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AI as enabler of Disruptive Innovation

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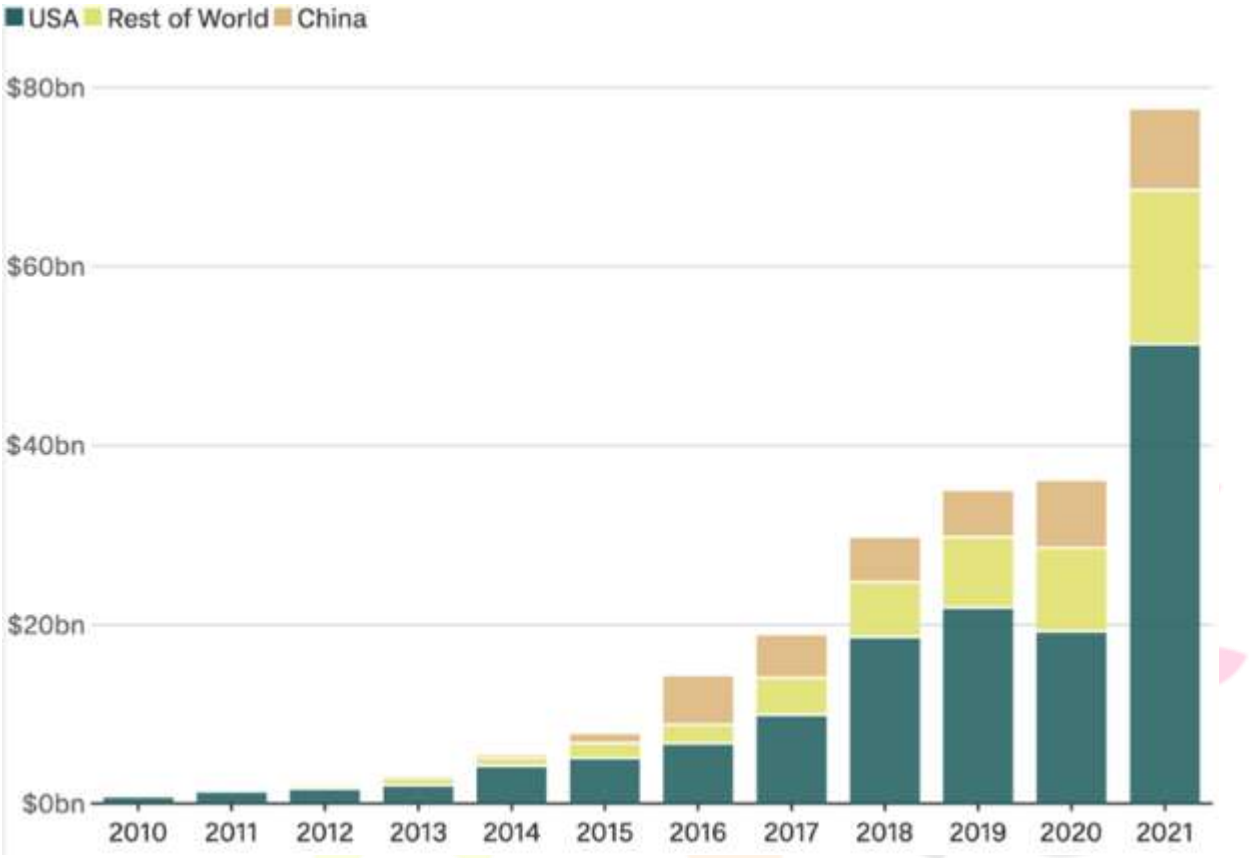
Abstract: AI is the emerging technology of the world. A revolutionary change is coming in the way industries would operate in the near future.AI is majorly going to bring far reaching changes in areas of Healthcare, Retail, Cybersecurity, Banking and Insurance. Survival of many organisations would depend on effective adoption of AI in their operations.

