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THE ROLE OF DIGITAL FINANCE AND TECHNOLOGICAL INNOVATION IN THE GROWTH OF THE GREEN ECONOMY

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ANNOTATION

The development of green economy has become a global trend, and digital finance and technological innovation are playing an increasingly important role in promoting its growth. This article explores the application trend of digital finance and technological innovation in the development of green economy. It discusses how digital finance can provide new financing channels for green projects, and how technological innovation can improve the efficiency and effectiveness of green production and consumption. The article also analyzes the challenges and opportunities facing the development of digital finance and technological innovation in the green economy, and provides suggestions for future development. Overall, this article highlights the potential benefits of integrating digital finance and technological innovation into the development of green economy, and emphasizes the importance of promoting sustainable and inclusive economic growth.

Introduction: The global community is facing an urgent need to transition towards a green economy to address the environmental challenges and ensure sustainable development. The integration of digital finance and technological innovation has emerged as a promising approach to achieve this goal. Digital finance can provide new financing channels for green projects, while technological innovation can enhance the efficiency and effectiveness of green production and consumption.

The trend towards digital finance and technological innovation in the development of green economy is gaining momentum. Governments, international organizations, and private sector entities are increasingly investing in green technologies and digital finance solutions. The use of blockchain technology, artificial intelligence, and the internet of things (IoT) is enhancing the transparency, accountability, and traceability of green investments.

Moreover, digital finance is enabling the mobilization of capital for green projects from a wider range of investors, including retail investors. This is promoting inclusivity and democratization of green finance. Technological innovations are also enhancing the efficiency and effectiveness of green production and consumption, reducing waste, improving resource utilization, and promoting circular economy principles.[42]

However, the integration of digital finance and technological innovation in the development of green economy also presents challenges. These include issues related to data privacy, cybersecurity, and responsible use of technology. There is a need for robust regulatory frameworks to ensure the responsible use of technology and prevent any negative impacts on society or the environment.

The three Vs of big data are variety, volume, and velocity. The operation and service patterns of established industries have altered as a result of the integration and innovation of big data and other sectors, and new platforms, new models, and new business forms have emerged, such Internet banking and automobile sharing. The sharing and openness of large data has also accelerated mass innovation and entrepreneurship. Technological advancement and economic advancement that is driven by technology accelerate the digital economy. Traditional industries may increase their productivity and innovation capacity and accomplish their digital transformation with the advancement of big data technology and the integration of diverse social economy sectors.

The core of blockchain is a distributed accounting, synchronous updating ledger system that works in a decentralized, trustless manner to maintain a trustworthy database. Blockchain is essentially an unchangeable distributed ledger that serves as the foundational technology for Bitcoin. It also represents a whole new distributed infrastructure and computer paradigm. Its fundamental concepts include the use of distributed networks to achieve decentralized information processing, consensus mechanisms to build trust between nodes, asymmetric encryption, and redundant distributed storage to achieve information security, and blockchain data structures to achieve data information traceability.

The following are the blockchain's current development tendencies in the age of the digital economy: The virtual blockchain will first be converted into a physical blockchain. Currency speculation will slow down, and blockchain's capabilities for establishing trust will be taken seriously and implemented in the actual world to boost the effectiveness of the real economy. And last, cross-fusion. The integration of emerging digital technologies like big data, the Internet of Things, and artificial intelligence will be accelerated by blockchain. Big data, the Internet of Things, artificial intelligence, and other next-generation information technologies are needed to enable the development of blockchain technology and applications as well as to broaden the application field. In the meantime, the advancement of blockchain technology and applications is crucial for the growth of the next generation of the information technology sector.

Despite the fact blockchain technology is still in its early stages of development and has just a small number of applications currently, there are still several issues. The digital economy management platform based on blockchain is anticipated to become a public data sharing management infrastructure, and blockchain technology will gradually become the mainstream of the application. As it spreads from the financial sector to the non-financial sector penetration, it will gradually become a new demand that subverts the traditional business model.

