

The Impact of China's Digital Economy on the Transformation of Traditional Industries

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Abstract

The rapidly developing digital economy in China has had a profound impact on traditional industries, promoting economic development and technological innovation. How the new information industry represented by "artificial intelligence", "big data", "cloud computing" and "Internet of Things" can reshape manufacturing, agriculture, retail, logistics and other industries in this project. "Internet plus", "Digital China" and other initiatives have created a good atmosphere for Chinese enterprises to improve efficiency, reduce costs and improve user experience in digital transformation. This study focuses on specific examples, including smart factories using automated control and digital twin technology, precision farms with drones and artificial intelligence, and an e-commerce platform that revolutionizes the retail industry and supply chain. However, issues such as technological gaps, cybersecurity, digital illiteracy, and uneven regional development still persist. The report emphasizes that the key to addressing the above issues lies in strengthening digital infrastructure, improving staff skills, and developing balanced management policies. On this basis, the combination of 5G network, blockchain, and metaverse technologies will bring greater development space. The research findings emphasize that in order to maintain the momentum of digital transformation, government, industry, and society must collaborate. China's traditional industry can achieve long-term sustainable development and strong international competitiveness in this digital world as long as innovative strategies are adopted and existing difficulties are eliminated.

Keywords

Digital economy, traditional industries, transformation, China, innovation, Industry 4.0.

1. Overview of China's Digital Economy

1.1. Definition and Scope

The so-called "digital economy" is an economic behavior represented by the Internet, mobile Internet, big data, artificial intelligence, cloud computing, Internet of Things, etc. China is the world's largest digital country, positioning itself to promote its economic growth through digital technology. China's digital economy is no longer limited to traditional technology industries, but has also extended to various aspects such as e-commerce, finance, digital manufacturing, smart agriculture, and smart logistics[1].

1.2. Key Developments

In the past decade, due to a favorable policy environment, strong technological development, and the rise of a group of powerful technology enterprises, China's digital economy has made significant progress.

1.2.1. Government Initiatives

The strategic policies of countries such as "Internet plus", "Made in China 2025" and "Digital China" have all pointed out the direction of China's digital economy development. The purpose

of this move is to combine digital technology with traditional industries, promote innovation, and enhance economic efficiency. For example, the "Internet plus" plan is to apply network technology to medical care, education, agriculture and other aspects.

1.2.2. Technology Giants Play a Promoting Role

Chinese technology companies, including Alibaba, Tencent, Huawei, and JD.com, all play important roles in creating a digital world. Their investment in research and development, as well as the application of cloud computing and artificial intelligence technology, are promoting innovation and expanding the digital industry. For example, Alibaba's cloud computing and e-commerce platforms are revolutionizing the retail industry, while Huawei's 5G will bring revolutionary changes to the world's telecommunications industry.

1.3. Economic Impact

China's digital economy has become an important foundation for the development of gross domestic product. According to the latest figures, by next year, the manufacturing industry will account for over 40% of the gross domestic product[2], indicating that the importance of the manufacturing industry is constantly increasing. This growth has benefited from the popularity of the Internet, the popularity of mobile payment, and the innovation of digital products.

1.3.1. Creation of Job Positions

In industries such as e-commerce, financial technology, and logistics, the digital economy has generated millions of job opportunities. In addition, this also provides opportunities for small and medium-sized enterprises to use digital platforms to explore new markets and expand their businesses.

1.3.2. Technological Innovation and Productivity Improvement

Digital technology has greatly improved the productivity of traditional industries. For example, through artificial intelligence and the Internet of Things, the manufacturing process can be maximally improved, while through big data analysis, the decision-making level of the agricultural and retail sectors can be enhanced.

1.4. Challenges and Opportunities

However, while its development prospects are broad, it also faces many problems, mainly including unequal access to information networks, information security risks, and information gaps between urban and rural areas. To ensure widespread sustainable development, it is necessary to address the above-mentioned issues.



Figure 1. Overview of China's Digital Economy

2. Challenges Faced by Traditional Industries

2.1. Challenges in the Manufacturing Sector

As a pillar of the Chinese economy, the manufacturing industry has been greatly impacted by rising labor costs, intensified global competition, and traditional production models. Many traditional manufacturing enterprises rely on labor-intensive production processes to cope with the competition of global economic integration. Due to the lack of high-level automatic control and digital integration, production efficiency has decreased and operating costs have increased.

