Research on the Development of Network Economy under the Background of Big Data

XinYi Wang[a],Qiuyi Tao[b]

{[a]2945682497@qq.com,[b]3294268346@qq.com}

Liaoning Normal University,116029,Dalian,China

Abstract. With the rapid development of science and technology in China, new industries have emerged as a result of advancements in technologies such as big data and the Internet of Things. Big data has significantly impacted consumption and production methods, leading to the emergence of the network economy, which is becoming more visible to the public. In comparison to the traditional economy, the network economy offers advantages such as speed, reach, influence, and appeal. In China's current development stage, the Internet economy holds a crucial position and represents the mainstream trend of economic growth due to the widespread adoption of online shopping and online lifestyles. However, the virtual economy also brings about challenges in terms of information security, personal security, and network security, making supervision and guarantees more challenging. This study aims to examine the status, opportunities, and challenges of the network economy within the context of big data and propose strategies for optimization.

Key words: Big data; Network economy; Individualized demand; Consumer consumption

1 Introduction

Global changes in modern social and economic life are directly dependent on the methods of production, transmission, retention, fixation and consumption of information, the growth of its specific weight in the structure of gross income [1]. With China's economic industry entering a new phase of development, big data is playing a crucial role in driving the growth of the network economy and transforming transaction methods and service forms. The business model within the network economy offers advantages such as real-time operations and high efficiency, resulting in reduced transaction time and costs, thus positively impacting trade. Furthermore, the utilization of network technology and online payment systems can enhance marginal benefits, ensuring sustainable economic development and comprehensive transactions. [2] Producers can seamlessly sell their products through multiple channels, allowing them to promptly respond to market changes and implement appropriate measures. This demonstrates how the network virtual economy has become an essential player in today's economic market. However, it is important to note that risks and challenges accompany the network economy's reliance on big data and technology, which need to be addressed during its continuous development.

ICPDI 2023, September 01-03, Chongqing, People's Republic of China

DOI 10.4108/eai.1-9-2023.2338747

2 The development status of network economy

2.1 Big Data and Network Economy

Big data typically refers to advanced network technology that enables the collection, cleaning, and analysis of vast amounts of data within a limited timeframe. It requires constant updates to data and patterns, utilizing insightful and extensive databases, as well as efficient execution to handle massive and high-speed information. Big data offers numerous advantages, including fast transmission speed, accurate calculation, wide influence range, strong appeal, and decisive decision-making power.

The network economy refers to an economic form that establishes its own business model and market principles using Internet technology, facilitating the swift flow of transaction information through networks. It expands market scale and technological influence [3], integrating diverse information resources with the aid of technology-based enterprises. Moreover, it relies on the collaborative internal and external business activities to conduct research and development, production, manufacturing, and sales. It is sought after by users due to its provision of convenient, fast, and high-quality services, distinguishing it from the traditional economy.

2.2 The Development Course of Network Economy

From the perspective of economy, the era of science and technology has experienced three important stages of development.

From the outset of storing information on the Internet to the creation of search engines, and now to the development of information classification display platforms, the network economy has emerged due to the rapid appearance of Internet technology and the growth of commercial applications.These advancements have facilitated the swift rise in consumer demand and the standardization of network goods, providing a solid base for the network economy to flourish.

The second stage is characterized by the advent of Web 2.0. This signifies a gradual shift in the use of the Internet from a one-way channel for transmitting information to a platform where users can create and share content. During this period, there is a rapid growth in the number of internet users, and various new applications such as social media, blogs, and video sharing platforms emerge one after another. The demand from previously unseen consumers surges at an astonishing rate, and the network economy expands into increasingly diverse sectors.

The fourth Industrial Revolution (I4.0) brought out many disruptive technologies that have substantially transformed existing systems and brought up new business models and processes across diverse domains and sectors [4]. Today's age is characterized by informationization, intelligence, and advancements in science and technology. The emergence of big data has provided enterprises with vast amounts of data resources.[5]The implementation of artificial intelligence algorithms has made services such as personalized recommendation and intelligent customer service more sophisticated. It also scientifically directs the marketing strategies of enterprises, enhances the optimization of marketing systems and content, and enables a comprehensive understanding of their own shortcomings. This consequently enhances the user experience and yields significant business advantages [5].