Key words: Artificial intelligence – disruptive innovation - industry applications – machine learning - predictive analytics- natural language processing - new age

INTRODUCTION

Artificial Intelligence has the potential to disrupt existing technologies in a big way, not by itself per se, but inducing revolutionary changes in exiting capabilities. The scenario has much in common with the introduction of electricity in 1880s.Electricity as independent source of power could be fully utilized only when organizations are designed to harness it from the ground up. Many decades passed between the first practical demonstrations showed how electrical power could be harnessed and when it began to be put to widespread use as articulated *by* Joshua Gans, Ajay Agarwal Avi Goldfarb in their book *Power and Prediction-The Disruptive Economics of Artificial Intelligence.*
During these years, electricity was applied to what Gans and his co-authors call "point solutions" – switching out existing systems (such as lighting, for example) for more efficient electrical replacements.
Although this undoubtedly led to efficiencies, it wasn't until the true value of electricity was discerned (in this case, allowing power use to be decoupled from its source) that the technology became truly transformational.
"Whereas the primary benefit of electricity was that it decoupled energy from its source, which facilitated innovation in factory design, the primary benefit of AI is that it decouples prediction from the rest of the decision-making process, which facilitates innovation in organizational design via reimagining how decisions interrelate with one another." Gans says in his book. In other words, AI will achieve its transformational potential when it enables a shift from just lowering the cost of
of operations to creating vastly more productive systems.
This means that right now, we are in "between times" for AI. This era is similar to the period between about 1890 and the 1930s where, although we could see that electricity was hugely transformational, the systemic uses that would change the world – such as the widespread electrification of factories and then homes – had not yet been established.
AI certainly will have a major impact on the global economy. It is estimated that the market for predictive analytics software will amount to more than $44.3 billion worldwide in 2030, advanced driver assistance systems will have a global market volume of $28.1 billion in 2026, global voice recognition market in enterprise, consumer, and healthcare is to reach $28 billion in 2027, and natural language processing market is anticipated to become $49.4 billion is 2027.

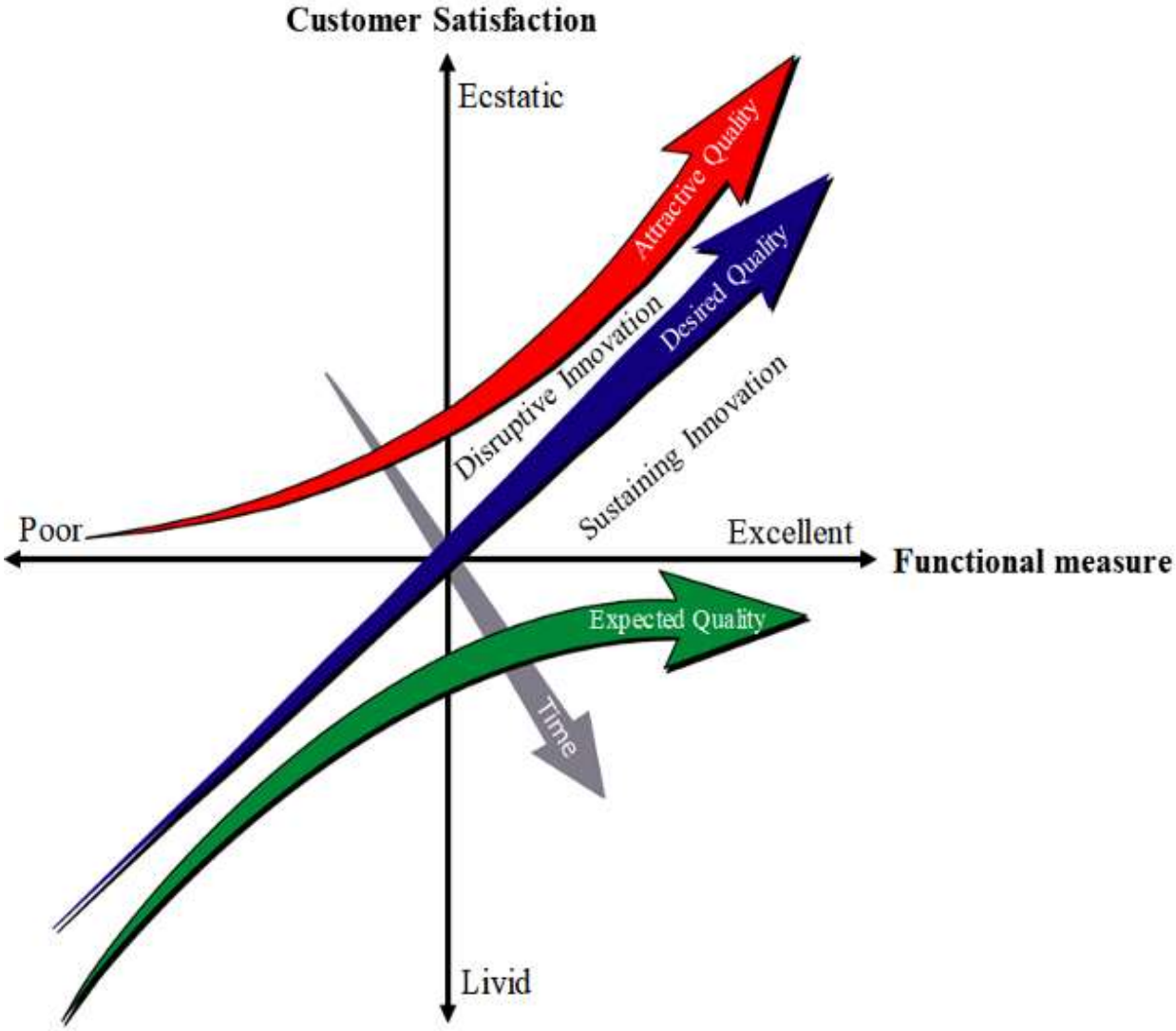
The graph below displays the rapid increase of global investment in AI:



