International Journal of Social Sciences and Public Administration
ISSN: 3005-9836 (Print), ISSN: 3005-9585 (Online) | Volume 4, Number 1, Year 2024
DOI: https://doi.org/10.62051/ijsspa.v4n1.12
Journal homepage: https://wepub.org/index.php/IJSSPA/index

The Impact of Digital Finance on Corporate Green Innovation

Zhen Chen*, Gaohan Zhang

University of Chinese Academy of Social Sciences, Beijing 100000, China
*Corresponding Author: Zhen Chen

ABSTRACT

This paper discusses the impact of digital finance on corporate green innovation. Digital finance greatly promotes the development of corporate green innovation by providing convenient financing channels, reducing financing costs, and improving the efficiency of capital utilization. Utilizing big data and artificial intelligence technology, enterprises are able to better manage and control risks, thus improving the success rate of green innovation projects. In addition, digital finance also reduces information asymmetry, optimizes resource allocation, and improves the efficiency and effectiveness of green innovation through information transparency and data analysis. This paper analyzes the successful case of Tesla to reveal the key role of digital finance in green innovation, and puts forward corresponding suggestions for policy support and corporate strategy adjustment to promote the sustainable development of green economy.

KEYWORDS

Digital Finance; Green Innovation; Case Study.

1. INTRODUCTION

Driven by globalization and technological progress, digital finance is rapidly emerging as an important part of the modern financial system. Digital finance usually includes various forms such as mobile payments, digital currencies, blockchain technology, financial technology applications, etc. These emerging technologies and tools have not only changed the mode of traditional financial services, but also greatly enhanced the efficiency and popularity of financial services. Meanwhile, global environmental problems are becoming increasingly severe, with climate change, resource depletion, environmental pollution and other issues forcing governments and enterprises to take more active measures(Divya and Tripura, 2022). Green innovation has thus become a new direction for enterprise development, aiming to reduce environmental load and realize sustainable development through technological innovation and management innovation. Green innovation not only includes the green design of products and services, but also involves the environmental improvement of the production process, resource recycling and other aspects. The combination of digital finance and green innovation lies in the fact that through the popularization and development of digital finance, enterprises can more conveniently obtain funds, improve operational efficiency, and reduce the cost of innovation, thus promoting the implementation and promotion of green innovation. Studying the impact of digital finance on corporate green innovation helps to understand and reveal the interaction between the two, and provides valuable references for enterprises and policy makers. The main objective of this study is to explore how digital finance affects green innovation of enterprises. In the era of digital economy, enterprises need to adjust their strategies to adapt to the new market environment. Understanding how digital finance affects green innovation can help enterprises better formulate green development strategies and enhance market competitiveness. Through this study,

governments and regulators can understand the role of digital finance in promoting a green economy, so that they can formulate more effective policy measures to encourage enterprises to engage in green innovation and promote sustainable development of society(Hao and Chen, 2022).

2. A THEORETICAL ANALYSIS OF THE IMPACT OF DIGITAL FINANCE ON CORPORATE GREEN INNOVATION

2.1. Access to Funds and Expansion of Financing Channels

According to the Efficient Market Hypothesis (EMH), financial markets are efficient in resource allocation, and information can be quickly and accurately reflected in asset prices. Based on this theory, digital finance significantly improves the efficiency of the financial market through advanced technological means, reduces information asymmetry and transaction costs, and enables enterprises to access capital more conveniently and quickly, especially in the field of green innovation. Digital financial platforms, through their decentralization and wide coverage, provide diversified financing channels for enterprises, especially SMEs, so that they can more easily obtain the funds they need for development. These platforms utilize big data and algorithms to assess the credit risk of borrowers, reducing the information asymmetry problem in the traditional financial system. In addition, digital finance reduces the intermediary link through smart contracts and blockchain technology, directly connecting the financing demand side and the capital provider, reducing financing costs. These technologies not only simplify the financing process, but also improve the efficiency of capital utilization, enabling enterprises to invest more resources in the development and implementation of green innovation projects. The self-executing nature of smart contracts ensures a transparent and efficient flow of funds, further reducing delays in funding and increased costs due to human factors. In the financial market, the reduction of transaction costs and the increase of information transparency enable funds to be allocated more quickly to efficient and sustainable projects, promoting the investment and development of enterprises in the field of green innovation. Through digital finance, enterprises not only have access to more financing opportunities, but also enjoy higher efficiency and lower costs in the process of accessing funds, thus enhancing their competitiveness and sustainability in green innovation. This expansion of access to capital and financing channels provides a solid financial foundation for corporate green innovation and promotes the development of a green economy(Ketterer, 2017).

