



Exploring the Impact of Emerging Technologies on Digital Economy. Future Trends and Recommendations: A Narrative Review

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ABSTRACT

Emerging technologies play a vital role in shaping digital economy. The growth of the digital economy presents both chances and difficulties for further advancement. In this era of digitalization and innovation where ultimate goal is reaching towards a robust economic development through achieving sustainable development goals digital economy enhance these goals. The digital divide between developed and developing nations continues to widen by not taking appropriate actions. On the other side latest technological developments also lead towards attainment of sustainable development goals. Emerging technologies like Artificial intelligence is effecting operational developments in different sectors of an economy. Digital technologies impact the majority of socioeconomic processes and activities in the economy. Despite the fact that world is still in the early phases of digital transformation the digital economy is expanding quickly. While various sectors have advancements in technological innovation that are boosting their effectiveness and efficacy. This study helps in identifying the current emerging areas of technologies and their impact on different sectors by reviewing existing literature. It recommends the researchers and scientists to focus on the interconnection of digitalization of economy and emerging technologies by paying more attention towards this domain of research. Additionally it suggests enhancing mutual opportunities that are meant to create a viable and inclusive digital transformation. It is essential to embrace pioneering technologies since they can greatly improve resource efficiency. It also recommends the government to make funding towards technological advancements in order to build a sustainable economy.

Keywords: Emerging Technologies, Digital Economy, Innovation, Digitalization, Artificial Intelligence

Introduction

The term "digital economy" refers to a new and creative way of doing business and conducting economic activities that use digital technologies and electronic communication. Examples of these industries include e-commerce, digital marketing, digital financial services, software development, computer games, and cloud services. Improved user experiences, quicker processing times, and simpler access to services and goods are the outcomes of the substantial shift toward online business interactions brought about by the use of digital technologies and electronic communication. Due to its enormous influence on business and economic operations, the digital economy is constantly growing and is acknowledged as a major driver of economic growth and development in many developed nations. By reviewing existing literature of the digital economy and emerging technologies and how they mutually relate while affecting the economic, social, and cultural domains this study finds the gap for future research perspectives. By uniting block chain, artificial intelligence, and digital twins, start-ups can become more innovative and efficient in their operations, which help them survive and grow in the rapidly changing digital economy (Rathod et al., 2024). Block chain as well as AI combined can improve start-ups' data security business intelligence, promoting innovation, enhancing decision-making and propel the digital economy's growth (Chowdry, 2024). AI and other emerging technologies when combined can improve productivity, customize user experiences, and change business models—all of which greatly help start-ups and spur growth in the

digital economy (Riley, 2023). Artificial intelligence can improve operational effectiveness, encourage social inclusion, and support sustainable practices—all of which can help startups succeed in the digital economy. While block chain and AI integration can improve start-ups' transaction security, efficiency, and transparency, promoting innovation and the expansion of the digital economy by resolving privacy and regulatory issues (Narwal et al., 2024). By enabling creative business models, improving efficiency, encouraging collaboration, and developing trustless systems, emerging technologies like block chain and artificial intelligence can revolutionize startups and ultimately propel growth in the digital economy (Ness ,Xuan,& Oguntibeju 2024). According to Demaci (2022) through cultivating productivity, opening up new business opportunities, changing consumer interaction the emerging technologies like block chain and AI can completely transform startups and spur the expansion of the digital economy. The assimilation of emerging technologies into the digital economy has, in general, result in heightened efficacy, resourcefulness, and competition, ultimately propelling financial expansion and affluence. The digital economy will continue to change and grow as long as businesses use these technologies and adjust to them. This will open up new possibilities for expansion and improvement in the global economy. Additionally, the

Internet of Things has made it possible for businesses to gather and evaluate enormous volumes of data instantly, giving them a better understanding of customer behavior and the ability to make more educated decisions. Because of this, companies can provide customized goods and services, which boosts client happiness and loyalty. Businesses are able to increase customer satisfaction, streamline processes, and generate new revenue streams due to these technologies. For instance, Chatbot driven by AI have transformed customer service by offering clients real-time support, and block chain technology has improved financial transaction security and transparency. Likewise, wearable technology and telemedicine are being used by the healthcare industry to improve patient care and management. Virtual and augmented reality are revolutionizing the way students interact and learn in the classroom in the education sector. For businesses to stay ahead of the curve and promote sustainable growth in the digital era, they must embrace emerging technologies. Businesses can lower expenses, increase growth and innovation potential, and streamline operations by implementing and investing in these technologies. Summing up, emerging technologies have the power to completely transform every aspect of the economy, their significance cannot be denied.