Literature review: One study by 1912, Schumpeter made a preliminary study on the relationship between financial development and technological innovation. (J. A. Schumpter, 1942)

However, it was not until the promotion of financial marketization and the development of the third scientific and technological revolution that the study of the relationship between financial development and technological innovation formally attracted the attention of scholars at home and abroad and became a hot topic of academic debate .(R. Nanda and T. Nicholas.2014)

The essence of sharing economy is to eliminate sellers in the traditional sense, and it is digitalization that drives the progress of the elimination process. Digital technology makes it interact in the transaction process in the form of point-to-point connection, so as to improve the availability of services, reduce transaction costs, and enable consumers to enjoy the characteristics of productive services.(J. Schor and C. Fitzmaurice,2015)

The information asymmetry between money supply and demand restricts the external channels of enterprise development and financing. Traditional financial intermediaries cannot participate in innovative projects, nor can they prevent moral hazard problems that enterprises may face by establishing an effective mechanism of money supply pre

[42] J. A. Schumpter, Captitalism, Socialllism and Democracy, New York: Harper: Harper & Brothers, NewYork, NY, USA, 1942

review, event tracking and post supervision.(J. E. Stiglitz and A. Weiss,1981)

For technological innovation activities, the lack of effective financial support may lead to the “flow of production” of a large number of innovative projects, which inhibits the improvement of regional innovation efficiency, and is ultimately not conducive to the optimization and upgrading of China’s industrial structure and the establishment of an innovative country .(P. Aghion, T. Fally, and S. Scarpetta,2007)

Methods: Virtual reality (VR) is based on data collection, computer three-dimensional graphics, multimedia, interpersonal interaction, network transmission, three-dimensional display, and other technologies that have been combined to create a new technology. Big data may offer detailed support for an immersive virtual environment as the digital economy develops, and virtual reality offers extensive visualization options for big data. People's capacity to process and evaluate interactive large data is improved in this way.

The development of virtual reality technology has brought forth new industrial shifts and economic prospects in the age of the digital economy. The use and advancement of virtual reality in industrial design, virtual commerce, psychological therapy and rehabilitation, military simulation, and other sectors has been fueled by the digital economy. To solve the issues that conventional 2D and 3D visualization systems are unable to process due to complex datasets, MIT Multimedia Experiment Center, Virtualitics, and other research institutions apply big data technology to VR scene construction, maximizing the inherent benefits of VR (immersion). Based on NASDAQ data, the virtual realm of the rollercoaster gives riders a first-person perspective of NASDAQ's ascent and decline over the last 21 years. Master of Pie showed how VR can be used in big data analytics, where users can instantly examine and change data since it is presented in a more realistic and engaging way.[43] According to Forbes, big data analysts utilizing the technology can view four times as much data as they could on a standard computer screen "at a glance."

The sharing economy, a new business model based on big data, cloud computing, and third-party payment, has emerged quickly as a result of the fast expansion of mobile internet. The goal of the sharing economy is to eliminate conventional merchants, and digitization is what propels this elimination process forward. In order to increase service availability, lower transaction costs, and give customers access to the features of productive services, digital technology makes it participate in the transaction process through point-to-point connections. For instance, bike-sharing and car-sharing are expanding quickly in terms of shared transportation The rise of the digital economy is accelerated by the sharing economy's quick development. Accurate matching is accomplished by analysis and prediction based on the vast amounts of data provided by the sharing economy, accelerating the growth of the sharing economy. A decision-making framework for urban development may be established based on the vast amounts of data created by the sharing economy, which can also be used to assess the current situation and evolving trends in urban employment, transportation, education, health care, and other livelihoods. In the future, the sharing economy will progressively extend to a wide range of industries, particularly important ones like education and health care.[44] It will also carry out derivative activities, encourage more cross-border collaboration and innovation, and further expand its dimensions and service chain. The sharing economy will likewise progressively expand to encompass the entire process, from consumption and production to distribution and circulation.