Moreover, due to geopolitical tensions and outbreaks of infectious diseases, the world's supply has been disrupted, making traditional production models even more fragile. Failure to adapt to changes in market demand or integrate real-time data into decision-making processes hinders industrial recovery capabilities and competitiveness.

2.2. Challenges in the Agricultural Sector

China's agriculture, though key to food security, is constrained by poor management and inefficient energy use. The agricultural production mode of our country is labor-intensive, and the demand for fertilizer, water and other resources is large, so it is difficult to achieve sustainable agricultural development and ecological environment deterioration.

Productivity has been hampered by the limitations of modern technologies such as precision agriculture, Internet of Things surveillance systems and HIV -induced data analysis. In addition, due to the imbalance of digital infrastructure construction in rural areas, many farmers lack effective means to improve food production and achieve optimal distribution of resources[3].

2.3. Challenges in Retail and Logistics

Although zero-sales and logistics have been integrated into Chinese society, they still have some problems such as inefficiency and dispersion. In the field of e-commerce, traditional retail companies often lack the strength to compete with e-commerce giants like Alibaba and JD. com. For small and medium enterprises, without digital marketing tools, data-based inventory management and online platforms are difficult to expand customer base and maintain profits. In logistics industry, because of the decentralization of supply chain and the inefficiency of the terminal, the transportation cost increases and the transportation speed becomes slow. Although some enterprises have begun to use intelligent logistics, but many enterprises do not have enough manpower and technology to achieve this problem.

2.4. Common Challenges Across Industries

2.4.1. Limited Digital Literacy

Many traditional companies, especially small and medium -sized enterprises, are lack of digital education for their personnel and managers. These gaps in understanding hamper the application of new technologies and the potential for innovation.

2.4.2. Resistance to Change

In traditional industries, there is often organizational inertia and resistance to change. Managers and employees who work the regular way may be reluctant to embrace the digital shift, fearing that their jobs will be replaced or their business interrupted.

2.4.3. Hidden Dangers of Network Security

As the industry digitized, they became more vulnerable to Internet security. Threats such as data leakage, hacking, and blackmail can all pose huge threats, especially to companies that do not have adequate network security.

2.4.4. Digitization is Costly

Initial investments in digital transformation, such as upgrading infrastructure, adopting new technologies, and training personnel, are not allowed by small companies. Such professionals can delay or prevent the transition to the digital age.

2.5. The Need for Transformation

Despite these and other problems, the pressure for reform is growing. With global competition, expectations for individuals and effective services, combined with the need for sustainable development, these factors have prompted traditional industries to adopt digital products.

3. Digital Economy as a Catalyst for Transformation

3.1. Adoption of Emerging Technologies

With the application of emerging technologies such as artificial intelligence, big data, blockchain, cloud computing and Internet of Things, the digital economy is driving the transformation of traditional industries. We are committed to improving productivity, streamlining operations, and improving the user experience.

For example, AI -based technologies can help manufacturers predict maintenance needs, optimize production plans, and reduce costs. At the same time, the information of farmland soil quality, weather conditions and crop growth status based on Internet of Things technology lays a foundation for information based decision-making[4]. Blockchain technology has also revolutionized the transparency and traceability of supply chains, ensuring product reliability and enhancing trust among stakeholders.



Figure 2. Digital Economy as a Catalyst for Transformation

3.2. Case Studies of Transformation

3.2.1. Manufacturing Sector: Smart Factories

China's manufacturing industry is experiencing the process from traditional labor- intensive to intelligent. Companies such as Foxconn use the Internet of Things, robotics and digital twins for real-time monitoring and automation. The process can reduce manual errors, improve production work and improve production quality.

3.2.2. Agriculture: Precision Agriculture

JD is an e-commerce giant, it has entered the ranks of precision farms. Using UAVs, AI algorithms and IoT sensors, farmers can monitor crop growth, automate irrigation, and accurately predict harvests. Structural Transformation Promotes Agricultural Productivity and Rational Allocation of Resources.

