

Research on the Impact of Digital Economy on Industrial Structure Upgrading

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Abstract: With the swift advancement of the modern economy, the digital economy has progressively merged into various sectors. By leveraging cutting-edge information technology, it has become a pivotal strategy to enhance both production efficiency and quality, representing the inevitable route for the transformation and upgrading of modern enterprises and industries. As the digital economy continues to develop and spread, technology has not only given rise to numerous new industries but also fostered a conducive environment for the transformation and upgrading of traditional sectors. This study takes this context as its research backdrop, examining the development background of the digital economy. It outlines the impact mechanisms through which the digital economy influences industrial structure upgrading and subsequently identifies the specific effects of the digital economy on such upgrades. Furthermore, it constructs a reform paradigm for the digital economy aimed at facilitating the upgrading of industrial structures.

Keywords: Digital economy; Industrial structure; Transformation and upgrading; Impact

Online publication: April 28, 2025

1. Introduction

With the release of the “14th Five-Year Plan for Digital Economy Development” and other relevant policies, our nation has increasingly emphasized the significance of digital economy growth. Not only have we established objectives aimed at advancing digital transformation and creating new drivers for digital economy expansion, but we have also proposed strategic initiatives such as “digital ecology construction” and “digital China construction.” These provide both direction and structural support for enhancing industrial restructuring within the digital economy. Consequently, analyzing the influence of the digital economy on industrial structure has emerged as a critical subject in contemporary economic development research. It is essential to fully leverage the pivotal role of digital technology in fostering novel economic patterns and models, thereby effectively boosting the competitiveness of the digital sector and establishing a framework for a modernized economic system.

2. Overview of digital economy and its development

The digital economy is a model of economic development that relies on digital knowledge, digital technology,

and information network systems. The digital economy has transformed the carrier form of production factors in the traditional economic model. By leveraging information and networks, it facilitates economic interaction, thereby playing a crucial role in enhancing efficiency and optimizing structures ^[1]. More precisely, the defining traits of digital economy growth can be observed in several key areas: the swift enlargement of its scale, ongoing advancements in technology, the digitization of conventional industries, a rising need for skilled personnel, significant challenges related to information security, and substantial backing from associated policies. It not only facilitates the spread and implementation of technologies such as artificial intelligence and big data, but also offers a fresh drive and setting for the transformation of China's industrial structure. Thereby creating a comprehensive and structured economic security framework.

3. The impact mechanism of digital economy on the upgrading of industrial structure

3.1. Driven by technological innovation

The essence of the digital economy revolves around technological advancement, which facilitates industrial evolution by integrating emerging technologies. Consequently, when examining how the digital economy influences industrial structures, technological innovation serves as the primary catalyst. For instance, big data technology, when applied across various sectors, not only enhances production efficiency and enables precise resource allocation but also fully leverages data-driven insights to support strategic decision-making for both enterprises and industries. This further stimulates the growth of innovative models such as intelligent manufacturing, digital finance, and smart cities while offering a foundational impetus for the transformation and modernization of traditional industries ^[2].

3.2. Resource allocation as the motivation

Data analysis serves as a distinctive supportive feature of the digital economy, showcasing precise forecasting and decision-making abilities, particularly in resource allocation and management. Within enterprise production management, big data technology not only uncovers deeper patterns from market, client, and internal enterprise perspectives but also directs the refinement and execution of production and sales processes to attain intelligent management goals and outcomes ^[3]. On one side, the digital economy leverages advanced technologies like big data to systematically design production schedules, enhance marketing strategies, and boost production efficiency. On the other side, it facilitates seamless integration among suppliers, manufacturers, and distributors, elevating chain management effectiveness and achieving optimized resource distribution and improved management quality ^[4]. Moreover, the digital economy can employ big data analytics to identify resource wastage issues in production and marketing, offering a significant contribution to cost reduction and efficiency enhancement.

3.3. Market demand as the driving force for change

In the evolution of the digital economy, the demand patterns and consumption behaviors of modern society and consumers are subtly transforming, driving a holistic upgrade in market demand. Regarding traditional goods and services, consumers increasingly prioritize personalization, convenience, systematic approaches, and sustainability. They also exhibit a growing preference for green environmental protection, safety, and health, reflecting a multifaceted pursuit ^[5]. Consequently, green consumption has emerged as a significant trend shaping current market demand. This not only facilitates greater development opportunities for the green economy and associated industries but also offers guidance for industrial restructuring, serving as a critical factor for businesses to enhance competitiveness and align with consumer expectations.

