

EMERGING TECHNOLOGY TRENDS

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UNIT TITLE : Emerging Technologies

New and quickly evolving technologies that have the potential to have a large impact on a number of industries and facets of society are referred to as emerging technology trends. Advancements in fields like information technology, artificial intelligence, automation, biotechnology, robotics, renewable energy, and more are frequently a part of these trends. These major new trends in technology are listed below:

1. **Artificial Intelligence (AI):** The creation of intelligent devices and systems that can carry out tasks that traditionally require human intelligence is known as artificial intelligence (AI). This covers computer vision, deep learning, natural language processing, and machine learning.
2. **Internet of Things (IoT):** The Internet of Things (IoT) is a network of linked devices that can communicate and collect data. It makes it possible for items like cars, appliances, and wearable technology to connect with one another, increasing automation, efficiency, and data-driven decision-making.
3. **Blockchain :** Blockchain is a distributed and decentralized digital ledger system that enables safe and open transaction recording across numerous machines. It is used in a variety of fields, including healthcare, supply chain management, and finance.
4. **Extended Reality (XR):** Technologies including virtual reality (VR), augmented reality (AR), and mixed reality (MR) are all included in XR. With the use of these technologies, the real and digital worlds are combined to create immersive and engaging experiences for a variety of markets, including gaming, education, healthcare, and training.

5. 5G and Next-Generation Networks : The next generation of wireless technology, or 5G, offers higher network capacities, lower latency, and quicker speeds. It makes it possible for cutting-edge applications like Internet of Things gadgets, smart cities, and driverless vehicles.
6. Edge Computing: Instead of transmitting data to a centralized cloud server, edge computing entails processing and analyzing information closer to the source or "edge" of the network. This lowers latency, improves real-time processing, and enables IoT and AI applications.
7. Robotics and Automation : Automation and robotics technologies are developing quickly, allowing activities to be carried out with more accuracy, efficiency, and autonomy. They can be used in household settings as well as in sectors including industry, healthcare, agriculture, and logistics.
8. Biotechnology and Genetic Engineering: By enabling customized therapy, enhancing crop yields, and solving sustainability issues, developments in biotechnology, gene editing, and genetic engineering have the potential to completely transform healthcare, agriculture, and environmental conservation.
9. Renewable Energy and Storage : The growth of renewable energy sources including solar, wind, and hydroelectric power is accelerating as the globe places more emphasis on sustainable solutions. Additionally, improvements in energy storage technology, such as fuel cells and batteries, are essential for the effective use of renewable energy sources
10. Quantum Computing: When compared to conventional computers, quantum computing is capable of doing complicated calculations at an exponentially faster rate. It has the ability to resolve challenging

issues in fields including drug development, optimization, cryptography, and climate modeling.

11. **Autonomous Vehicles:** The development of autonomous vehicles and self-driving cars has the potential to completely change the way we travel. To increase safety, efficiency, and mobility, businesses are investing in technology like cutting-edge sensors, computer vision, machine learning, and networking.
12. **Biometrics and Identity Management:** Identity management and authentication systems increasingly use biometric technology like iris scanning, facial recognition, and fingerprint recognition. In a number of industries, such as banking, government services, and access control, they provide increased security and convenience.

Impacts of Emerging Technologies

The effects and repercussions that developing technologies have on many facets of society, the economy, and individuals are referred to as their impacts. These effects may be both favorable and unfavorable. Following are a few typical effects of new technologies:

- **Economic Transformation:** Emerging technologies frequently result in large economic changes. They have the power to establish new markets, businesses, and industries. For instance, the development of e-commerce and digital platforms has transformed the retail industry and given rise to fresh company ideas. If developing technologies are not effectively managed, they may potentially cause established industries to collapse, displacing workers and increasing economic inequality.
- **Increased Efficiency and Productivity:** Many new technologies seek to increase production and efficiency across a range of industries. Processes may be streamlined, errors can be decreased, and output can be improved through automation, artificial intelligence, and robotics. Cost reductions, higher productivity, and enhanced business competitiveness can result from this. But it can also lead to job losses and necessitate retraining for the workers.
- **Enhanced Connectivity and Communication:** The way that individuals connect and communicate has already been revolutionized by technologies like the Internet, social media, and mobile devices. Emerging technologies that further improve connectivity and open up new avenues for interaction and collaboration include augmented reality, virtual reality, and enhanced telecommunications. This might benefit global networking, healthcare, and education. Privacy, the digital divide, and the standard of online interactions remain issues, though.

- **Improvements in Healthcare:** New technologies have the power to completely change how healthcare is delivered, diagnosed, and treated. Personalized medicine, remote patient monitoring, and early disease detection are made possible by developments in biotechnology, genetics, telemedicine, and wearable technology. Better health outcomes, more accessibility to healthcare services, and enhanced patient experiences are all possible results of these technologies.
- **Environmental Sustainability:** Numerous cutting-edge technologies support attempts to protect the environment. Solar and wind power are examples of renewable energy sources that help cut carbon emissions and fight climate change. Resource use is optimized by energy-efficient technology and smart grid systems. Biotechnology can help sustainable farming methods increase crop yields while minimizing their negative effects on the environment. These technologies are essential for solving urgent global problems.

Risks Associated with Emerging Technologies

Emerging technologies offer a wealth of advantages and opportunities, but they also carry certain inherent dangers and difficulties. Emerging technology concerns include, among others things:

- **Privacy and Data Security:** There are worries about privacy invasion and data breaches as technologies that gather and analyze enormous volumes of data proliferate. Strong security measures are needed to guard against unwanted access and data breaches due to the increased susceptibility of personal and sensitive information caused by the interconnectivity of devices and systems in developing technologies, such as the Internet of Things (IoT).
- **Ethical Considerations:** Regarding their creation, use, and use, emerging technologies frequently give rise to ethical questions. If improperly developed and governed, artificial intelligence (AI)

systems, for instance, could display prejudices, support discrimination, or violate people's rights. Other technologies, like genetic engineering or autonomous systems, also present moral conundrums that demand careful thought and control.

- **Job Displacement and Economic Inequality:** Technologies like automation and artificial intelligence (AI) have the power to upend entire industries and replace workers. However, if the workforce is not sufficiently prepared for the evolving job market, they run the risk of escalating economic disparity. In order to lessen the negative effects and ensure a smooth transition for affected workers, reskilling and upskilling initiatives are crucial.
- **Dependency and Systemic Risks:** Utilizing developing technology too heavily can lead to dependencies that, if broken, could have negative effects. For instance, if a single technology or platform fails or is corrupted, it may cause serious disruptions. The interconnectedness of diverse technologies, where flaws or vulnerabilities in one system can have a domino effect on others, can also create systemic dangers.
- **Social Impacts and Inequality:** If emerging technologies are not economical or accessible to all facets of society, they may worsen socioeconomic inequities. Social differences can be created as a result of the digital divide, limited access to technology, and unequal benefits distribution.