The Internet of things is rapidly developing, enabling a range of sensors and terminals to connect to the network and connect collectively. The quantity and makeup of Internet-connected devices have both dramatically risen concurrently, from PC to mobile phone to tablet to the Internet of Things era. The pressing requirement to assess unstructured data results from this evolution. According to estimates, there will be 50 billion connected sensing devices in 2020, creating 2.5 million terabytes of data daily, or 2.38 times as much as the current Internet. The Internet of Things is being used more quickly in areas including clinical observation frameworks, smart home machine control, and operations and production network following because of the combination of the Internet of Things with the modern economy. In the age of the digital economy, the Internet of Things has generally advanced in the following ways: First, high precision sensor development is being developed to increase information transmission and collection in general. The popularity of wearable technology increases the mobility of the Internet of Things, while high-precision sensor development improves observational awareness and accuracy. Second, it can work in tandem with clever devices to enhance the Internet of things' cognitive capabilities. In order to grasp the continuous monitoring administration of the client's body and prevent the occurrence of linked illnesses, the monitoring data of smart watches/wristbands in wearable gadgets may be supplied to the medical clinic gradually. Third, the biological system of the Internet of Things has evolved into the main form of utilization landing. The IoT biological system has also been arranged in a progressive manner by IT behemoths.[45] Apple, for instance, has designed a multi-stage IoT ecosystem that includes smart home HomeKit, wearable device HealthKit, and automobile IoT CarPlay. Project IoT was offered by Google, which also provided the basic IoT working framework known as Brillo. Huawei has provided Lite OS, a compact Internet of Things operating system, and NB-IoT, a complete solution for setting up an Ocean Connect environment[46].

The accumulation of computerized resources, the increase in processing speed, and the improvement of organizational offices have transformed the flood of vast information from a science fiction to a reality, and man-made brainpower is now entering a new phase of cross-line combination with significant application and influencing turn of events. The Federal Bureau of Investigation (FBI) established the FACE dataset (NGI), which contains the fingerprints, irises, faces, and other biometric data of 117 million adult Americans. Face recognition technology may be used to identify the target through photos. Man-made reasoning innovation may be used in the clinical area to manage the enormous amounts of data and information obtained, identify the crucial cases and key premise, and improve the precision of conclusion and navigation. Then, deep learning and artificial intelligence will be increasingly vital to both computer economy and human consciousness innovation. Accelerate the use of program-driven, clinical, and common sense computer thinking in money, fostering a new wave of contemporary change.

Its core components are data resources, the essential technology of data mining, and resource utilization. Its essence is large data, cloud computing, Internet of things, artificial intelligence, and blockchain: five new digital technologies that are driving the digital transformation. The digital economy is the economic sector that is currently growing the most quickly and widely.

Big data technology helps the sharing economy industry innovate and grow, but it also has many drawbacks, including poor regulation, information security, and privacy issues. Relying solely on big data sharing technology has prevented the development of new economic models, while blockchain technology has encryption sharing, which does not compromise the benefits. It offers new technological assistance for the transfer and exchange of data, and it can work in conjunction with big data technologies. In the age of big data, blockchain technology offers three features: First, the value and application space of blockchain data are enhanced by big data mass storage and distributed computing technologies. Blockchain offers a solid assurance for the open exchange of big data under the presumption of privacy protection, liberating additional large data, thanks to its dependability, security, and immutability. Second, the traceability aspects of blockchain may significantly enhance the quality of data. As a result, the quality of the data has a high confidence endorsement. Blockchain can record every stage of data processing in full, including data gathering, transaction, circulation, and computational analysis. Third, standardizing data use and adjusting authorisation scope are both possible with blockchain. Desensitization-induced data trading and circulation can stop information islands from forming and encourage the gradual development of globalized data trading scenarios. The effective integration of the digital economy with blockchain technology and the Internet of Things will also usher in a new round of economic revolution.