4. The impact of digital economy on the upgrading of industrial structure

4.1. Upgrading traditional industries and promoting transformation and optimization

For traditional industries, the digital economy offers not only advanced technological backing but also fosters a trend of extensive transformation, serving as a key driver for upgrading and optimizing these sectors. For instance, in traditional manufacturing, the digital economy can swiftly identify shifts in market demand and consumer behavior through big data applications and services. Additionally, it can provide optimization recommendations based on data analysis to strengthen the competitive edge of products and services. Meanwhile, supported by cutting-edge technologies like artificial intelligence and cloud computing, the traditional manufacturing sector can transition its production methods, process flows, and departmental collaboration toward platform-based, networked, and intelligent systems. This even enables real-time monitoring and precise maintenance services for equipment and personnel, thereby enhancing production efficiency and quality. Such advancements have a direct influence on the transformation and upgrading of traditional industries ^[6].

4.2. Developing emerging industries and promoting diversified development

As a novel economic paradigm, the digital economy plays a crucial role in facilitating the transition and enhancement of the traditional economy while giving rise to numerous new sectors and consumption patterns. Driven by advancements in digital technology, forms of the new economy such as online consumption, VR gaming, and cloud-based services have gained widespread adoption. This has stimulated the growth of ancillary service industries tied to the digital economy and significantly boosted the share of the tertiary sector. For instance, innovations in intelligent terminals powered by artificial intelligence offer smart solutions for domains like home automation, smartphones, and automobiles. Additionally, the swift progress of generative AI technologies has catalyzed the expansion and practical implementation of large-scale AI models ^[7], including those developed by DeepSeek. Furthermore, with the backing of the industrial internet and smart manufacturing, breakthroughs have been achieved in the development of smart factories and service-oriented production models. Moreover, cutting-edge fields like 6G and quantum technologies are now entering their planning and developmental stages.

4.3. Improving industrial structure and enhancing service quality

The digital economy significantly contributes to the transformation and upgrading of the three major industries. Initially, in agriculture, it introduced a sophisticated management approach to modern farming. Leveraging technologies like drones, the Internet of Things, and big data, it enables smart monitoring, production, and services, offering optimized pathways for agricultural logistics and supply chains. Furthermore, within industrial manufacturing, the digital economy fosters an environment conducive to the Industrial 4.0 revolution. It delivers intelligent support across the entire chain of design, research, development, production, and sales, driving progress toward greater efficiency, intelligence, and sustainability ^[8]. Lastly, in the service sector, by reshaping people's lifestyles, the digital economy has given rise to innovative service models in areas such as finance, tourism, logistics, and catering. This not only enhances user experiences but also expands the growth avenues available to the service industry.

5. The paths of digital economy promoting the upgrading of industrial structure

5.1. Building a digital technology innovation system

To guarantee that the digital economy effectively supports the upgrading of the industrial structure, it is essential to develop a robust, stable, dynamic, and systematic digital technology innovation ecosystem.

First, it is essential to establish mechanisms for protecting digital intellectual property and patents. First,

efforts should focus on advancing the development of an intellectual property legal framework, clearly defining the scope and protection criteria for rights associated with digital innovations. Concurrently, enforcement actions must be taken to thoroughly combat violations of digital intellectual property ^[9]. Additionally, promoting the establishment of digital intellectual property trading platforms can offer a standardized market setting, facilitating the conversion and circulation of such achievements.

Second, a robust incentive system for technological innovation needs to be developed to create a fair and equitable environment for growth among innovators. From the perspective of the government, this can be achieved by offering financial backing and tax benefits. For instance, establishing dedicated support funds and favorable tax policies could help expedite industrial innovation. On the other hand, enterprises should focus on building an internal incentive framework for technological innovation, providing ample material and spiritual rewards to individuals and teams that achieve significant research and development milestones ^[10].

Third, a mechanism for technological innovation development and collaboration should be created to address and overcome related technical challenges together by engaging in deep cooperation with universities and research institutions, thereby facilitating the transformation and growth of businesses and industries.

Fourth, a publicity and education system needs to be developed to conduct training on digital technology and the digital economy within companies. Additionally, at the societal level, it should promote the outcomes of digital technology applications, along with related topics such as intellectual property rights and patent protection, thereby fostering a positive social environment ^[11].

5.2. Adhering to the integration of the digital economy

To facilitate the transformation and upgrading of industrial structure within the digital economy, it is essential to utilize the benefits of digital technology via comprehensive service platforms. Additionally, the focus should be on enhancing the synergistic development between the digital economy and industrial structure.

First, in the implementation of a digital economy service platform, it is essential to develop an industry research framework rooted in digital technology. This involves thoroughly examining the current state, obstacles, and growth prospects of traditional industries. By extracting precise and authentic data, customized transformation strategies can be formulated. The digital economy model and its associated technological infrastructure should also be integrated. For instance, in the context of traditional manufacturing, leveraging the insights from the service platform allows for the development of smart factory solutions tailored to specific enterprise traits and requirements. Additionally, this approach enables the effective utilization of technologies such as the Internet of Things and big data, highlighting their practical significance ^[12].

