

# Application Scenarios, Low-carbon Models and Practical Paths of Green Payments in China

Yilang Luo<sup>1,\*</sup>, Haoran Hu<sup>2</sup>, Jiang Wu<sup>2</sup>

<sup>1</sup>School of Finance, Anhui University of Finance and Economics, Bengbu, China

<sup>2</sup>School of Art, Anhui University of Finance and Economics, Bengbu, China

\*luoyilang2001@163.com

## Abstract

As an infrastructure in the field of green finance, green payment plays an important role in guiding the green-oriented allocation of social resources and the public's awareness of environmental protection, and promoting the greening, recycling and low-carbonization of the production methods of enterprises and the consumption patterns of individuals and households. This paper explores the basis of green payment development in China from five aspects: theory, market, policy, finance and digital ecology, and examines the positioning of green payment to help achieve the goal of "carbon neutrality" at three levels: macro, meso and micro. In the light of the lifestyles of Chinese residents, the specific application scenarios of green payment in China, such as transportation, low-carbon life and paperless payment, are compiled. We use electronic payment methods such as WeChat payment to explore the mode of green payment ecosystem to achieve low-carbon development, and explore the practical path of green payment to help "carbon neutrality" in both broad and narrow sense from the perspective of industrial chain. Finally, the above analysis is combined with the practical significance of green payment for carbon neutrality and the suggestions for the future development of green payment in different dimensions.

## Keywords

Green Payments; Carbon Neutrality; Low Carbon Development.

## 1. Introduction

In August 2021, in order to promote the green transformation of the payment industry, the China Payment Clearing Association issued the "Innovative Green Payment Services, Boost Green Development - Initiative for the Payment Clearing Industry to Support the Double Carbon Strategy and Promote Green Payment": Calling on the main bodies of the industry to incorporate "Carbon Neutral" into the strategic layout of enterprise development, practice the concept of green, environmental protection and low-carbon operation, advocate green and low-carbon life and production methods, focus on green payment and service innovation, and accelerate the promotion of green and low-carbon development.

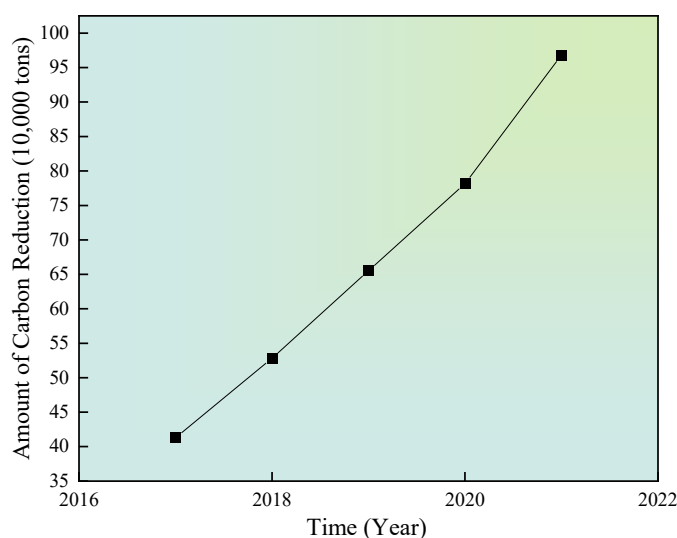
In recent years, green payment methods have made great contributions to carbon reduction in society. Taking carbon reduction by WeChat Pay in travel as an example, from 412,800 tons of carbon reduction in 2017 to 968,100 tons of carbon reduction in 2021, a total of 3,346,100 tons of carbon reduction in the past five years.

At present, there is a certain foundation for the development of green payment in China. First of all, the application of digital technology helps to optimize the structure and efficiency of financial institutions as well as the assumption of environmental responsibility, which is conducive to promoting the development of green finance in China. Moreover, digital

technology is conducive to promoting China's industrial transformation and upgrading, demand structure optimization, and forming a green development model of green production and consumption. Secondly, electronic payment, as an enhancement and supplement to traditional payment methods, has laid a solid foundation for the sustainable development of green payment by virtue of its recordable, identifiable and traceable features as well as green, convenient, efficient and secure payment experience. Finally, digital RMB is steadily developing. As of December 31, 2021, there are more than 8,085,100 digital RMB pilot scenarios, with 261 million personal wallets opened and \$87.565 billion of transactions. As a new digital payment tool, "digital currency" will accelerate the intelligent and green transformation of payment terminals and become a new driving point for the green, low-carbon and high-quality development of the current payment industry.

