction. Clearly, human talent is one of the most crucial aspects in establishing leadership in this evolving and expanding field. Companies that are able to hire and retain the right kind of talent will have an edge.

Source: <sup>5</sup>[https://www.nytimes.com/2017/10/22/technology/artificial-intelligence-experts-salaries.html?\\_r=0](https://www.nytimes.com/2017/10/22/technology/artificial-intelligence-experts-salaries.html?_r=0)

# ACQUISITIONS IN AI: DASH TO DOMINANCE



The large technology firms have made acquisitions to grow capabilities in inorganically. There is a race to grab artificial intelligence start-ups and smaller firms by the big technology corporations. Acquisitions in the AI space are focused on developing various capabilities inorganically. More than 300 companies operating in Artificial Intelligence space have been acquired since 2013, with more than 100 acquisitions happening in 2017 alone<sup>6</sup>.

Acquisition is a powerful tool for the large organisations to plug the gaps in AI offerings. For instance, the technology behind one of the popular AI assistants - Alexa - came from Evi Technologies which was acquired by the largest e-commerce firm in 2013. Similarly, acquisitions such as API.ai, Deepmind technologies and DNNresearch help the search engine giant enhance its capabilities.

Acquisitions also help existing players in enhancing their customer offerings. For instance, a Healthcare company that has existing research and development capabilities can enhance its R&D efforts significantly by integrating new technologies such as big data and deep learning to its clinical research platform.

Source: <sup>6</sup><https://www.cbinsights.com/research/top-acquirers-ai-startups-ma-timeline/>

# ACCESS TO DATA – FUEL FOR AI



The quality and depth of data is critical for realizing a successful AI business. Other than the surge in computational power and AI software tools, the growth of data in the recent past is one of the most important factors behind the early success of AI. IDC estimates that the digital universe will reach 40 ZB (1 ZB is  $10^{21}$  bytes) by 2020 and machine generated data will constitute 40% of this.

Businesses that have access to structured high-quality data will have an edge in developing AI applications and/or using the data to create offerings that add value to the customers.

# CONCLUSION

Technology is already the largest sector in terms of market capitalization. Five years ago, there was only one technology firm among the world's largest 5 companies and no company was valued more than \$500bn. Currently, the largest five are all technology firms and each is valued more than half a trillion dollars. The message is clear - the trillion-dollar future lies in technology. AI is at the heart of most of these new-age tech behemoths. AI is also the backbone of a large number of new-technologies including IoT, Robotics, Autonomous Vehicles, Drones, Genomics, cybersecurity, Virtual/Augmented reality, Big Data and other digital technologies. Use cases and the technology itself are evolving at a very fast pace. As per ImageNet 2017 results, the winning accuracy in classifying objects in the dataset has surpassed human abilities. Machines have already beaten best human players at complex games such as Chess, Poker and Go. From an investment viewpoint, one cannot afford to miss the AI space. The AI universe is a diverse and evolved space with multiple players from pure-play AI firms to diversified tech giants. This gives ample opportunities to pick SuperNormal Companies at a SuperNormal Prices - the Scientific Alpha way.



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## About OmniScience Capital

OmniScience is an all IITian global investment management firm that has developed a proprietary investment engine Scientific Alpha which is based on a structured value investing framework focused on enhancing safety & designed to capitalise on market inefficiencies and capture alpha.

## Scientific Alpha

Scientific alpha is built on decades of deep research on value investing philosophy as formulated and developed by Ben Graham and Warren Buffett and the first principles of investment management. It is the next stage of evolution of this philosophy focusing on alpha from safety. Resulting portfolio is what is termed a SuperNormal Portfolio or an investment grade equity portfolio (note: investment grade equity doesn't imply capital protection.)

## Global Product Suite

Our offerings are built for global listed equities (USA, UK, Europe, Japan, India) and aimed at Indian & global UHNWI, family offices & institutional clients. Through its partnerships with custodian registered with SEBI (India), SEC (USA), FCA (UK), FSC (Mauritius) & DIFC/ESCA (Dubai)- OmniScience Capital offers India's only separate account investment platform for taking exposure to Scientific Alpha portfolios of Indian and global equities.



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