FIDILITY SOLUTIONS

Inspired by Technology, Driven by Trust

Technology Trends To Watch Out for the Next Decade

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1. Introduction

Over the last one decade, we have witnessed the birth and evolution of disruptive technologies like AI/ML, IoT, Industrial IoT, Cloud Computing, E-commerce, 5G, and Robotic Process Automation which have redefined the Information Technology and Digital Business landscape. Today these technologies have gained a widespread adoption in our day to day lives and reached a maturity level where newer cutting-edge technologies are emerging out from these foundational platforms

After a two-year long hiatus due to the COVID-19 pandemic, as economies around the world are steering back to normalcy, breakthrough technologies in the field of Automotive, Healthcare, Augmented Reality, Supply Chain Management and Digital Banking are garnering the much-required traction, adoption and acceptance among businesses and societies

In this blogpost we will explore some of the current technology trends that are evolving at a rapid pace and have a huge potential to transform the global ecosystem, shaping the future of the world in this "new normal" of post-pandemic era!

2. Electric Vehicles

As more and more organizations, OEMs and governments around the world continue to pledge towards reducing carbon emissions and attaining net zero carbon emission by 2050, Electric Vehicle (EV) sector is bound to play a vital role in achieving this ambitious milestone. The adoption of EV and the PHEV (Plug-in Hybrid EV) in the transportation and automobile industry is experiencing an exponential rise with every passing year and it is expected to surpass the traditional Internal Combustion Engine (ICE) vehicles by 2030. The global concern on climate change is motivating corporations towards the inevitable and apparent transition of their fleet of vehicles to EVs. In addition to large and medium size organizations adopting to electrification, the growing awareness among general public on the benefits of transitioning to EVs provides a major opportunity and boost to the growth of this sector

The unprecedent advancements in driving range improvement, battery health management, real-time data mapping, engine self-checks, EV charging stations, smart charging and autonomous driving is not only expanding the capabilities of EVs but also improving its overall efficiency and capacity. Developing a public infrastructure for suitable charging points is also a key apart from the more traditional charge at work or home concept. Some of the noteworthy EV charging trends encompass Smart charging, Fast charging and V2G (Vehicle-To-Grid) charging which allows greater control and convenience on electricity consumption

Some of the major automotive companies in the global and Indian electric vehicle market include:

- Tesla
- Nissan
- Toyota
- Volkswagen
- GM
- Tata Motors

- Mahindra Electric

The entire EV ecosystem around the globe has gained momentum and governments around the world continue to lay stricter norms for zero carbon emission and offer incentives and subsidies for embarking on the EV train adoption, thus laying the road ahead for the new generation electric vehicles and transforming the world to a truly go green energy society

3. Robotic Surgery

As the name implies, Robotic surgery is an advanced form of minimally invasive surgery in which robots perform surgeries on patients with very high precision and minute incisions. The Robotic instrument consists of a scalpel which operates upon the patients, guided by a surgeon seated at the robot's control console. During a robotic-assisted procedure, the surgeon makes a small incision in the patient's body to insert miniature instruments along with high-definition cameras which provide a real-time 3D view to the surgeon at the console. The surgeon then controls the instruments by making movements which the robotic arms mimic inside the patient's body

Over the past few years, the healthcare industry is witnessing an extensive increase in adoption and deployment of surgical robots to assist minimally invasive surgeries in oncology, laparoscopy, urology, thoracic, orthopaedic and neurosurgery segments. The technological advancements in the field of automated medical instruments, high-definition 3D imaging, computing technology, sensors, remote navigation systems, robotic controlled catheters, artificial intelligence and other accessories utilized for medical surgeries are improving the precision, grip, feedback, and autonomy of robotic surgery system

Some of the key players in the global Robotic Surgery market include:

- Intuitive Surgical
- Stryker Corporation
- Medtronic
- Smith & Nephew
- Zimmer Biomet