**Table 1.** WeChat Pay Life Payment (Travel) Carbon Reduction

| Year         | Carbon Reduction |
|--------------|------------------|
| 2017         | 41.28            |
| 2018         | 52.83            |
| 2019         | 65.53            |
| 2020         | 78.16            |
| 2021         | 96.81            |
| <b>Total</b> | <b>334.61</b>    |



**Fig 1.** Amount of carbon reduction (2017-2021)

In the face of the current international situation and China's goal to achieve "carbon peak" by 2030 and "carbon neutral" by 2060, green payment and other such Green payment and other such green and low-carbon technologies and digital means provide opportunities for China to further support the green and low-carbon development of the payment industry. How to determine the application scenarios of green payment and the mode and path to help achieve the goal of "carbon neutrality" is still an urgent issue to be solved.

With the deepening of the concept of green development in the payment industry, the concept of green payment was gradually put forward. on August 17, 2021, the China Payment Clearing Association issued the "Innovative Green Payment Services, Boost Green Development - Payment Clearing Industry Initiative to Support Double Carbon Strategy and Promote Green Payment" to the payment clearing association industry, clearly calling for " Payment market players should take the initiative to grasp the opportunities of carbon peaking and carbon

neutral, innovate green payment services, advocate green and low-carbon life and production, and creatively promote green development", and put forward specific initiatives in four dimensions: establishing concepts, conducting carbon verification, advocating low-carbon consumption, and exerting technological empowerment.

In May 2022, the report "Green Payment Helps Carbon Neutral Goals", released by Tencent and the International Institute of Green Finance of the Central University of Finance and Economics, defines green payment for the first time, and provides reference for the sustainable development of green payment from two dimensions: theory and practice. The development of green payment is conducive to mobilizing the whole society to practice green, low-carbon and environmentally friendly living concepts and consumption and payment behaviors, thus helping to accelerate the pace of low-carbon transformation of the economy and society. As an electronic payment concept with green attributes, relying on the rapid development of electronic payment, green payment is also an important link that closely links production and life and provides financial infrastructure, involving many types of subjects such as regulation, enterprises and individuals, and can influence the layout of key industries and fields upstream and downstream, and then derived to green consumption, green production, green finance and other aspects to help the green and low-carbon transformation of the economy and society.

## 2. Literature Review

Since the early 1970s, foreign scholars have been interested in the study of low-carbon consumption and payment for human beings. British economist Barbara Ward and American microbiologist Rene Dubos's "Only One Earth" (1972), from a review of the impact of traditional industrial civilization's consumption on different countries, proposed that environmental problems are essentially demographic and economic problems, and called on people of all countries to adopt a "low-carbon" lifestyle to protect the earth. He called on all people to adopt a "low carbon" lifestyle to protect the earth. In recent years, many scholars have also tried to study the use of green payment methods such as electronic payments. In terms of payments in various industries (various application scenarios), Prasanta et al. (2015) studied the prepayment policies of manufacturers and trade credit mechanisms for retailers and found that customer demand for their goods is a direct result of the greenness of the goods, the selling price and the environmental friendliness of the products, and that the use of green payments can effectively reduce environmental pollution from various sources such as factories and automobiles. Pollution of the environment. Abdulkarim and David (2016) explored the use of green payments as a perspective of market auctions to reduce energy consumption and lower system delays more than non-green payments, which can effectively reduce environmental pollution from energy consumption. Lee et al. (2022) found in their study that farmers using green payment in agricultural production can achieve incentives similar to the US conservation area program, effectively reducing the pressure on environment and climate change.

In the domestic society, as early as in 2007, as a third-party financial service provider, EPROPay first advocated the concept of "green payment, happy life". Since there is no official definition of the concept of green payment at home and abroad, there is still a lack of specific research on green payment in domestic academia. An (2021) found that online payment technology, mainly by Internet companies, can increase residents' participation in environmental protection and can give full play to the role of Internet payment in promoting green sustainable development. As an infrastructure in the field of green finance, "green payment" guides the green-oriented allocation of social resources and the public's awareness of green environmental protection, and promotes the greening, recycling, and low-carbonization of the production methods of enterprises and the consumption methods of individuals and families. In addition, the green and low-carbon development of the payment industry itself, while carrying out digital

technology innovation, actively explores reducing the energy consumption of payment technology and realizing the greening of its own operation.