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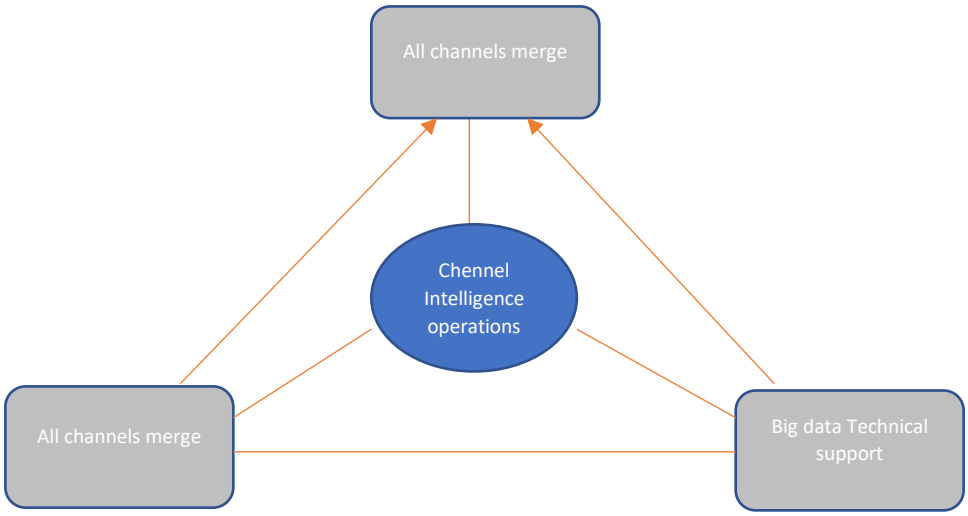
[45] R. Nanda and T. Nicholas, “Did bank distress stifle innovation during the great depression?” Journal of Financial Economics, vol. 114, no. 2, pp. 273–292, 2014.

[46] F. Guo, S. T. Kong, and J. Wang, “General patterns and regional disparity of internet finance development in China: evidence from the peking university internet finance development index,” China Economic Journal, vol. 9, 2016.

economy. The digital economy is the one that is currently growing the fastest. Because of the fundamental changes that new digital technologies have brought about in human thought, production, and daily life, economic digitalization has become a key driver of creative economic growth.

Figure 1. Depicts the new retail applications that have emerged in the digital economy.



Results: The Internet of Things (IoT) combines artificial intelligence, cloud computing, and big data analytics to analyze data collected by a large number of connected sensors that can monitor complex physical and mechanical performance in real time to optimize production and perform proactive maintenance, improving efficiency, and generating information that can be used to develop new processes. The obtained data may also be utilized to study other crucial areas outside of production, such as lowering energy use and investing in network resources.In product production planning and process control, the factory uses smart devices and sensors to collect large amounts of data from the manufacturing process, dig into these data and applications, and optimize processing methods, processing sequence, and system technology indexes such as cutting parameters, real-time monitoring of the manufacturing process, troubleshooting, and feedback adjustment[47].

Through the Internet of things, the manufacturing process, equipment operating conditions, process parameters, and other information can be gathered in real time, and product quality and faults may be identified and quantified. Machine learning technology is employed offline to mine the association between product problems and historical data from the Internet of Things and develop control rules. It can regulate the manufacturing process in the online state by using improved learning technologies and real-time feedback to eliminate product flaws. At the same time, it may include expert knowledge to constantly enhance learning outcomes. In the maintenance service link, sensors are used to monitor the status of the equipment, and machine learning is used to create an analytical model of the equipment failure. Before the failure occurs, the potentially failing workpiece is changed to assure the equipment's ongoing trouble-free functioning. To increase inventory efficiency, firms may utilize geographic big data analysis technology to integrate and optimize supply chain distribution networks, optimize buy time, purchase amount, warehouse allocation, and so on. [48] Artificial intelligence may also be employed in digital field equipment life cycle health management, machine vision-based field safety, field environmental management, and other areas of field management optimization.