AI AS AN ENABLER OF DISRUPTIVE INNOVATION

AI is a key enabler for disruptive innovation that leads to game changing products and services able to serve low-end or unserved consumers and migrate to the mainstream market. While sustaining innovation aims at satisfying customer current needs, improves product performance based on feedback from customers, reducing defects and making something faster and more powerful, disruptive innovation satisfies customer future needs and may provide lower performance in some key features but creates some unique features valued by market.

The Kano model developed by Karam Kano, ERP Consultant, Published July 12, 2022 is an insightful way of understanding of customers' needs for new products and services. Disruptive innovation lays in the region between attractive quality and desired quality while sustaining innovation is the region between desired quality and expected quality. As customer expectations change over time, attractive features become expected features. For example, car features such as power windows, power seats, adjustable steering wheel, and cruise control are moving from being desired features to be expected features. Other features like lane keep assist, adaptive cruise control, blind spot detection and prognostics are moving from being attractive features to be desired features. While features like super cruise and autonomous driving are still attractive features for many customers.



Customers may abandon the product/service and move to another product/service with more attractive features if the product/service does not reflect the evolving customer expectations. Now, Google is the largest marketing platform, Amazon is the largest bookseller, Skype is the fastest growing telecom company, LinkedIn is the fastest growing recruiting company, iTunes and Spotify are fastest growing entertainment companies, Airbnb is the world's biggest accommodation provider although it does not own any real estate, Uber is the world's largest taxi company with no vehicles, Facebook is the world's most popular media owner that creates no content and Alibaba is the world's most valuable retailer with no inventory.

Today companies are adopting AI on a large scale due to its capacity to bring intelligence to tasks that previously did not have it. This, coupled with the technology's ability to automate repetitive processes with intelligence, makes it a highly disruptive power in various sectors. Some of the industries that are most likely to be impacted by the widespread adoption of AI technology will be discussed below.