2.2. Risk Management

Uncertainty Theory emphasizes that firms face a high level of uncertainty when engaging in innovation activities, especially in green innovation projects due to their novelty and technological complexity. This uncertainty is mainly characterized by the unpredictability of market demand, the complexity of technology development, and changes in the policy environment. Digital finance significantly improves the risk management and control ability of enterprises in green innovation projects through big data and artificial intelligence technologies. First, digital finance uses big data analysis and artificial intelligence technology to deeply mine and analyze internal data and external environmental data to help companies more accurately assess the risks of green innovation projects. For example, by analyzing data on market trends, consumer behavior and policy changes, enterprises are able to better predict the market prospects and potential risks of green innovation projects, so as to make more scientific and reasonable investment decisions. This improved risk assessment capability helps reduce the negative impact of uncertainty and improve the success rate of enterprises in green innovation projects. Second, the green insurance products provided by digital financial platforms can provide protection for enterprises' green innovation projects. These insurance products are automated and efficiently managed through smart contracts and blockchain technology, providing a new way for enterprises to diversify and transfer risks. For example, for risks such as failure of

green technology research and development or insufficient market demand, green insurance products can provide financial compensation in case of project setbacks and reduce the financial losses of enterprises. In this way, enterprises' hesitation to move forward due to risk is greatly reduced, increasing their willingness and motivation to engage in green innovation. In addition, digital finance also provides financial support for enterprises' green innovation projects through venture capital and crowdfunding. Venture investors and crowdfunding platforms utilize big data and artificial intelligence technology to conduct rigorous risk screening and assessment of projects, so as to select green innovation projects with higher potential and lower risk for investment. This precise investment mechanism not only provides enterprises with sufficient funds, but also further reduces project uncertainty through professional risk management tools(Boskov and Drakulevski, 2017).

2.3. Information Transparency

The theory of information asymmetry states that the two parties to a transaction in a market usually have different information, which can lead to market failure and the inability to optimize the allocation of resources. Digital finance significantly optimizes the efficiency and effectiveness of resource allocation by increasing information transparency and reducing information asymmetry, especially in corporate green innovation. First, digital finance platforms require enterprises to make detailed information disclosure. This information disclosure not only includes financial status and operation, but also covers the specific content, progress and expected results of green innovation projects. Through open and transparent information disclosure, investors and stakeholders are able to gain a more comprehensive understanding of an enterprise's green innovation project and thus make more rational investment decisions. This transparency reduces information asymmetry, improves market efficiency, and promotes rational allocation of capital. For example, when developing new environmentally friendly materials, an enterprise disclosed its R&D progress, technical parameters and market expectations in detail through a digital finance platform, which attracted investors interested in the green project and thus successfully raised the required funds. Second, digital finance utilizes big data technology to conduct in-depth analysis of an enterprise's operational data and market data. Big data analysis can help companies identify opportunities and challenges for green innovation and develop more effective innovation strategies. For example, by analyzing data on market demand, competitors and the policy environment, enterprises can more accurately grasp the market prospects and technological direction of green innovation, and avoid blind investment and waste of resources. In addition, big data analysis can also monitor the implementation effect and market response of an enterprise's green innovation project, so as to adjust its strategy in a timely manner and improve the success rate of the project. Through the information disclosure and big data analysis of digital financial platforms, enterprises can realize higher information transparency and data insight. This not only reduces the risk of market failure caused by information asymmetry, but also improves the efficiency and effectiveness of corporate green innovation through accurate resource allocation. Increased information transparency makes investors more willing to invest in green innovation projects and reduces the difficulty of financing, while the depth of insight provided by big data analytics helps companies better cope with the uncertainty and complexity of green innovation(Du et al., 2024).