3.2.3. Retail: E-Commerce and Omnichannel Strategies

The retail sector has changed significantly since the rise of e-commerce platforms such as Alibaba and JD.com. The platform integrates big data and artificial intelligence technology to provide personalized consulting, improve inventory management and enhance customer loyalty. Omnichannel blends online and offline retail models to make the line between traditional and e-commerce clearer.

3.2.4. Logistics Services: An Intelligent Supply Chain

China's logistics industry has begun to introduce intelligent technology to improve the operational efficiency of its supply chain. Alibaba's logistics division, which uses artificial intelligence and big data analysis, optimizes paths, reduces delivery times and saves costs.

3.3. Benefits of Digital Transformation

3.3.1. Enhanced Productivity

The integration of digital technology, so that the work process becomes simple, less human intervention, the shortest downtime. This will reduce the operating costs of various industries more effectively.

3.3.2. Improving Customer Experience

Digital platform enables enterprises to use big data to understand customer preferences, to provide customers with more personalized services and better interaction. This can foster customer loyalty and thus increase sales.

3.3.3. Sustainable Operation

Digital transformation can maximize the use of energy, reduce the impact on the environment, thereby achieving sustainable development. For example, precision farming saves a lot of water and fertilizer, while smart manufacturing minimizes waste and energy consumption.

3.3.4. Enhancing Competitiveness

By using a digital approach, traditional industries can maintain their competitive advantage worldwide. Increased efficiency, innovation, and customer acceptance give the company greater competitiveness.

3.4. Overcoming Barriers to Transformation

While the benefits are obvious, there are some hurdles to be overcome in successfully applying digital technology:

Input costs: The government and private sector need to work together to encourage the use of digital products.

Working Group Training: Increasing digital reading skills and technology skills of employees is the key to long-term success.

Policy support: Management structures should promote innovation in a secure and equitable market environment.

4. Barriers to Digital Transformation

4.1. Technological Gaps

The gap of science and technology between region and enterprise is the main bottleneck that restricts the development of digital economy from traditional industry in China. At present, many emerging technologies such as artificial intelligence, big data, Internet of Things, etc. have made in-depth research on the specialized personnel and equipment needed. It is difficult for many enterprises to integrate digital tools efficiently, which results in waste of resources and

inefficiency. In addition, the implementation of these technologies is complex and poses an obstacle to enterprises that lack expertise and resources[5].

4.2. Workforce Challenges

Having a digital savvy workforce is crucial to achieving this transformation, but many traditional industries lack highly qualified employees. In this area, staff often don't understand digital tools and platforms, and their managers lack an understanding of digital strategies.

Resistance to change is another common problem. Employees fear that if they automate, they will lose their jobs and be unwilling to accept new technology. While important, efforts to strengthen technology and reinvigorate the economy require significant investment of time and money, with adverse consequences for businesses, especially small and medium-sized ones.

4.3. Security and Confidentiality of Information

As industries increasingly use digital technology, their attacks on computers become more vulnerable. Many traditional companies do not have strong network security capabilities, which makes them vulnerable to data leakage, extortion software and so on. If there is a mistake in the information system, it will cause huge economic losses, reputation damage, and even be punished by the regulatory authorities[6].

In addition, the privacy of personal data is also an important issue. Collecting, storing, and analyzing massive amounts of information from users and others raises ethical and legal concerns. In order to ensure customer confidence, companies need to follow stringent rules to protect the security of personal data.

4.4. Financial Constraints

Digital transformation requires large-scale technological infrastructure, software, training, and system updates. For many small and medium enterprises, such advance costs are difficult to bear. Moreover, because long-term investment gains (ROIs) are not immediate, adoption of new technologies is hesitant.

Although to a certain extent, the state subsidies and private investment help to some extent to reduce the economic burden, but due to differences in economic development, in the lower level of economic development, the survival of small enterprises and small enterprises are subject to certain constraints. Without adequate funding, companies will be left behind in the digital age.

4.5. Resistance of Enterprises

Another obstacle is resistance from organizations. Traditional industries usually have very deep conventions and levels, it is difficult to adapt to change. Managers may not understand the benefits of the digital transformation, and employees may have doubts about unfamiliar technologies.