REASONS WHY COMPANIES ARE SO EAGER TO ADOPT ARTIFICIAL INTELLIGENCE

1. Improvement Through Machine Learning

Machine learning programs form a subset of AI that has the ability to learn from the data fed to them, even after being deployed. This gives a utility factor to companies adopting ML algorithms, as maintenance and upgrade costs are reduced. Moreover, the self-improving nature of ML allows solutions to dynamically develop according to the needs of the problems at hand.

While the capabilities of AI are varied and different from deployment to deployment, some characteristics exist across all kinds of AI. Primarily, they can utilize large amounts of data to give better solutions. This is a huge advantage for companies that have collected large amounts of data such as finance, healthcare and logistics They can simply train an AI to solve a certain problem using this data and deploy a solution explicitly suited to their needs.

AI can be deployed and improved upon with minimal effort and can also be tailored to a company's requirements using data. This tailoring of solutions for the problem at hand is one of the biggest reasons companies are attracted to AI solutions. Combined with the capability of machine learning algorithms to improve upon themselves with additional data, this makes AI very useful for enterprises.

2. Reduced Expenses

Another unique selling proposition of artificial intelligence solutions is that they are not only faster than human labour, but also considerably cheaper. This is advantageous to companies looking to explore AI as a solution, as the potential monetary gains are much higher than the initial investment.

3. Predictive Advantage

Predictive analytics, a branch of AI, is very useful across industries. Using machine learning algorithms and predictive models, a program can be trained to find the relationship between various variables. The program then uses this information to predict what the relationship between the variables will be like in the future.

For example, a predictive algorithm employed in a supply chain scenario will be trained using the data of the shipments. The quantity, supply, and demand of each item will be ingested by the algorithm, among other data. Then, the program can accurately predict the required quantity to be shipped by looking at past relationships between supply and demand.

As one can imagine, predictive analytics can optimize processes vastly, cutting down on warehousing costs and overheads. This is especially useful in retail, supply chain, and logistics markets. Predictive analytics is simply indicative of another useful characteristic of complex AI programs; pattern recognition.

By utilizing concepts from statistics and computer science, an ML program can be trained to recognize patterns. This not only includes patterns in the harvested data but also in areas, such as image and video recognition. This gives it considerable use in healthcare, defense, and customer service.

INDUSTRIES AI WILL DISRUPT THE MOST BY 2030

Artificial intelligence has entered various sectors in the last five years. With the enterprise adoption of machine learning and deep learning algorithms, some of the industries that are most likely to be impacted by the widespread adoption of AI technology are as given below

1. Healthcare
2. Customer Service and Experience
3. Banking, Financial Services, and Insurance (BFSI)
4. Logistics
5. Retail
6. Cybersecurity
7. Transportation
8. Marketing
9. Defense
10. Lifestyle

1. Healthcare

AI's adoption in the healthcare sector would bring a lot of benefits to adopters. Primarily, the healthcare sector as a whole has been focused towards collecting accurate and relevant data about patients and those who come into care.

AI enabled data analysis can effect widespread deployment of predictive healthcare. Using the power of predictive analytics, AI can help doctors make proactive moves towards ensuring their patients' health. This is a much better approach to healthcare than the post facto approach taken today. With the rise of IoT-enabled embedded devices, doctors can remotely monitor the health of patients, and can also be informed in case a patient is in an emergency.

Apart from predictive healthcare, AI can also enable an easier analysis of scan results through image recognition. This has already been used to help doctors diagnose symptoms at a much higher rate, as AI can sift through multiple scans much faster than humans. Health chatbots are also being developed. These bots would allow doctors to collect preliminary data regarding the symptoms of the patient.

2. Customer Service

A major disruption is on the cards as far as customer service sector is concerned. Natural language processing (NLP) algorithms are being used in the form of chatbots which can collect information about a customer's issues and enable customer support executives to work more efficiently. Sometimes these chatbots are able to resolve the customer's issues on their own, involving human executives only if necessary.

Instead of having an assigned algorithm with a set of predefined responses, the chatbot can dynamically adapt itself to any issue the customer is facing. Moreover, as the customer does not need to wait to get connected with a support executive, the waiting time is reduced, thereby improving customer experience.