2.4. Improve Efficiency and Reduce Costs

The theory of economy of scale holds that enterprises can reduce unit costs and improve production efficiency by expanding the scale of production or increasing the diversity of products. Digital finance significantly optimizes the operation and management of enterprises through the application of advanced technological tools, improves efficiency and reduces costs, thus playing an important role in green innovation. First of all, digital financial tools significantly improve the operational efficiency of enterprises through automation and intelligent means. These tools reduce the waste of human resources and enhance the speed and accuracy of capital flows, enabling companies to focus more

energy and resources on the development and implementation of green innovation projects. For example, the electronic payment system simplifies the transaction process and reduces the cumbersome steps and time consumption in traditional payment methods, while the intelligent financial management system improves the accuracy and efficiency of financial management by integrating and analyzing data and reduces redundancies and errors in financial management. Second, digital financial technology further promotes green innovation in enterprises by reducing financial management and transaction costs. The application of smart contracts and blockchain technology reduces intermediary links and manual intervention, making the transaction process more efficient and transparent and reducing the increase in costs due to information asymmetry and intermediary fees. These saved costs can be directly invested in green innovation projects, increasing the R&D investment and implementation of the projects. By optimizing the allocation of resources, enterprises are able to achieve more efficient green innovation at lower costs. In addition, the digital finance platform provides enterprises with diversified financing channels, further enhancing their competitiveness and sustainability in green innovation. Through crowdfunding and P2P lending, enterprises are able to obtain the required funds more conveniently and use these funds to expand the scale and scope of green innovation, further realizing the effects of economies of scale and scope. Expanding the scale of production and increasing the diversity of products not only reduces unit costs and improves production efficiency, but also promotes the widespread application and popularization of green technologies and products and promotes the green transformation and development of the entire industry(Thomas and Hedrick, 2019).

3. CASE STUDY

Tesla, as a leader in the global electric vehicle market, has successfully combined digital financial technology with green innovation to realize significant market success and environmental benefits. Tesla has pushed the development of electric vehicle technology through continuous innovation and used digital financial means to optimize fund management and marketing, demonstrating how a typical enterprise can achieve green innovation through the integration of technology and finance. In terms of the combination of technological innovation and green innovation, Tesla has continuously invested in R&D funds to push forward breakthroughs in battery technology and self-driving technology, ensuring that its electric vehicles are ahead of competitors in terms of performance and environmental protection. These technological innovations not only improve the range and safety of vehicles, but also significantly reduce carbon emissions, reflecting the application of Economies of Scale and Economies of Scope theories. By expanding the scale of production and increasing the diversity of products, Tesla effectively reduces the unit cost and improves the production efficiency, while realizing a win-win situation in terms of environmental and economic benefits. In terms of the application of digital finance, Tesla has utilized fintech tools to introduce innovative financing and sales models. For example, through its online direct sales platform and financial services, Tesla has simplified the car-buying process and improved the user experience. This not only optimizes resource allocation, but also reduces transaction costs and enhances market efficiency. In addition, Tesla has raised funds through the issuance of green bonds to support its renewable energy projects and the expansion of its electric vehicle production line. This practice not only improves the efficiency of capital flow, but also provides the necessary financial support for green innovation projects. In terms of marketing strategies, Tesla has increased consumer awareness and acceptance of electric vehicles through precision marketing and brand building. Tesla's marketing strategies include actively participating in environmental initiatives, organizing EV experience events, and using social media platforms to interact with users. These strategies not only enhance the brand image, but also attract a large number of loyal customer groups, showing an effective response to Information Asymmetry Theory (IAT). By increasing information transparency and improving the efficiency of market information dissemination, Tesla reduces information asymmetry and optimizes the allocation of market resources. The key to Tesla's success lies in its continuous technological innovation, effective

application of digital finance and precise marketing strategy. These elements combine with each other to promote Tesla's leading position in green innovation and market competition. By utilizing advanced technological means and financial tools, Tesla has not only realized its own high-speed growth, but also provided strong support for the development of the global green economy, which has become a model for other enterprises to study and learn from(Bruijl, 2017).

