ISSN 2959-6130

Research on the Impact of the Advancement of Emerging Technology on the Economy

Wei Zhang[1,*]

[1] Business School, Wenzhou University, Wenzhou, China
*Corresponding author: 22210180153@stu.wzu.edu.cn

Abstract:

The advancement of emerging technology has become an important engine to promote economic progress in our time. This paper aims to explore how modern technology shapes and influences the new pattern of economic development. Through an in-depth analysis of cross-border trade cooperation, changing the employment structure, and changing the issuance and circulation of money, this paper reveals the positive role of these technologies in improving production efficiency, optimizing resource allocation, and promoting innovation-driven development. At the same time, it also pays attention to the challenges brought about by the development of science and technology, such as unemployment caused by the changing employment structure and the widening of the digital divide, and puts forward corresponding suggestions. The results show that the rational use of modern technology can not only accelerate economic growth but also promote the overall progress of society. Therefore, modern science and technology should be actively developed to achieve sustainable development.

Keywords: Development of emerging technology; Global trade and collaboration; Accelerated currency circulation; Employment structure change.

1. Introduction

With the rapid advancement of emerging technology, science and technology has become one of the important engines to shape the economic development pattern. From the industrial revolution to the digital age, technological advances and innovation have profoundly changed the way we live, our business model, and the way the global economy operates. Over the past few decades, the rapid advancement of emerging technologies, such as information technology and artificial intelligence, is redefining the way of production, distribution, consumption, and social interaction. The popularization and application of these technologies not only accelerate the digitization and automation of production processes but also greatly improve productivity and efficiency. At the same time, they also provide unlimited possibilities for the emergence of emerging industries and business models, promoting the boom of innovation. However, although the development of emerging technology has brought great opportunities and challenges to the economy, there are also some potential problems and risks. For example, the threat of privacy security after COVID-19 and the inequity caused by regional technology inequality. Therefore, it is necessary for us to deeply explore the impact of the development of emerging science and technology on the economy, and how to better use science and technology to promote sustainable economic development and inclusive growth.

Technology related to information and communication (ICT) has accelerated economic growth. It has fueled economic expansion and served as one of the main forces behind the advancement of manufacturing and international communications technologies. Numerous economic endeavors, such as global trade and foreign direct investment, primarily depend on an array of contemporary information and communication technologies. The long-term economic progress of the N11 countries is adversely affected by the expansion of ICT [1]. Simultaneously, all forms of green technology breakthroughs play a major role in the notable increase in urban employment levels, with non-resource cities and major environmental protection cities being more likely to generate good employment impacts from green technology innovation. Through mechanisms that improve air quality and encourage the optimization of the industrial structure, green technology innovation can support employment and economic development [2]. The goal of the sharing economy's new organizational architecture is to foster economic growth by utilizing digital enablement mechanisms such as value

appropriation and integration, updating and upgrading, and renewal and moderation. Transaction and acquisition costs are further reduced due to the development of digital technology and infrastructure.[3]. Blockchain proponents may enhance social good, environmental impact, and corporate governance by boosting accountability, transparency, and traceability. Further research and development in this field can promote the further development of global supply chains, becoming more sustainable and responsible, which will make a significant contribution to the scientific community [4]. CT and educational inequality are positively correlated, and the imbalanced distribution of educational resources can be made better by developing transportation infrastructure. At the same time, the relationship between transport infrastructure and educational inequality rises first and then declines [5]. Due to the development of digitalization, the output of products has gradually increased, alleviating the regional income imbalance in China. Search costs have fallen with advances in e-commerce technology, so searches are increasing and users can buy the products they want at a more affordable price. In remote, poor, or smaller areas, the increase in consumption propensity is more significant, so the equalization of consumption is greater than the income equalization, as observed in China. With the rapid advancement of e-commerce, the proportion of income and consumption inequality in China has increased significantly. In addition, this situation will gradually ease with the opening of the economy, but increase with the improvement of transportation conditions [6]. The digital currency issued by the central bank is imported into traditional receivables financing, and the risks caused by credit risk and information asymmetry are solved through digital currency technology and blockchain technology; Digital technology can regulate capital flow, and blockchain technology can monitor logistics and information flow. By incorporating the central bank's digital currency into the conventional method of financing accounts receivable, one can lessen the likelihood that financial institutions will experience loan default, increase the level of support provided by the financing, expedite the financing process, and ease the financial burden on small and micro businesses [7]. The development of AI has reduced the cost of production, increased wages, and increased productivity. AI capital also lessens labor demand by integrating labor with AI, and vice versa. The use of AI can accelerate economic growth. While nations with aging populations may sustain increased technology through work, labor-rich nations should embrace it. To make sure that these models are used as effectively as possible, care should be taken [8]. In spati-temporal economics, economists in AI significantly make a trade-off between social welfare and equality and productivity in utilitarianism [9]. According to estimates made using a non-linear dynamic panel regression model, AI has a significant "U-shaped" effect on total factor productivity (GTFP). Based on the research of industry heterogeneity, the "productivity paradox" is the result of low intelligence in labor- and resource-intensive industries not being able to successfully increase GTFP. The "resource curse" can be broken and GTFP growth can be encouraged in resource-rich regions by raising the AI level, according to an analysis of regional heterogeneity [10].