Apart from chatbots and customer helplines, use of recommendation engines can also prove beneficial. For instance, the Amazon website dynamically generates a distinct homepage for all of its customers based on their browsing habits. Netflix also utilizes recommendation engines to a great extent, thus enhancing customer experience by providing tailored recommendations for each user.

3. Banking, Financial Services, and Insurance (BFSI)

AI and the financial sector are a great fit for each other. Similar to healthcare, BFSI companies have been collecting, collating, and organizing data for many decades, making AI a natural addition to the field. The technology has been used to detect the chance of an individual conducting a fraudulent transaction.

Banking is a sector where paperwork and documentation are ever-present. AI may also automate processes that were previously done manually, such as paperwork and documentation. This will not only decrease the time required to solve issues but also enable banks to serve customers better.

Moreover, predictive analysis has also found great success in the BFSI (Banking Finance Services and Insurance) sector. Banks can identify high-value customers using predictive analytics through data mining and parsing text online. They can also retain customers longer by providing additional services based on their spending and financial activities.

By looking at the customer's credit history, an AI can accurately predict the likelihood of an individual defaulting on a loan. This streamlines the process of onboarding new customers while reducing the likelihood of non-payment.

4. Logistics

AI in logistics holds the potential to drastically change operations. Predictive analytics can accurately predict the inventory required by a vendor and optimize routes to minimize overhead costs.

Using predictive analytics, breweries may not only able to brew the optimal amount of each beverage, but also accurately predict the demand of a certain product. This would allow them to cut down the warehousing expenses and overhead costs significantly.

Shipping companies also stand to benefit greatly from implementing AI. Usually, document checks at customs stations hold up the shipping process. Today, it takes multiple working days for a ship to get clearance to ship all its goods. Image recognition algorithms and intelligent automation can help customs officials conduct checks more effortlessly by scanning the documents involved.

This data can then be used to accurately keep track of shipments while cutting down on time spent at ports. Due to the technology's benefits, the worldwide shipping industry has also adopted AI, especially predictive analytics, to optimize supply chain economics.

5. Retail

Retail analytics is already seeing widespread adoption among retailers. Apart from optimizing the supply chain, retailers are also able to accurately predict how much to stock in their supermarkets. Moreover, by collecting data about the way that customers access the store, they are able to arrange the products according to customer preferences, thereby increasing the overall sales.

Retail is also set to be disrupted by AI in the form of self-shop stores. Amazon has already demonstrated a proof-of-concept for completely autonomous shopping. Amazon Go has already opened several stores all over the United States. It utilizes machine learning, deep learning, image recognition, and smart automation to allow customers to walk in and walk out with the products of their choice.

Apart from brick-and-mortar establishments, Amazon has cemented its leadership role in online marketplaces through retail analytics. By analyzing the customer browsing patterns and their purchases on the site, Amazon is able to accurately predict similar products, thus maximizing sales.

6. Cybersecurity

AI in cybersecurity can work with vast databases that most cybersecurity companies maintain to check for virus attacks. The technology is also being adopted by antivirus companies to provide a proactive method of combating cyberattacks.

Due to a large amount of existing data on the kinds of cyber-attacks, malware, and attack vectors, AI can be trained to exhibit reasoning. This would allow companies to employ set-it-and-forget-it AI solutions that will continually monitor the network for any suspicious or malicious activity. If such an activity is detected, the algorithm can immediately repair the hole in security or notify human handlers of the problem. This reduces the time required to solve the problem, thus minimizing risk and loss of information.

In addition to this, long-term cyberattacks on high-profile targets, such as multinational enterprises, can also be detected sooner by AI solutions. AI actively monitors the networks for malicious activities, thus allowing a company to detect an attack a lot sooner. This is integral in reducing damage and protecting the company from financial and data losses.

7. Transportation

Autonomous driving is considered as one of the most revolutionary uses of AI in the real world. Self-driving cars have already made their way into the mainstream due to companies like Tesla, and even Uber is looking into deploying autonomous vehicles. Giants like Google are also creating self-driving technology.