4. THE IMPACT OF DIGITAL FINANCE ON CORPORATE GREEN INNOVATION AND RESPONSE STRATEGIES

4.1. Policy Support and Regulatory Improvement

Policy support and regulatory improvements are crucial to promoting the healthy development of digital finance and green innovation. First, with regard to policy support, governments should formulate and implement a series of policies that are conducive to the development of digital finance and green innovation(Singh, 2022). This includes providing financial incentives such as financial subsidies, tax incentives and low-interest loans to encourage enterprises to invest in green innovation. Through financial subsidies, the government can directly reduce the cost of green innovation for enterprises and enhance their incentives; tax incentives can reduce the tax burden of enterprises and release more funds for innovation activities. In addition, the government can set up a special fund to support the research and development and promotion of digital financial technology and help SMEs obtain the necessary financial and technical support, which will provide a strong financial guarantee for innovation. In terms of regulatory improvement, establishing a sound regulatory system is the key to ensuring the healthy development of digital finance. The government should strengthen the regulation of digital financial platforms and formulate transparent and fair regulatory standards, laws and regulations to prevent the accumulation and outbreak of financial risks. Transparent regulatory standards can enhance market confidence and attract more investors to participate; fair laws and regulations can ensure fair competition in the market and prevent monopolization and unfair competition. At the same time, a risk early warning mechanism is established to detect and deal with potential risks in a timely manner and to safeguard the stability and healthy development of the digital financial market. The risk early warning mechanism, through real-time monitoring of market data, can prejudge risks in advance and take preventive measures to avoid the occurrence of financial crisis. Overall, policy support and regulatory improvement are important safeguards for the development of digital finance and green innovation. Through financial subsidies, tax incentives, low-interest loans and special funds, the government can provide strong financial support to promote the investment and development of enterprises in the field of green innovation; through transparent and fair regulatory standards and risk early warning mechanisms, the government can ensure the stability and healthy development of the digital financial market and prevent the accumulation and outbreak of financial risks. This double guarantee of policy and regulation can not only optimize resource allocation and improve the efficiency of capital use, but also promote the sustainable development of the green economy and achieve a multi-win situation in terms of economic, environmental and social benefits.

4.2. Technology Innovation and Talent Cultivation

Technological innovation and talent training are important pillars in promoting the development of digital finance and green innovation. First, in terms of technological innovation, enterprises should increase their investment in the research and development of digital financial technologies and actively promote the application of cutting-edge technologies such as blockchain, artificial intelligence and big data in green innovation(Wang and He, 2024). These advanced technologies can not only significantly improve the efficiency of capital flows, but also provide accurate market forecasts and risk assessments to help enterprises better plan and implement green innovation projects.

Blockchain technology, through its decentralized and tamper-proof characteristics, enhances the transparency and security of transactions and effectively prevents financial fraud; artificial intelligence, through deep learning and analysis of massive data, can provide intelligent decision-making support for enterprises and optimize the allocation of resources; and big data technology, through the analysis of market trends, consumer behaviors, and policy changes, can help enterprises capture green innovation opportunities and develop scientific innovation strategies. At the same time, the development of digital finance and green innovation cannot be separated from a large number of high-quality professionals. Enterprises and the government should work together to establish a comprehensive talent cultivation system, provide targeted training and education programs, and cultivate composite talents with knowledge of financial technology as well as green innovation thinking. Enterprises can enhance the professional skills and innovation ability of their employees through internal training and external cooperation, while the government can support the cultivation of talents in universities and research institutes through the establishment of scholarships and funding of research projects. In addition, the government can attract and retain top international talents through international cooperation projects and exchange programs to enhance the competitiveness and innovation ability of domestic enterprises. The organic combination of technological innovation and talent cultivation will provide strong motivational support for digital finance and green innovation. Through the extensive application of cutting-edge technologies, enterprises can improve operational efficiency, reduce costs, optimize resource allocation, and promote the smooth implementation of green innovation projects; through the cultivation and introduction of high-quality talents, enterprises can enhance their core competitiveness, and improve their position and influence in the global market. The synergistic cooperation between government and enterprises can not only accelerate the process of technological innovation and talent cultivation, but also promote the formation of a benign and interactive innovation ecosystem, providing a solid guarantee for the sustainable development of green economy. Overall, technological innovation and talent cultivation are key elements in the development of digital finance and green innovation. By increasing R&D investment in cutting-edge technologies and promoting the widespread application of blockchain, artificial intelligence, big data and other technologies, enterprises can significantly improve their innovation efficiency and results; by establishing a sound talent cultivation system and providing targeted training and education programs, enterprises and the government can jointly cultivate and introduce high-quality professionals to enhance the innovation capability and competitiveness of enterprises. The dual drive of technology and talent will inject a strong impetus to the development of digital finance and green innovation, realizing a multi-win situation in terms of economic, environmental and social benefits.