This study will illustrate the technology of emerging science and technology for the specific influence of economic development, from the influence of modern e-commerce technology for global trade and collaboration, intelligent manufacturing transformation for the change of employment structure, digital currency and electronic payment technology for the circulation of the circulation of three perspectives, explore the positive significance of the emerging science and technology for the advancement of the global economic development, find out the disadvantages of emerging science and technology for the economic advancement and put forward suggestions.

2. The Mechanism of Technological Development's Impact on the Economy

2.1 Global Trade and Collaboration

Modern technologies, such as the Internet of Things (IoT), big data analytics and automated transport systems, have greatly increased the speed of goods transport and significantly reduced their costs; creating more opportunities and reducing geographical barriers for import and export trade worldwide. At the same time, expand the international market and information dissemination channels. The development of the Internet, especially mobile Internet technology, provides a convenient channel for enterprises to enter the international market for promotion and sales; the e-commerce platform creates a cross-border online trading platform for enterprises, reduces intermediate links, improves the speed of commodity information circulation, and realizes real-time information sharing and communication. Data show that, in contrast to 2017, when international e-commerce in China only reached approximately 8 trillion yuan, the size of international e-commerce in China in 2022 achieved 15.7 trillion yuan (Fig. 1). On the other hand, emerging technology strengthens international cooperation and policy communication: the advancement of science and technology provides a closer and more convenient communication platform among governments; multilateral economic cooperation organizations such as G20 and WTO use digital means to jointly address global

economic risks and challenges. In addition, science and technology are also in many fields leading global problem-solving and cooperation (such as climate management). In the long run, technological advances optimize the industrial structure and improve the added value: high-tech industry development not only promoted the status in the global industrial chain, and through multinational companies and international division of production factors to achieve higher value-added global trade product chain and service chain formation and the development of also promote international cooperation projects and innovation ability.

Fig. 1 China's cross-border e-commerce transactions from 2017 to 2022

2.2 Change the Employment Structure

In general, with the widespread application of automation technology and robots, many repetitive and labor-intensive jobs have been replaced by machines, which directly affects the employment structure of traditional manufacturing industries and some service industries. Among them, technological progress has led to the rise of new industries, such as big data analysts and artificial intelligence developers. These emerging industries have had an increased demand for a highly skilled, highly knowledgeable workforce. From the perspective of the employed, the development of technology makes it possible to work remotely and work flexibly. More people are telecommuting through the Internet, changing the traditional working mode and promoting the balance between work and life. As technology continues to evolve, the labor market has a changing demand for skills. In the past, the demand for a low-skilled labor force was gradually decreasing, but the demand for a labor force that can operate complex machines and handle high-tech tasks is constantly increasing. To adapt to changes in the job market brought by technology, education and continuous learning become particularly important. Individuals need to constantly update their knowledge and skills to meet new job needs. Technological development may lead to further polarization of the labor market, with highly skilled workers enjoying more employment opportunities and higher income, while low-skilled workers may be at risk of employment pressure and lower income decline. Through these changes, the advancement of science and technology is reshaping the structure of the labor market and the future employment trend, putting forward new challenges and requirements to society's employment policy and individual career planning (Table 1).

Table 1. China's industry-specific estimates of the number of jobs that AI and associated technologies will create and destroy (2017-37)

	Job displacement		Job creation		Net effect	
	%	Millions	%	Millions	%	Millions
Services	-21%	-72	50%	169	29%	97
Construction	-25%	-15	48%	29	23%	14
Industry	-36%	-59	39%	63	3%	4
Agriculture	-27%	-57	16%	35	-10%	-22
Total	-26%	-204	38%	297	12%	93

2.3 Impact on Currency

Technological advances have contributed to the rapid development of digital payment systems, such as mobile payments and online banking. The application of these technologies accelerates the flow of money and improves the efficiency of money supply and financing. At the same time, in terms of quantitative analysis, the application of emerging technology, especially big data and artificial intelligence, helps the central bank to analyze the economic conditions more accurately, so as to regulate the money supply more effectively and scientifically, so as to achieve economic stability and control inflation. The advancement of science and technology has promoted financial innovation to create new money and financial products, such as the emergence of new financial instruments such as cryptocurrencies behind blockchain technology, which have changed the traditional money supply mechanism to some extent. On the other hand, the development of technology has also helped the progress of financial regulatory technology, enabling regulators to monitor and manage the money market more effectively, ensuring the stability of the money supply and the security of the financial system (Fig. 2).