2.3 Current Situation of Network Economy

With the advancement of digital technology and the widespread implementation of social virtual economy, humans have entered a phase of digital survival and development [6]. More and more companies and individuals engage in online trading of goods and services through various internet platforms, and consumers are gradually embracing the habit of shopping and consuming online. Financial services like online payments and virtual currencies, which stem from internet platforms, are gaining popularity. As cloud computing and big data technology continue to progress, businesses and individuals are able to store and process massive amounts of data through cloud services, and utilize big data analysis to derive valuable insights and drive further growth in the digital economy. Despite the ever-changing nature of digital technology, characterized by its connectivity, intelligence, and personalization [6], it is still challenging to assert that the network economy is flawlessly new. The challenges posed by the network economy must be constantly addressed and improved upon during its implementation.

3 The development of network economy coincides with opportunities

3.1 Can deeply understand the personalized needs of users in the network economy

Big data plays a vital role in the network economy. According to CNNIC data, the penetration rate of online shopping in China is increasing rapidly, and the purchasing power of users is improving. The fusion of online consumption habits and social online shopping forms consistently fuels the expansion of the online retail market and expedites the growth of online shopping users.[7]

Big data enables the collection, storage, and analysis of vast quantities of user-generated data. By doing so, it allows businesses to gain insights into users' behaviors, preferences, and purchasing habits. This information can be used for market positioning, product design, and enhancing user satisfaction. Moreover, by examining users' historical behaviors and preferences, personalized recommendations can be made, enhancing user satisfaction, loyalty, and transaction conversion rates.

3.2 Improve the operational efficiency of network economy and achieve cost reduction and efficiency increase

Big data, as a scientific and technological tool, can effectively assist enterprises in comparing and analyzing manufacturer supply and user demand. It can provide more accurate product positioning and pricing, optimize supply chain management and operational processes, facilitate data-driven decision-making, and enhance production and supply efficiency. The network economy streamlines procedures, facilitating internet-based business transactions which save offline time and reduce transaction costs. It contributes to overall efficiency improvements and provides technical support for industrial and service transformation. [1]-[8]Visual analysis aids enterprises in predicting market trends, demand changes, and risk factors, enabling better planning of business development and resource allocation. It helps reduce inventory and excess capacity, and facilitates rational arrangement of production plans and supply chain management, ultimately leading to the harmonization of social and economic benefits.

3.3 Innovate service products and expand the network economy market

Big data enables comprehensive and accurate data support, serving as a basis for decision-making in innovation. Through data analysis and results, enterprises can predict trends more accurately, leading to the successful launch of innovative products and services that cater to market demand. This, in turn, helps increase the user base and expand the consumer market. Furthermore, big data allows businesses to uncover hidden opportunities within the data, unlocking the potential for innovation. It aids enterprises in identifying new market demands and consumer behaviors, while also addressing individual user needs through product innovation. Simultaneously, big data drives the growth of emerging industries and establishes a robust foundation for their advancement and progress. [8]

Using big data technology, enterprises can collaborate and share with external partners, innovative entrepreneurs, and developers to collectively develop innovative products and services. This open innovation model facilitates the sharing and integration of innovation resources, expediting the speed and efficiency of innovation, and fostering its growth. The fusion of digital technology and traditional real economy is a significant milestone in transformation and upgrading. By employing the dimensions of structural empowerment, resource empowerment, and psychological empowerment, enterprises can effectively reduce costs, enhance efficiency [9], expand economic markets, and increase their market share.

4 The development of network economy is facing challenges

4.1 Causing the leakage and abuse of personal privacy in the network economy

We live in an ever-changing era where it has become easier to collect, store, and analyze personal information in the network economy. [10]While the network brings convenience, it also brings with it a series of problems.

The process of collecting and analyzing big data can result in the disclosure of personal information. In the network economy, users' personal information is commonly collected and stored for personalized recommendations, targeted advertising, and other services. However, there is a risk of data leakage and abuse during this process. If personal information is hacked or used improperly, it poses a serious threat to personal privacy.