4.3. Corporate Strategic Alignment and Marketing

In the context of the development of digital finance and green innovation, enterprises need to adjust their development strategies in time to adapt to the new situation and new requirements. First, enterprises should optimize their internal management processes, improve operational efficiency, reduce costs and increase investment in green innovation projects in accordance with the development trend of digital finance and green innovation(Karlsson and Wåhlin, 2017). This strategic adjustment will not only help enterprises make more progress in environmental protection and sustainable development, but also improve overall operational efficiency and reduce operational costs through technology and management optimization, thus releasing more resources for green innovation projects. For example, enterprises can streamline financial processes, reduce human errors and time wastage, and improve the efficiency of capital utilization by introducing smart financial management systems, electronic payment tools and blockchain technology. At the same time, enterprises should actively explore new business models that organically combine digital financial technology with green innovation to enhance market competitiveness. This innovative business model can not only enhance the added value of products and services through digital means, but also attract more environmentally conscious consumers through green innovation. For example, enterprises can develop a blockchain-based green supply chain management system to ensure environmental

compliance in all aspects of production, transportation and sales of products, thereby increasing consumer trust and loyalty to the brand. In addition, enterprises can utilize financial technology tools to launch green financial products, such as green loans and green bonds, to support more environmentally friendly projects and enterprises and further expand the influence of the green economy. In terms of marketing, enterprises should increase the promotion of green innovative products and services to improve consumer awareness and acceptance. By strengthening brand building and carrying out green marketing activities, enterprises can effectively enhance their market image and competitiveness. For example, enterprises can organize promotional activities on environmental protection themes, sponsor green projects, or promote environmental protection concepts on social media to enhance public recognition and support for green innovative products. Enhancing product quality and service level is also an important part of market promotion. By providing high-quality green products and excellent after-sales service, enterprises can enhance market reputation and attract more loyal customers. In addition, enterprises can make use of digital financial platforms for precision marketing, and with the help of big data analysis and artificial intelligence technology, they can understand consumer demand, formulate personalized marketing strategies, and expand their market share. By analyzing consumers' purchasing behavior, preferences and feedback, enterprises can more accurately locate target customers, design tailored marketing programs and improve marketing effectiveness. For example, enterprises can identify consumer groups interested in green products through big data analysis and utilize digital advertising platforms to accurately place advertisements and increase the conversion rate of advertisements. At the same time, enterprises can also optimize marketing strategies and adjust marketing programs in real time through artificial intelligence technology to ensure the efficiency and flexibility of marketing. In conclusion, enterprise strategy adjustment and marketing promotion are important initiatives to promote the development of digital finance and green innovation. By optimizing internal management processes and exploring new business models, enterprises can improve operational efficiency, reduce costs and enhance market competitiveness; by strengthening brand building, conducting green marketing activities and using digital financial platforms for precision marketing, enterprises can increase market awareness and acceptance of green innovation products and services, expand market share and promote the sustainable development of the green economy.

REFERENCES

[1] Divya, P., & Tripura, N. (2022). A Study on Emerging Trends and Challenges in Digital Finance. Journal of Management (JOM), 9(3).

[2] Hao, X., Chen, F., & Chen, Z. (2022). Does green innovation increase enterprise value?. Business strategy and the environment, 31(3), 1232-1247.

[3] Ketterer, J. A. (2017). Digital finance: New times, new challenges, new opportunities.

[4] Boskov, T., & Drakulevski, L. (2017). Addressing the role of risk management and digital finance technology on financial inclusion. Quality-Access to Success, 18(161), 113-115.

[5] Du, X., Hong, J., Tao, H., & Zhang, Y. (2024). Is digital finance always beneficial to accounting information transparency? Evidence from China. China Journal of Accounting Studies, 1-35.

[6] Thomas, H., & Hedrick-Wong, Y. (2019). How digital finance and fintech can improve financial inclusion. In Inclusive Growth: The Global Challenges of Social Inequality and Financial Inclusion (pp. 27-41). Emerald Publishing Limited.

[7] Bruijl, D. G. H. T. (2017). Tesla Motors, Inc.: Driving digital transformation and the digital ecosystem. Inc.: Driving Digital Transformation and the Digital Ecosystem (October 14, 2017).

[8] Singh, V. K. (2022). Regulatory and legal framework for promoting green digital finance. In Green digital finance and sustainable development goals (pp. 3-27). Singapore: Springer Nature Singapore.

[9] Wang, R., & He, Z. (2024). Using big data analysis to optimize the two-wheel-drive model of green finance composite talent cultivation. Applied Mathematics and Nonlinear Sciences, 9(1).

[10] Karlsson, S., & Wåhlin, F. (2017). Digital Strategies and Strategic Alignment.