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Disruptive Technology for Significant Performance Enhancement

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Abstract: *A disruptive technology is one that displaces an established technology and shakes up the industry or a groundbreaking product that creates a completely new industry. There is no doubt that 2017 was a breakthrough year for some of the technologies we have been watching. AI, VR, AR, Chatbots, self-driving cars all took significant leaps forward in terms of their practical applications and adoption, taking many by surprise. It is definitely true to say that the robots are no longer coming—they are here, and they are taking jobs. Rates of innovation and adoption will not slow down in 2018, so we've pulled together the key emerging technology trends to watch and plan for. One thing is for certain in 2018, whether you work in strategy, risk management, operations, start-ups, R&D or marketing, you need to be abreast of the potential of disruptive digital technologies.*

Keywords: *Disruptive Technology*

I. INTRODUCTION

When we think about technology, we often think about physical devices that are electrical or digital. In fact technology means far more than that. The dictionary definition refers to Technology as, “methods, systems, and devices which are the result of scientific knowledge being used for practical purposes.” As we look to the year ahead tech disruption will be driven as much by the methods and systems as it is by the devices we associate with tech disruption. It's impossible to predict exactly which trends will become the most disruptive over the course of 2018 [1]. Having said that, there are a number of developments that have and will continue to shape business strategies. From automation to sustainability, organisations are adapting to a whole new wave of consumer preferences. Here we attempt to sort through the many claims to identify the technologies that have the greatest potential to drive substantial economic impact and disruption by 2025 and to identify which potential impacts leaders should know about. Important technologies can come in any field or emerge from any scientific discipline, but they share four characteristics: high rate of technology change, broad potential scope of impact, large economic value that could be affected, and substantial potential for disruptive economic impact. Many technologies have the potential to meet these criteria eventually, but leaders need to focus on technologies with potential impact that is near enough at hand to be meaningfully anticipated and prepared for. Therefore, we focused on technologies that we believe have significant potential to drive economic impact and disruption by 2025 [2].

A. Interaction Sensors

Virtual reality and augmented reality require new paradigms with projection based displays and spatially augmented reality objects for effective interaction. There are a number of modalities for sensing user actions like infrared lighting, depth cameras, eye-tracking, EEG interfacing etc [1]. Gesture recognition is a technology that achieve dynamic human interactions without requiring physical touch or contact based input mechanisms. The tracking technology generally falls into two categories Glove based approaches and Vision-based approaches. Microsoft's Kinect has been integrated in various consumer devices for the purpose of entertainment eg controlling games, starting a movie. The kinect sensor has recently been opened up for use with windows PCs for commercial purposes. But it comes with a limitation that for a smooth skeleton tracking, the user distance from the sensor must be between 1m and 3m also Kinect cannot perform finger detection.

B. Blockchain technology

Blockchain technology is a secured chain of blocks -a series of data records, each connected to the one before it. Blockchain keeps the record of all data exchanges also utilizes a distributed system to verify each transaction. Organisations across a wide range of sectors are already experimenting with blockchain technology to establish trust networks, improve transparency, and reduce friction and costs. Despite fierce debate, interest in cryptocurrencies powered by blockchain remains strong. More commercial businesses are accepting cryptocurrency payments, starting of course with Bitcoin and Ethereum. Industrial applications will expand, encompassing the obvious financial uses as well as innovative solutions for energy, trade, marketing, healthcare, security and more.



Fig1: Blockchain technology

C. Improved decision Making with Prescriptive Analytics

The emergence of smart data discovery capabilities, machine learning, and the automation of the entire analytics workflow is enabling organisations to handle vast amounts of information. Smart data discovery capabilities in particular are driving huge advances in how we understand unstructured and dark data. Using this data organisations are able to predict market developments bringing greater depth to prognostics. Prescriptive analytics goes beyond knowing, providing recommended actions based on prior outcomes. A recommended course of action to achieve a specific outcome.

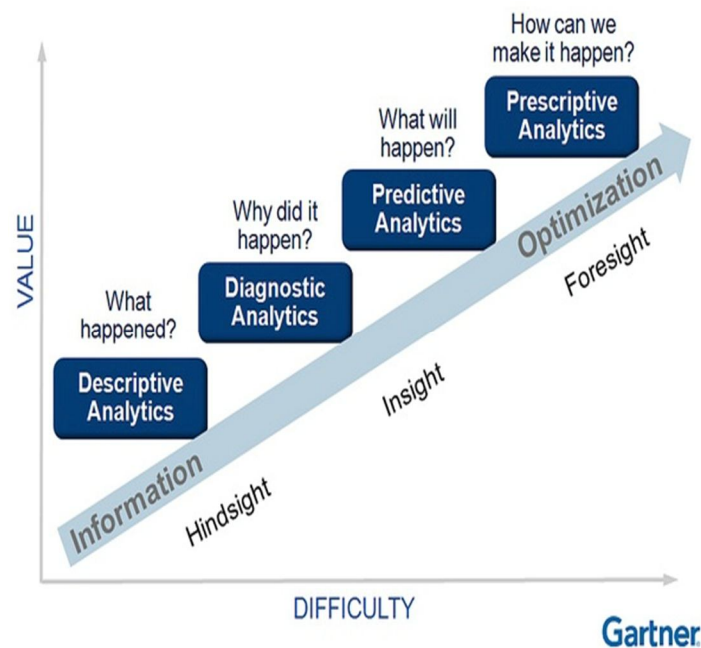


Fig 2: Prescriptive Analytics

D. Growing Interest in Digital Twins

A digital twin refers to a digital representation of physical assests, systems, services or processes. This pairing of the physical world and virtual allows analysis of data and monitoring of systems to anticipate problems well in advance, prevent downtime, develop new opportunities and even plan for the future by using simulations. The digital simulation and optimization based product design is a recent growing trend in the industries. It is more widely used in the areas where there is no privacy concern. It is used to control the efficiency of airplane engines, power turbines etc. Tesla [5] is applying the same concept to its cars. Basically digital twins is a simulation model that updates and changes in accordance with the real world assests to enable better decision making and improve efficiency of the product or system. A digital twin could be used to simulate a piece of complex machinery, for instance, predicting how it will respond in certain scenarios and how best to optimise performance. Also they provide businesses with the ability to respond to changes, improve operations and add value to the internet of things.



Fig 3: Digital Twins

E. Renewables and Clean Energy near tipping point

The cost of renewables is plunging faster than anticipated as the efficiencies of wind turbines and solar panels increase. This, coupled with huge advances in energy storage, will see the continued decline of fossil fuels. Incumbent businesses like Shell and BP are shifting their focus to renewable options as consumers gradually adopt clean energy options. One of the most notable triumphs of the renewable cause has been the manufacture of economically viable electric vehicles, and the implementation of an infrastructure to support them.



Fig 4: Renewables and Clean Energy

F. Increased Cross Sector Innovation.

Convergence, collaboration and the open source movement have all contributed to the encouragement of cross sector innovation. Companies are looking to businesses in other industries for insights and expertise that can enhance their own products and services. Agri Tech and FinTech, for instance, are developing alongside each other to tackle financial issues within farming. As cross sector innovation becomes the norm, we will see the greater application of successful strategies and business models from one industry to another.

II. CONCLUSION

As discussed above, technologies have the potential to meet the challenging criteria eventually, but leaders need to focus on technologies with potential impact that is near enough at hand to be meaningfully anticipated and prepared for. Therefore, we have summarized on technologies that we believe have significant potential to drive economic impact and disruption by 2025.

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