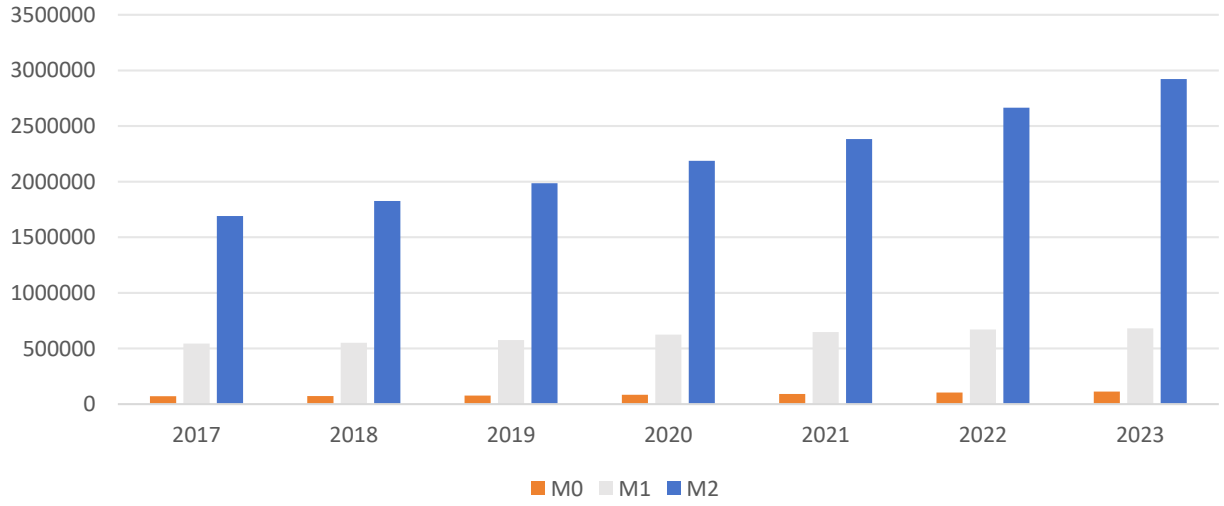

Fig. 2 China's circulating money supply(2017-2023)

3. Problems and Limitation

Although the advancement of emerging science and technology has brought many conveniences to human beings, there are also some technical limitations and defects, which may bring some problems and limitations to economic development:

3.1 Degeneration of the Human Self-Generated Processing Capacity

The advancement of emerging technology will lead to many industry practitioners and people's lifestyles are highly dependent on technology. If there are technical failures, network attacks, or other technical problems, it may lead to long-term production line interruption, personal information leakage and other serious consequences, causing serious irreversible impacts on the economy. If the international settlement system suddenly collapses in ordinary times, then global international trade will not be conducted for a considerable period, and all transactions involving foreign exchange will be suspended.

3.2 Personal Privacy and Security

With the development of technology, a large number of data from individuals and institutions are digitized and stored on the Internet. Data privacy and security issues have become an important challenge in modern society. If data is improperly used or leaked, it may damage personal rights and interests and personal information to be leaked, which will affect the normal operation of the economy.

3.3 Digital Divide

Although emerging science and technology have brought great development opportunities to developed regions, the digital divide still exists in some developing countries and regions. The lack of sufficient technological infrastructure and digital capacity causes economic development in these regions to be relatively hindered, leading to a further widening of the gap between rich and poor and increasing inequality in the global economy.

3.4 Impact on Employment in Specific Industry

With the development of automation, artificial intelligence

and other technologies, some traditional manufacturing industries and alternative industries such as duplicate labor jobs may be threatened. For example,livestreaming marketing through sales of online e-commerce will improve sales performance, but at the same time, it will lead to the unemployment of offline sales staff and forced closure of offline stores. Technological unemployment can lead to social instability and economic unrest, and it needs government and business action to address this challenge.

3.5 Impact on Environment

Some accompanying products of the development of emerging technology may have negative effects on the environment, such as e-waste and energy consumption. The intensification of environmental problems may hurt economic development and aggravate the uneven distribution of resources, leading to more poverty in poor areas.