Based on the basic definitions in the People's Bank of China's "Electronic Payment Guidelines [No.1]" and other policy documents, "green payment" can be defined as the introduction of green and low-carbon concepts into the payment business, and the provision of electronic payment products and services with green attributes by enterprises, individuals and families when they produce, consume or benefit the public in a green manner. Green electronic payment products and services.

On the one hand, green payment relies on information technology and mobile terminals to provide efficient, convenient and paperless payment services and products for the public's daily life, helping the public to develop a green and low-carbon consumption concept, and to support green development to meet people's aspiration for a better life in the context of building a low-carbon society in China. On the other hand, by relying on the flow advantage of the electronic payment platform, green payment can bring positive diversion for the green development of the industry and help promote the deepening of green consumption patterns such as green home appliances to the countryside and green product purchases, and at the same time, it can play a good role in promoting the further expansion of the carbon inclusion system and deepen the low-carbon and green concepts to all aspects of production and life.

### 3. The Path of Green Payment to Help Carbon Neutrality

Based on the report "Green Payment Helps Carbon Neutral Goals", the green payment ecosystem covers five major elements: users, merchants, payment service providers, regulation, and payment-related technical support. As a tool that connects multiple parties throughout, green payment is a key medium for penetrating social production and operation activities and activating the economy, and constitutes a green development ecosystem through the low-carbon transformation impact brought by green payment as radiation to each constituent element, and a preliminary path diagram for green payment to help carbon neutrality is formed.

- Forming a basic framework supported by regulation

Regulation is the force and support behind the development of green payment, and green payment cannot be separated from the top-level design, green standards and carbon data integration support. In the context of the "double carbon" goal, green payment, which is given green connotation, will fully invoke its market practice experience, scenarios, users and merchant volume, and is an effective path to break the regulatory authority's data tracking and collection of green scenarios, and play a role in helping the "double carbon" goal. The role of the company is to support the "double carbon" goal. By improving and regulating data authorization, data linkage, innovation guidance, technical support, industry risk regulation and management, regulation will provide better support for green payment development.

- Innovative payment industry green development direction

For payment service providers and payment-related technical support, green payment provides a new direction of green and low-carbon development, which helps drive the low-carbon transformation of the industry in which it is located. Green payment will also bring about green changes in the industry while promoting the industry's own awareness of green development. On the one hand, green payment can guide more payment industry enterprises to innovate and develop green payment services and products, including low-carbon technology application and management, exploration of industry chain environmental data, and deepening of payment chain green methodology; on the other hand, green payment can guide relevant technical support industries to strengthen technical capacity and innovate technical support to develop in a greener direction, including the maturation of software and hardware low-carbon technologies.

- Boosting the low-carbon transformation of the production industry

For merchants, green payment can help the digital and green transformation of all related industries. As a bridge between the production and consumption sides, green payment can influence the production side by promoting green consumption, and bring about changes in the green transformation of industries. In terms of the production side, the merchant to which green payment is connected, green payment can not only accelerate the promotion of green products and services and promote the production and sales of green products and services, but also empower the production, circulation, distribution, consumption and other links, leading to the transformation and upgrading of the production and operation mode of traditional industries from the supply side to the demand side, providing green production and operation channels for the development of new industries, and helping various industries to promote the carbon neutral goal with green attributes. It also provides green production and operation channels for the development of new industries, and helps industries to promote the realization of carbon neutrality with green attributes. At the same time, by embedding environmental data tracking in the payment link, it can provide carbon accounting basis for production enterprises, which will help to promote the low-carbon management capacity of the industrial chain.

- Guiding the public to deepen the concept of green consumption

For users, green payment brings about a change in low-carbon life pattern at the social level by guiding green consumption. As the initiation and experience end of green payment, users' choice is closely related to the setting of green payment scenarios. Through the setting of consumption mode, consumption scene and interactive module, Green Payment meets the diversified consumption needs of users with the guidance of carbon benefit, personal carbon footprint and digital RMB, thus guiding users to actively practice the green concept, carry out green consumption and low-carbon life, and form a green consensus with users to help form the low-carbon development at the whole society level. In the actual application of green payment, the green payment scenario is mainly through the paperless payment process, low-carbon travel and low-carbon life to reduce carbon emissions and help achieve the "double carbon" goal.