With the surgical robotics landscape rapidly evolving, companies will need to additionally differentiate along factors such as user experience, better patient outcomes, reduced errors and faster patient recovery time to accelerate and achieve a strong position in the global market space

4. Quantum Computing

Quantum computing is a rapidly-emerging technology that is based on the principles of quantum theory namely superposition and entanglement which is used for solving complex mathematical models where traditional computing systems have limited success. Classical computers rely on deterministic states of 0 and 1 called bits, whereas QCs work on interdependent and non-linear structures called qubits which are capable of storing information of both states simultaneously, thus making them the best candidate for modelling complex non-linear and probabilistic systems such as molecule modelling, weather systems and deep neural networks

Today Quantum computing has evolved from an experimental tool to a potential future solution for complex issues, that is not possible to solve using traditional computers. The gradual and steady progress achieved in this field is paving ways for more robust QC hardware, QC software and QC as a service which companies worldwide are willing to invest and adopt in their digital business transformation journey

Some of the key technology giants and well-funded start-ups that have invested heavily in quantum research and development are

- IBM
- Google
- Microsoft
- Amazon
- QCI
- D-Wave Systems

One of the major challenges in taking Quantum Computers to mainstream deployment is the requirement of extremely cold operating temperature of approximately -272 °C to be able to maintain the state of the qubits. Extensive research and testing are ongoing for achieving a conducive operating temperature for all practical purposes. Eventually Quantum computers will give us a computing power that is a trillion times more powerful than the traditional advanced supercomputers. Quantum computing can be a game-changer in fields of cryptography, chemistry, material science, logistics, financial modelling, agriculture, and pharmaceuticals once the technology is more mature and stable. The era of Quantum Computing is already here and it has opened up a future full of possibilities and opportunities

5. Metaverse

Metaverse considered as the future of internet is the latest buzzword with a potential to completely transform and take the virtual and augmented reality landscape to another level. The term Metaverse is coined from two words meta which means beyond and universe. It is basically the other version of universe which we shall experience in the immersive and digital world of the internet. The Metaverse proposes a novel platform where the gap between the real and virtual worlds are bridged by creating a 3D digital space for people to connect, collaborate and network through the technological innovations of AR, VR and wearable devices

The key technologies that power the Metaverse are AI, AR/VR, 3D Modelling, Blockchain, Edge Computing, 5G, and Web 3.0. Over the past few years, technology leaders worldwide have invested heavily in the research and development of innovative digital services and solutions in the Metaverse. Some of the powerful business applications where Metaverse would eventually find its way into are gaming, virtual events, collaborative workspace, digital marketplace, digital real estate, social networking, online education, media and entertainment

Some of the pioneers and technology leaders who are in the forefront of developing applications and platforms for Metaverse are:

- Meta (formerly Facebook)
- Microsoft

- Apple
- Google
- Roblox Corporation
- Amazon

Needless to say, like any other emerging technology, Metaverse has its own set of challenges and limitations. The biggest challenges with Metaverse right now are identity hacking, privacy issues, safety, governance and laws, data security, currency in virtual world and platform interoperability. Companies are working round the clock to address and resolve many of these issues and it could be just a matter of time before we all could immerse ourselves in the other world of Metaverse

6. Cryptocurrency

Cryptocurrency is a virtual digital online payment method created using cryptographic encryption and hashing algorithms. It is based on blockchain technology which is a distributed ledger system in which each and every transaction is recorded as a chain of encrypted blocks thus making it unalterable and transparent. In addition to this, the use of encryption and hashing techniques provide a highly secure and safe channel for all exchanges. Unlike traditional currencies which are managed and regulated by central banking authorities, cryptocurrencies operate independently in a decentralized manner. Cryptocurrencies are created digitally through a "mining" process using powerful computers that solve complex algorithms. Over the past several years it has gained immense popularity and steering its way towards mainstream financial system

Some of the widely traded cryptocurrencies are:

- Bitcoin
- Ethereum
- Litecoin
- Dogecoin
- Tether

There is a clear divide and conflict of opinion among technologists and government regulatory bodies when it comes to accepting cryptocurrencies as an approved medium of transaction and a legal tender. This explains the volatile nature of crypto market with the prices skyrocketing one day and nose diving the other. While the number of institutions accepting crypto as a legitimate payment is increasing day by day, but still, it is in very early stages and future is quite volatile and unpredictable

7. Blockchain

Blockchain technology was first used in 2009 to create the Bitcoin cryptocurrency and thereafter it has gained widespread popularity with a potential across a range of use cases. As per the definition, Blockchain is a database that stores encrypted blocks of data and chains them together in a chronological order recording each and every transaction in the system. The benefits of blockchain technology which is predominantly a decentralized and distributed ledger system includes transparency, enhanced security, autonomy, traceability and reduced costs for operation. Today Blockchain is undoubtedly one of the most promising technology trends to watch out for the coming decade

With the scope of applications expanding to diverse sectors such as financial and banking services, supply chain management, logistics, identity management, retail and healthcare, blockchain is undeniably a futurist technology that has the capability of revamping the entire global infrastructure thereby having a positive impact on the socio-economic growth. As per the current trends blockchain could eventually find its utilization in supply chain management of vaccines and drugs, emergence of digital currency, adoption in metaverse, integration into government services and implementation of smart contracts and NFTs.

Some of the top blockchain companies which provide Blockchain-as-a-service (Baas) cloud solutions are: -

- IBM
- Coinbase
- Bit Mining Ltd
- ScienceSoft
- Ripple Labs Inc

The advancements in Blockchain technology are rapidly evolving and its impact can be felt across industries as they gear up for its early adoption in their strategy and operations. One of the major challenges with blockchain is the huge compute power needed to perform complex mathematical operations for validating and recording transactions in the network thereby making it quite energy intensive. Several initiatives and joint efforts have been taken to make it a sustainable technology with an aim to reach a net-zero carbon emission by 2040. As this technology progresses, a plethora of opportunities open up in identifying newer business models, applications, platforms and value streams and very soon we could witness a 360° transformation as more and more enterprises leverage on its benefits to drive their business and delivery models

8. 3D Printing

3D printing also known as additive manufacturing is a fast-growing technology for creating prototype designs in production and manufacturing industries. Today 3D printing is used across a vast range of use cases including architectural models, component prototyping and artificial human organs. While conventional printers print 2D graphics on a piece of paper, 3D printing produces a three-dimensional object from a digital model by adding layers of thin materials on top of one another. Common type of materials used based on the final product are sand, ceramic, plastic and metals. The major advantages of using 3D printing are reduced cost and time, rapid prototyping, less wastage, reduced errors, confidentiality and production on demand

In recent years 3D printing technology has expanded its influence across industry verticals like automotive, healthcare, manufacturing, construction and aerospace. Though it had started off as a means to build quick prototypes, with the latest innovations and advancements that have happened in this industry, we can expect to build fully functional products and solutions in the coming years. Some of the notable applications where 3D printing is expected to revolutionize and demonstrate a major disruption are organ bioprinting, dental implants, personalized pharmaceuticals, recyclable foot ware and food shortage solution. During the pandemic many companies had faced challenges in their supply chain, logistics and workforce availability and all

this has motivated them to accelerate adoption of 3D printing into their manufacturing workflow as an integrated and customized solution

Some prominent players in the global 3D printing market include:

- Stratasys, Ltd
- EnvisionTec, Inc
- 3D Systems, Inc
- GE Additive
- Canon Inc

Few of the major constraints of additive manufacturing are its high material cost, equipment cost, post processing requirements, environmental concerns, regulatory guidelines and trained labour. Though many experts had earlier believed that 3D printing would make its way to common households by the year 2020, it is still mainly limited to large scale industrial applications. Nevertheless, this technology has tremendous potential to transform the global ecosystem with more and more industries embracing it in their business and technology portfolio

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