Figure 1: Emerging Technology Trends

Literature Review

Digital economy plays a crucial role in pushing global digitalization. Due to developments in technology and electric communication digital economic development takes place. Different sectors like healthcare, education, entertainment and other industries are also impacted by digital economy (Xia, Bhagaie, & Sajadi, 2023). The digital economy is changing as a result of emerging technologies, especially artificial intelligence (AI) and machine learning. These technologies also require investment in digital infrastructure to support inclusive growth, improve automation and augmentation, and encourage entrepreneurship (Spence, 2023). Advances in Artificial Intelligence (AI), Block chain, Cloud Computing, and other fields are causing a fast transformation of many other sectors. Along with improving operational effectiveness, these technologies are opening up new commercial avenues. With significant breakthroughs in communication, energy, and healthcare, emerging technologies are quickly changing a number of industries. Diabetes management has greatly improved thanks to Continuous Glucose Monitors (CGMs), which have features like real-time glucose monitoring and MARD values below 10 % (Almurashi et al., 2023). Innovative techniques for generating electricity from solar and cold space are being developed in the energy sector to address issues of efficiency and sustainability (Zhang et al., 2023). Furthermore, the use of metagenomic techniques to investigate cyanobacteria and algae is revealing valuable metabolites for use in industry (Zammit et al., 2023). Additionally, communication networks and organizational procedures are changing as a result of developments in 5G, big data systems, and smart grids (Cui et al., 2015; Bailey et al., 2022). As a study by Sestino et al. (2023) shared insights about the hyper-technological landscape of today has given rise to a global digital ecosystem known as the "data economy," where data is collected, arranged, and shared to generate economic value. They wanted to clarify how various aspects of the data economy interact with one another as documented in existing literature. Their research investigated the effects of the data economy on knowledge creation, digital business transformation, and business value creation. It also offered a thorough understanding of the opportunities, challenges, and implications of the data economy for governments, individuals, and society at large. They identified eight areas: (1) Data Security; (2) Technology Enablers; (3) Business Implications; (4) Social Implications; (5) Political Framework; (6) Legal Enablers; (7) Privacy Concerns; and (8) Data Marketplace which capture the key components of the data economy as they are currently portrayed in the literature. In a recent study by Paul et al. (2024) the role of new technologies has been discussed that have a big impact on the digital economy, like AI, IoT, and the metaverse, and need for research into their complex effects and potential future trends as well as adaptable strategies. They also mentioned that digital revolution has profoundly impacted business, society and consumers that made organizational adaptation necessary. This need has been made more urgent by the COVID-19 pandemic, which calls for a viewpoint on digital change. Artificial intelligence, augmented and virtual reality, social media, mobile apps, the Internet of Things, the metaverse, and corporate digital responsibility are important areas. Their review offered perspectives on these areas and made recommendations for future lines of inquiry. Artificial intelligence is a necessary technology for the metaverse to function according to the creator's set of rules. Use of energy storing bricks is a one way to make a building more energy-efficient by adding phase change materials (PCMs) to the building envelope, which would raise the thermal mass of the components and lower internal temperature fluctuations and peak temperatures so

PCM incorporated bricks can be used for this purpose (Saxena, Rashid, & Kashik, 2019). The development of experimental and theoretical research in quantum information processing is greatly aided by the implementation of a quantum computer. When paired with smart contracts, block chain technology offers transparent, secure, and impenetrable systems that can facilitate innovative business solutions. With billions of intelligent, communicative "things," Internet of Things (IoT) is envisioned as a component of Internet of the future. The use of xenobots is also evolving in medical research. Extended reality is used in multiple sectors like industrial, educational, retail and manufacturing. While various health researchers use genomics to diagnose, treat and prevention from diseases.

2.1 Emerging Technologies Role in Developing Economies

Particularly in developing nations, emerging technologies are essential for promoting economic growth. Productivity and sustainability are greatly increased by combining technological advancements like renewable energy and information and communication technology (ICT). ICT-related technological developments, in particular, promote economic growth by increasing productivity and efficiency (Sharma et al., 2021). Furthermore in order to use emerging technologies to increase economic competitiveness, human capital development through education and training is essential (Kowal & Paliwoda-Pekkosz, 2017).

2.2 Emerging Technologies and Emerging Markets

In addition to promoting economic growth, the adoption of cleaner energy technologies can reduce environmental impact (Lian, 2024). Industries and economies are changing as a result of emerging technologies and digitalization, especially in emerging markets. Digitization promotes socioeconomic development, resource mobilization, and business growth. For example, in the UK, digitally advanced businesses have demonstrated faster growth and an improvement in equity capital intensity, while debt capital intensity has decreased (Audretsch & Belitski, 2023).

2.3 Emerging Technologies drive Digital Economic Innovation

In order to fully realize the potential of emerging technologies for sustainable growth and societal benefit, policies and frameworks must adapt as they reshape industries and consumer behavior. This is how emerging technologies drive digital economic innovation (Yoo & Yi, 2022). Technologies that fall into the categories of connecting, collaborating, and capitalizing are revolutionizing supply chains in logistics (Wang & Sarkis, 2021). Digitalization strategies have a positive impact on technology use and are beneficial for family businesses in Brazil, in spite of current barriers (Begini et al., 2023). The big data fusion technology-based innovation driving model presented by Ji et al. (2023) effectively enhances the ability of emerging industries to come together and boosts the rate at which emerging enterprises' research and development outcomes are converted into new products which is a significant strategic development for the economy.

3. Conclusion and Research Recommendations

Artificial intelligence increases the effectiveness of operations and decision-making. Block-chain builds trust in digital interactions by offering safe ways to make transactions. Big Data makes it possible to use data-driven insights to create better business plans. While there are many benefits associated with the digital economy, there are drawbacks as well. For example, strong regulatory frameworks and the need to address digital divides can impede equitable growth in emerging markets (Lei et al., 2024). Across industries, digital technologies result in notable increases in productivity (Rumyk, 2023).

By reviewing existing studies on the topic, impact of emerging technologies on digital economy from (2020-2024); A recent book is written by Jallouli et al. (2024) in Journal of Telecommunication and digital economy furthermore they made contribution towards a conference in Portugal for springer 8th international conference in 2023 also in 2022 made contribution to 7th international conference in Romania while in 2021 contributed a conference in Estonia by springer journal of emerging technologies with the same theme of Emerging technologies, Digital Economy and innovations. While the book in 2024 has two citations while there is only one citation for 2021 conference proceedings. This analysis has been made strictly on the basis of keywords of Emerging Technologies, Digital Economy and innovation.

Through this literature review it is concluded that there is lack of research papers on connection of emerging technologies and digital economy by recent studies and there is a need to conduct more research in this era. It recommends the government to arrange more funding for technological improvements in order to construct a sustainable digital economy.

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