Big data will store and utilize personal information for an extended period. While it is lawful to gather and utilize personal data with user consent, prolonged retention and usage of such information can potentially encroach upon users' privacy rights. Furthermore, users may not have complete visibility into how their personal data is being used, introducing a sense of uncertainty surrounding their privacy rights.

4.2 Reduce the quality and accuracy of network economic data

Big data contains substantial data resources, nevertheless, there exists a substantial amount of low-quality data, resulting in the inaccurate analysis of user consumption. The data acquisition process is subject to various interference factors, such as sensor malfunctions and network delays, which may introduce noise or incorrect data. These erroneous data can disrupt the analysis and decision-making processes in the network economy, compromising the feasibility

and accuracy of the data and ultimately affecting the operation and development of the network economy.

Although internet-based businesses have made significant strides in leveraging big data, many virtual network operators still lack adequate comprehension and utilization of this resource. Moreover, there are numerous constraints in implementing big data, preventing China's network economy from fully embracing the era of comprehensive data analysis. Consequently, this hinders the security and accuracy of network economy analysis [9].

4.3 Insufficient data analysis ability and technical defects of network economy

The lack of analytics ability is a drawback of big data in the network economy. While big data offers a wealth of information, decision-makers can only benefit from its extensive, precise, and timely insights if it is analyzed effectively. Big data analysis necessitates specialized tools, technologies, and analysts who possess deep business knowledge and data interpretation skills. However, the market currently faces a considerable shortage of professionals with the necessary big data analysis capabilities. As a result, a significant amount of data remains untapped and wasted. Processing and storing big data demand complex technologies and systems like distributed computing, cloud computing, and database management. Yet, utilizing these technologies carries certain risks such as data leaks, insufficient security, and system failures. Should a system encounter failure or crash, it will result in data loss or hinder the ability to analyze and apply data effectively.

5 Optimization strategy of network economy development

5.1 Strengthen the awareness of protecting personal privacy in the network economy

Due to the virtual and open nature of the network, certain trade risks exist, and the economic platform is vulnerable to attacks by hackers and viruses. This can impact the normal functioning of the Internet and compromise the personal privacy and security of consumers. [12]Hence, there is a need to increase awareness about privacy protection and enhance supervision of the network economy. It is important for individuals to recognize the significance of information security and avoid sharing sensitive personal information with untrusted third parties. Regular updates and backups should be performed for personal devices and applications, while monitoring the usage and disclosure of personal information should be done on a regular basis. By paying attention to credit reports, setting up credit monitoring and fraud alarms, individuals can promptly identify and address the risks associated with personal privacy breaches, thereby reducing the chances of information leakage.

5.2 Establishing advanced network economic data model and technology

Data is an essential component that requires systematic management to support its utilization. It encompasses the analysis, examination, acquisition, and storage of information from various factors like production cost and selling price. It is crucial to safeguard the accuracy and consistency of data while ensuring the quality of both data and information [11]. It is essential to ascertain the reliability and authenticity of data from its source. By establishing cooperative relationships or cooperation agreements and collaborating with dependable data providers, one can acquire high-quality, transparent, and compliant data. The current big data trading

platform at Peking University offers assistance through its pricing model and pricing index system [12]. This helps to uncover potential patterns and correlations within the data, enhancing the ability to predict and make informed decisions. Additionally, emphasizing the traceability and verifiability of the data analysis process is vital to guarantee the credibility and reliability of the analysis results.

5.3 Improve the data analysis and technical level of network economy

The idea is the precursor to economic action, while innovation is the essence of all progress and development [9]. To enhance the capacity of data analysis in the network economy, we can focus on industry trends and the latest technologies. The field of data analysis in the network economy is rapidly advancing, with new technologies and tools constantly emerging. To overcome information lag and enhance the timeliness of economic industry, many scholars utilize unstructured methods to study economic activities. The advent of ChatGPT presents opportunities for the financial industry, enabling effective enhancement of risk management and intelligent customer service, expediting business approval processes, and creating a favorable environment for network economy development. The goal is to expand the network income groups and promote the stable growth of the network economy[13].