Cultural influences such as a preference for traditional business models and a lack of innovative thinking are also obstacles to reform. Breaking down this cultural barrier requires strong leadership, clear communication, and a clear determination to change.

4.6. Policy and Management Issues

Although China has introduced a number of measures to support the digital transformation, but still faced with management uncertainty and inconsistency. Complex regulatory compliance requirements, unclear data management standards, and concerns about intellectual property rights can all hinder business.

Moreover, the speed of technological innovation, often beyond the regulatory framework, makes the industry a gray area without clear guidance. Policymakers need to strike a balance between encouraging innovation and ensuring fair competition, protecting data and securing networks.

5. Strategies for Overcoming Barriers to Digital Transformation

5.1. Strengthening Digital Infrastructure

China needs to continue to invest in solid digital infrastructure if it is to fill the technological gap. High-speed Internet access for the vast urban and rural poor is key to ensuring that companies, wherever they are, can participate in the digital economy.

Partnerships between the private sector and the private sector can also play a key role in the financing and configuration of digital infrastructure.

5.2. Upskilling and Reskilling the Workforce

Training a group of digital skilled staff is critical to the success of digital transformation. Business and governments should work together to organize training courses in digital reading, technological skills and innovative business practices.

(a) Government-entrepreneur: policymakers can establish a job training centre and online education platform for all workers, especially in rural and underdeveloped areas.

Corporate training programs: Companies should focus on in-house training so they know how to use computers and how to program them. An atmosphere that promotes lifelong learning can provide more help for technological progress.

In addition, establishing partnerships with universities and research institutes will help integrate teaching programs with the needs of the digital economy and ensure the continued mobility of scientific and technical personnel.

5.3. Enhanced Network Security and Data Management

How to prevent and resolve the problem of information security is an important link in constructing digital information environment. Companies should put greater emphasis on protecting their networks, including encryption, firewalls, and regular security audits.

The national government should develop a comprehensive network security architecture and data security rules to support the above efforts. Clear data management, intellectual property rights, and personal data confidentiality measures can enable companies to use digital technology in the process, under the premise of protecting customer rights, enhance the trust of enterprises.

Public awareness campaigns can also teach individuals and businesses about best practices in cybersecurity and help to create a healthy digital ecology.

5.4. Financial Encouragement and Support

Targeted financial incentives can reduce the high costs of digital conversion. To promote investment in digital technology by small and medium-sized enterprises and traditional companies, the state can do so through subsidies, tax cuts and low-interest credit.

Capital and venture capital can also play an active role in supporting startups and small businesses. By establishing innovation centres and technology nurturing institutions, governments and private investors can create conditions conducive to experimentation and growth.

5.5. Promoting Institutional Change

Defeating corporate resistance requires strong leadership and a clear vision for digital change. Leaders should inform their employees of the benefits of change, address job choices, and address uncertainty.

Change management strategy: Adopting a segmented change process and involving employees in decisions can reduce resistance.

Innovative corporate environments: Encouraging experimentation, rewarding innovative ideas, and building cross-sectoral teams can create an environment that adapts to digital change.

5.6. Changes in Policy and Regulation

The government should promulgate a clear supporting policy oriented to digital reconstruction. These include:

Streamlining: Streamlining processes and reducing company bureaucracy.

Innovate a friend's strategy: Create a management environment that supports new technologies such as artificial intelligence, blockchain, and the Internet of Things.

Regional development strategies: targeted policies to implement digital transformation, narrow disparities and promote inclusion for less developed regions.

5.7. Cooperation and Use of Cooperation

In the process of transformation, the cooperation of various stakeholders is very important to break through the obstacles of transformation. Companies, governments, research institutions, and technology suppliers should work together to develop innovative solutions, share resources, and promote industry-wide change.

Industrial consultation: Intra-industry collaboration can help share best practices and resources to accelerate the reform process.

International collaboration: Participation in global science and technology cooperation can create opportunities for access to expertise, financing and cutting-edge innovation.

6. Conclusion

In Conclusion, in order to maintain the momentum of digital transformation, government, industry, and society must collaborate. China's traditional industry can achieve long-term sustainable development and strong international competitiveness in this digital world as long as innovative strategies are adopted and existing difficulties are eliminated.

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