Artificial intelligence's intelligent observation and recognition technology may be used to collect and coordinate real-time data on urban traffic, logistics, energy, the environment, and other topics. The digital intelligent administration of the city will eventually actualize the intelligent allocation of public resources, thanks to the data-driven construction of urban decision-making mechanisms. It can automatically digest the unstructured large surveillance video data created by the security business that cannot be calculated statistically using artificial intelligence technologies. Artificial intelligence has now infiltrated every sector and function to varied degrees. It can do intelligent analyses and efficiently use urban information by collecting data in many sectors, improving the efficiency of urban management, saving resources, protecting the environment, providing decision support for sustainable development, and promoting the creation of smart cities.

Discussion: The new digital technology has the scientific power to encourage educational innovation and progress. Educational big data is a collection of all the data created during the whole process of educational activities and gathered in accordance with educational demands for educational progress, and it has enormous potential value. New digital technologies such as blockchain and artificial intelligence, driven by big data in education, are becoming a subversive force to stimulate innovation and transform the education system. In comparison to traditional education, the implementation of personalized education applications is dependent on the use of modern digital technologies in the following areas.

Big data matching algorithms aid in the realization of learning recommendations, the analysis of learning data and course data, and the realization of adaptive learning. For example, the Knewton corporation in the United States has leveraged big data to give digital course materials, resulting in dynamic and ongoing customization to each student's specific needs. Big data behavior analysis means are continually boosting conventional education from statistical analysis for groups to behavior analysis for individuals as Internet technology continues to permeate the education business. After collecting large amounts of data, intelligent approaches such as association analysis and recommendation algorithms may be used to modify individualized instructional materials and procedures, automatically find rules, and anticipate them. For example, "Xuetang Online" can investigate the worth of MOOCs and modify courses accordingly. On the other hand, based on online and offline data analysis, it can help pupils solve difficulties more quickly. Real-time feedback on learning data is useful for exploring students' interests and traits, enabling the sharing of online and offline data, supervised learning, judging students' knowledge mastery, and promptly modifying teaching ideas and techniques.

The new digital technology contributes to the realization of the paradigm of two-way education delivery. Teaching content may be structured using virtual reality technology according to their own thoughts and knowledge structure, and this organizing information is not a basic linear structure. Virtual reality technology combines these complex pieces of knowledge into a network, giving pupils a realistic knowledge structure. It comprises not just the subject's fundamental material, but also the logical link between the subject's contents. It focuses on both the process of knowledge generation and the structure of knowledge. The unity and flexibility of the educational content may be precisely blended by coordinating our vision, hearing, and touch. Virtual reality may be restored to actual situations for many abstract

[47] J. E. Stiglitz and A. Weiss, "Credit rationing in markets with rationing credit information imperfect," American Economic Review, vol. 71, no. 3, 1981..

[48] R. Liu, B. Yang, E. Zio, and X. Chen, "Artificial intelligence for fault diagnosis of rotating machinery: a review," Mechanical Systems and Signal Processing, vol. 108, pp. 33–47, 2018

concepts and objects, allowing students to perform diverse experiments or even reproduce miniature sceneries to examine the essence of things or occurrences without fear of harm.

The number of visitors prediction and safety warning may be determined using weather, hotel, traffic, and other data. Deeply analyze the scenic spot's daily, weekly, seasonal, and holiday traffic characteristics, as well as the impact of weather, traffic, and historical traffic data on the scenic spot, and then control the distribution of tourists in the scenic spot in real time based on the scenic spot forecast and legal holiday traffic, in order to effectively prevent tourists from crowding and stampeding in the scenic spot.

In conclusion, the integration of digital finance and technological innovation is a promising approach to promote the development of green economy. The application of digital finance can provide new financing channels for green projects, while technological innovation can enhance the efficiency and effectiveness of green production and consumption. However, there are still challenges that need to be addressed, such as the need for regulatory frameworks and the potential risk of technology being misused. Therefore, it is important to continue exploring and promoting the development of digital finance and technological innovation in the green economy, with a focus on sustainability, inclusivity, and responsible use of technology.

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