Second, at the service content level of the digital economy platform, it is essential to create a variety of service modules, including technical training, policy guidance, and financial assistance. During the transformation of traditional industries, maintaining a smooth transition while preventing technical and financial challenges is crucial. Additionally, strategic planning for future growth should be implemented, with scientific, specialized, and targeted development pathways proposed through ongoing discussions and expert consultations.

Third, we need to leverage service platforms to facilitate the innovative evolution of traditional industries into new business structures and models. For instance, in the manufacturing sector, the conventional manufacturing approach can transition into a service-oriented manufacturing framework, delivering consumers with tailored, individualized, and smart products. Additionally, a more comprehensive service network should be established to attain superior transformation outcomes.

5.3. Creating a sound environment for the digital economy

A favorable environment is the key element for the digital economy to enhance the industrial structure. Consequently, it demands the collaborative efforts of the government, businesses, and society to establish an optimal environment that supports the growth of the digital economy.

First, it is crucial to focus on the innovation, advancement, and practical implementation of core technologies. To achieve this, a comprehensive collaboration among the government, businesses, research institutions, and universities is essential. This partnership should not only ensure ample financial backing for the development of frontier technologies but also foster interaction and collaboration among top-tier talents, thereby continuously broadening China's intellectual property in digital technologies ^[13]. Furthermore, the function of universities and research institutes in talent cultivation must be emphasized to supply robust human resource support for technological exploration and the progression of the digital economy, ultimately creating a positive feedback loop for talent sustenance.

Second, we need to advance the digital transformation of traditional sectors while facilitating the swift growth of emerging digital economy industries. This will steer the industrial structure towards intelligence, automation, personalization, and customization. More specifically, it is crucial to foster the growth of new digital sectors such as online education, telehealth, digital media, AI large models, and others ^[14]. Simultaneously, we should leverage advanced technologies to drive the upgrade and transformation of traditional industries, enhancing their productivity and operational standards via technological innovation, management model improvements, and updated marketing strategies.

Third, it is essential to develop a system aimed at refining the foreign trade structure while steadily expanding the scale of foreign trade within the digital economy context. First, leveraging cross-border e-commerce as a central platform can effectively showcase our high-quality products and services to international markets. Second, it is crucial to establish robust connections with the global community. This involves not only comprehending the economic conditions and consumer demands of various countries and regions but also actively engaging in international digital governance initiatives to foster an environment that aligns more closely with the requirements of international collaboration.

Fourth, we need to advance the development of digital trade pilot zones. By leveraging regional demonstrations and innovations, we can identify the challenges encountered in building digital economy industries, emphasize the significant benefits and advantages brought by digital technologies, and establish a robust model of the digital economy to facilitate industrial structure upgrades. This effort will serve as a valuable reference for the entire nation.

5.4. Improving the digital economy governance system

The governance of the digital economy should be approached from multiple angles, such as through policies, legal frameworks, and regulatory measures. This will help establish a healthy ecosystem that promotes the innovative use of digital technologies while effectively managing and mitigating data-related risks scientifically.

First, the continuous issuance of laws and regulations designed to enhance the structure of the digital economy service industry is essential. These regulations should focus on promoting market equity, safeguarding consumer rights, and establishing a comprehensive risk prevention and supervision system for the digital economy.

Second, enhance collaboration and coordination in the regional digital economy by leveraging network and data support to dismantle regional barriers. Establish a cross-regional resource allocation framework to facilitate cooperation in the digital economy at the regional level. Achieve the objective of information exchange ^[15], technological sharing, data synchronization, and mutually beneficial collaboration.

Third, the developed eastern regions should take the initiative in guiding and supporting the acceleration of digital economy growth in the central and western areas. For instance, cutting-edge digital economic frameworks and technologies from the eastern coastal zones could be transferred to the central and western parts. Additionally, innovative digital economy structures and approaches can be cultivated based on the specific industrial traits of each region.

6. Conclusion

In conclusion, during modern social and economic advancement, the digital economy has introduced novel economic frameworks and development paradigms to the industrial structure. Additionally, it has supplied the necessary technology and impetus for the transformation and upgrading of the traditional industrial system, thereby fostering favorable circumstances for the profound adjustment and sustainable progress of the industrial structure. By conducting a thorough examination of the influence mechanisms and roles that the digital economy plays in shaping industrial structures, governments, enterprises, educational institutions, and communities should cultivate robust collaborative relationships. Leveraging strategies such as technological innovation, resource distribution, market evaluation, and governance framework establishment, they can facilitate the integrated evolution of the digital economy with traditional industries. This effort aims to construct a comprehensive and high-standard digital economy operational and service platform, which will significantly contribute to the development of the dual circulation system within and beyond China's economy.

Disclosure statement

The author declares no conflict of interest.

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