4. Suggestions and Prospects

4.1 Strengthen the Comprehensive Integration of Esg and the Development of emerging Technology

Establish government, enterprise, and folk ESG cooperation mechanisms, promote ESG concept in combination with the advancement of emerging science and technology, the development of green technology, clean energy to reduce the enterprise production of by-products for environmental pollution, slow environmental problems for the negative impact of economic development, at the same time, the development of green technology also helps to improve the enterprise's core competitiveness and innovation ability. The implementation of ESG can direct investment toward initiatives and sectors that align more with sustainable development, maximizing resource allocation and fostering the robust and sustainable growth of the social economy.

4.2 Accelerate Industrial Transfer

Speed up some labor-intensive industries industry transfer, the development of emerging industries, support innovation entrepreneurship, promote the development of service industry, at the same time strengthen vocational training and education work, help them improve skills and knowledge level, master new professional skills, because of the advancement of emerging technology and the workers to the vacancy of emerging science and technology system, in order to prevent long unemployment for the adverse effects of social and economic development. The government can use policy tools during this time to direct related traditional industries toward rural poor areas, such as tax breaks, subsidies, and low-interest loans, to assist affected enterprises in moving toward lower costs. Additionally, local emerging science and technology systems can be developed to lessen the impact of the digital divide on the advancement of emerging science and technology caused by the wealth gap. These areas lay the groundwork for later advances in emerging science and technology.

4.3 Continue to Develop emerging Technology

To continue and vigorously develop emerging technology to reduce its production costs, mitigate the effect of the digital divide and narrow the gap between rich and poor between regions. To strengthen the development of emerging technology to reduce the probability of collapse of science and technology systems, while strengthening the protection of personal privacy information to prevent leakage.

5. Conclusion

This study shows that emerging technology has an important influence on economic development. Technologies such as loT improve the speed of transportation and reduce transportation costs, and the advancement of information channels provides convenience for international trade. On the other hand, technologies such as artificial intelligence have gradually replaced workers in labor-intensive industries through cost reduction, and many people's working patterns have changed. In addition, electronic payment technology has significantly improved the speed of money circulation and turnover, and electronic payment and digital currency are making it easier for governments to regulate the monetary situation in the market. From another point of view, the development of emerging technology has led to the degradation of people's processing ability, the increasing possibility of personal privacy leakage, the widening gap between the rich and the poor in the region, and the deterioration of the environment.

This study puts forward the view of combining the sustainable development of emerging technology with the ESG concept to accelerate the development of clean energy and green technology. The government can introduce relevant policies to guide emerging technology-related enterprises to transfer to less developed areas and strengthen the skills training for unemployed workers in line with emerging technology. In this way, it can not only accelerate industrial transfer and solve the problem of workers' unemployment but also slow down the intensification of the digital divide. Finally, the development of emerging technology should still be maintained, reduce the failure rate and strengthen the supervision of information to prevent personal privacy leakage.

References

[1] Nabi A A, Tunio F H, Azhar M, et al. Impact of information

and communication technology, financial development, and trade on economic growth: Empirical analysis on N11 countries[J]. Journal of the Knowledge Economy, 2023, 14(3): 3203-3220.
[2] He Z, Chen Z, Feng X. The role of green technology innovation on employment: does industrial structure optimization and air quality matter?[J]. Environmental Sciences Europe, 2023, 35(1): 59.
[3] Rong K, Luo Y. Toward born sharing: The sharing economy evolution enabled by the digital ecosystems[J]. Technological Forecasting and Social Change, 2023, 196: 122776.
[4] Qian C, Gao Y, Chen L. Green supply chain Circular economy evaluation system based on Industrial Internet of Things and blockchain technology under ESG Concept[J]. Processes, 2023, 11(7): 1999.
[5] Zhou P, Chen F, Wang W, et al. Does the development of information and communication technology and transportation infrastructure affect china's educational inequality?[J]. Sustainability, 2019, 11(9): 2535.
[6] Liu N, Qian Y, Gu X, et al. Digital technology, e-commerce, and economic inequality: The case of China[J]. International Review of Economics & Finance, 2024, 91: 259-271.
[7] Zhang Q, Yang D, Qin J. Multi-Party evolutionary game analysis of accounts receivable financing under the application of central bank digital currency[J]. Journal of Theoretical and Applied Electronic Commerce Research, 2023, 18(1): 394-415.
[8] Wang L, Sarker P, Alam K, et al. Artificial intelligence and economic growth: a theoretical framework[J]. Scientific Annals of Economics and Business, 2021, 68(4): 421-443.
[9] Zheng S, Trott A, Srinivasa S, et al. The AI Economist: Taxation policy design via two-level deep multiagent reinforcement learning[J]. Science advances, 2022, 8(18): eabk2607.
[10] Zhao P, Gao Y, Sun X. How does artificial intelligence affect green economic growth?—Evidence from China[J]. Science of The Total Environment, 2022, 834: 155306.