6 Summary

Big data is a technology and method to record people's living consumption, business production, and other aspects in the Internet age. Valuable data are carefully selected from the messy and complex information database and organized to form the final information. With the development of Internet technology in China, the era of big data has arrived. By relying on data technology, the network economy is moving closer to an era of exclusive personalization for users, advancing towards industry standardization and qualification standards, and continue to improve the level of research and development technology as a new track. Users need to be aware and prevent information leakage from the source, which can lead to violations of personal privacy, information capture risks, and telecom fraud. It is important for big data to maintain high-quality updates and develop technologies compatible with the network economy to address the lack of economic models and mismatches in model technologies. Additionally, it takes time to establish a perfect network environment, from the lack of network analysis levels and aspects. Upgrading the analysis framework using big data technology can expand the network market and actively promote the sustainable and sound development of the network economy while maintaining the development trend of the real economy. The problems and challenges that come with opportunities are increasingly evident. Implementing optimization strategies is an important approach to improving the challenges faced by the current development of the network economy. Encouraging, developing, and effectively utilizing the advantages of big data can drive the vigorous growth of the network economy.

References

[1] Liakhovych, O., Zaluzhnyi, A., Prytula, M., Skakovska, S., & Osadcha, O. (2023). Factors of the information and network economy sustainable development in ukraine. IOP Conference Series.Earth and Environmental Science, 1126(1), 012005. doi:https://doi.org/10.1088/1755-1315/1126/1/012005

[2] Zeng Shuheng. The influence and development of network economy on global trade [J]. Modernization of shopping malls, 2023 (14): 59-61. DOI: 10.14013/J.cnki.scxdh.2023. 14.029.

[3] Su Yadan, Huang Shihang, Hong Qiaoling, etc. Research on the path of economic management innovation and development of small and medium-sized enterprises under the network economy [J]. Trade Show Economy, 2023 (12): 157-160. DOI: 10.19995/j.cnki.CN10-1617/f7.2023. 12.157.

[4]Thayyib, P. V., Mamilla, R., Khan, M., Fatima, H., Asim, M., Anwar, I., . . . Khan, M. A. (2023). State-of-the-art of artificial intelligence and big data analytics reviews in five different domains: A bibliometric summary.Sustainability,15(5),4026. doi:https://doi.org/10.3390/su15054026

[5] Li Min.Analysis of precise marketing strategy of enterprises under the background of network economy [J]. Economic Outlook around Bohai Sea, 2023 (06): 115-117. DOI: 10.16457/J.cnki.hbhjjlw.2023. 06.054.

[6] Gao Fuping. Digital Economy: The Power of Social and Economic Change [J]. Journal of Northwestern Polytechnical University (Social Science Edition), 2023 (02): 103-114.

[7] Zhang Yina, Zhan Rong, Yang Feiyang. Internet consumption finance and network consumption growth [J]. New Finance, 2023 (06): 4-8.

[8] Chen Siyu, Zhang Fan, Zhao Xiaoling. Research on the application and ideas of big data to promote social and economic development and innovation [J]. Trade Show Economy, 2022 (24): 103-105. DOI: 10.19995/j.cnki.CN10-1617/F7.2022. 24.103.

[9] Sun Guoqiang, Hu Xiaoyu, Qiu Yuxia. Research on the convergence path of enterprise network and digital economy under the background of big data [J]. China Science and Technology Forum, 2022 (02): 95-104. DOI: 10.13580/j.cnki.fstc.2022.02.022.

[10] Zhu Yizhen. Application of Big Data in Internet Economy [J]. China Foreign Investment, 2022 (02): 142-144.

[11] Wu Qiong. Research on the Development of Big Data Applied to Internet Economy in the New Era [J]. National Circulation Economy, 2021 (32): 160-162. DOI: 10.16834/j.cnki.issn1009-5292.2021.32.041.

[12] Sun Zhen, Bai Yunhe, Wang Chao. Research on Pricing Model and Pricing Index System of Big Data Trading Platform [J]. Microcomputer Application, 2022, 38 (08): 91-93.

[13] Qiu Dongyang, Lan Yu. Opportunities, challenges and problems brought by ChatGPT to financial industry [J]. Southwest Finance, 2023 (06): 18-29.