Apart from this, autonomous driving can also be used for goods transportation. Self-driving trucks will enable quicker deliveries and more efficient spending, as they will not require rest stops and will cost lesser than human drivers. An example of this is Tesla's Semi automobile. This truck has safety features that are made possible by AI algorithms. These image processing algorithms can determine if a collision is imminent based on the speed of the vehicle and the perceived depth of other vehicles on the road.

Soon, this technology will advance enough to allow humans to take the position of a supervisor, who will only be required to monitor the AI. Driving will become autonomous in such circumstances, thereby reducing the strain on human drivers and cutting down the expenses for companies.

8. Marketing

The marketing industry is set to benefit from AI in two main ways. The first is more personalized messaging, and the second is better targeting. Other smaller benefits, such as intelligent automation and AI-based tools, have already begun surfacing and are being adopted.
AI marketing solutions can also determine the most effective messaging for a company based on customer preferences. For example, if a customer orders a pair of shoes, the algorithm sends out a notification to the customer for similar products, thereby increasing the likelihood of the customer buying another product.

AI will enable marketing departments to reach customers more easily, as targeted advertising using neural networks becomes more widespread. Services like Google and Facebook ads have already started using AI technology for better targeting. Recommendation engines can also be used for personalized advertisements on a user-to-user basis.

9. Defense

A1 has increased the use of autonomous weapons. Expensive air defenses, ground-to-air missiles, satellites, and fifth-generation fighters are virtually powerless to stop inexpensive, easy to produce, drones and missiles powered by today's readily available, commercial-grade AI technology.

Apart from autonomous weapons, image recognition and video recognition may be used for surveillance of the general population. By building upon existing databases with biometric and facial scans, a citizen can be identified using facial recognition algorithms in surveillance networks. This increases the general security of the nation while reducing human intervention, albeit at the cost of invasion of personal privacy.

10. Lifestyle

AI will also lead to several lifestyle changes, such as smart homes and integrated living. Devices such as Google Home and Amazon Alexa, AI enabled companion robots, have become popular all over the world,

Such devices are more and more being used among the general populace. Along with the rise of the internet of things, predictive algorithms can enable an automated way of living for adopters. For example, a fridge can use image recognition algorithms to detect if it is running low on vegetables. It can then place an order at a nearby grocery store and have the groceries delivered to the user's doorstep through a robot.

These disruptions brought about by AI will fundamentally change life as we know it.

CONCLUSION

While AI application has the potential to pervasively disrupt operative processes in diverse industries, there are certain aspects which limit use of AI.

Michael Beckley , CTO and founder, Appian Corporation says talking about the sectors that will be the last to be disrupted by AI, "Highly regulated industries are proving especially resilient to AI disruption. You need to be able to explain to financial regulators why you turned someone down for a mortgage, and that is difficult or even impossible with today's deep learning technology."

According to **Jeff Denworth , VP products and co-founder, VAST Data,**
"The industries that will be the most resistant to AI are those based on some combination of personal service and creativity. As AI becomes "smart" enough to take over mundane tasks, people will start valuing the human touch.

Sure, you can order your drinks from a tablet, and they can be delivered by a simple robot, but a human bartender does more than just mixing gin with tonic. People will still want to talk to their bartender and barber, and even more importantly, when things go wrong, they want to talk to a human being who can both listen and do something about the problem.

If we're lucky, as automation and AI take over ordinary tasks, some company in a service industry like an airline or hotel chain will realize that granting their humans more authority to deal with the failures of AI will lead to greater customer loyalty and therefore profits rather than having the AIs treat humans like more AIs."

While artificial intelligence is one of the most revolutionary technologies of the 21st century, its full effects on existing markets are yet to be seen. We are at the beginning of the adoption curve for AI and its accompanying technologies, and are yet to discover its full potential or impact on industry and society. It is just the dawn of the AI age and high noon is expected to be nothing short of amazing.

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