Take WeChat Pay as an example, as a platform tool to support green payment, WeChat Pay has actively practiced the concept of green and low-carbon development in recent years, vigorously advocated green and low-carbon production and lifestyle, carried out public welfare activities on low-carbon and environmental protection, and continuously expanded green payment application scenarios with the concerted participation and joint support of government departments, merchants and individual users, building a set of green payment application scenarios to promote carbon emission reduction and With the participation and support of various parties, such as government departments and individual users, the green payment application scenario has been expanded to build a green ecological system that promotes carbon reduction and environmental improvement, and supports the transformation of production and lifestyle to green and low-carbon direction. In terms of carbon reduction benefits, the total carbon emission reduction through paper saving in three types of WeChat payment application scenarios, namely, daily consumption, online ticketing and online medical care, is calculated to be 55,500 tons in the past year, and 188,200 tons in the past five years, with significant overall carbon reduction effects.

#### 4. Carbon Reduction Pathways and Models

This paper examines the positioning of green payment to help achieve the goal of "carbon neutrality" at three levels: macro, meso and micro.

- Macro level.



As an important foundation for the financial market and economic operation, the payment industry plays a vital role in the process of economic development and social development with green payments. First, green payment is a powerful support for transforming economic development. Secondly, green payment helps to build rural ecological civilization and adds bricks to the goal of common prosperity.

Relying on the high penetration rate of electronic payment, green payment has become a "booster" for the whole society to achieve the goal of "double carbon". Firstly, green payment promotes green consumption and realizes people's aspiration for a better life. Secondly, green payment plays a good role in promoting the further expansion of carbon inclusiveness by relying on the flow advantage of electronic payment platform. Third, the greening of electronic payment is popularized overseas and boosts the cross-border use of RMB.

- Meso level.

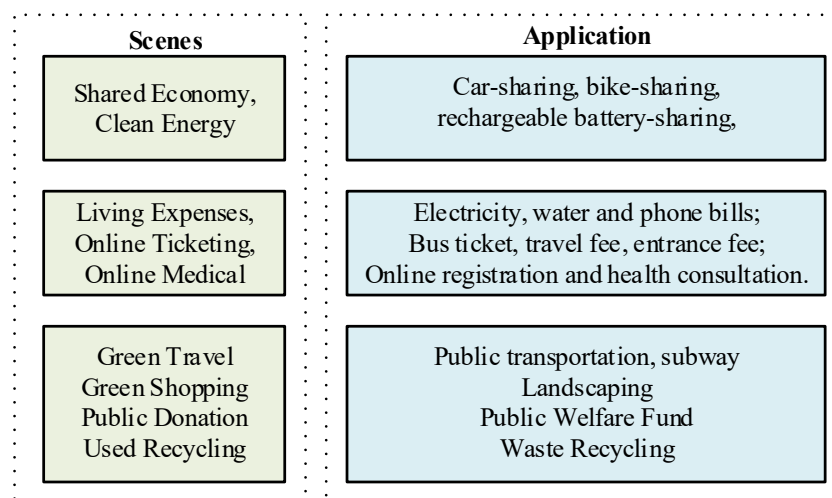
Green payment will play a green effectiveness and promote the high-quality development of the payment industry.

Green payment can play a linking role and empower other industries to upgrade green. First, promote the green transformation of the real economy. Second, to empower the sustainable development of green industry. Third, to promote the innovative development of the financial technology industry.

- Micro level.

Green payment widely influences consumers' behavioral habits, and implicitly conveys green consumption concepts and shapes low-carbon living habits to consumers. First, green payment scenarios guide people to a low-carbon lifestyle. Secondly, the new consumption model of "social + payment" is not only a consumer innovation of payment institutions, but also shows consumers' preference for the social meaning behind consumption.

## 5. Application and Practice of Green Payment



**Fig 2.** Green payment scenarios and applications

Under the strategic background of helping the country achieve the goal of "double carbon", WeChat Pay, as a platform tool to support green payment, has been actively practicing the concept of green and low-carbon development in recent years, vigorously advocating green and low-carbon production and lifestyle, carrying out public welfare activities on low-carbon and environmental protection, and expanding green payment application scenarios with the concerted participation and support of government departments, merchants and individual users. With the participation and support of various parties, including government

departments, merchants and individual users, we have been expanding green payment application scenarios, building a green ecological system that promotes carbon emission reduction and environmental improvement, and supports the transformation of production and lifestyle to a green and low-carbon direction. According to the calculation, in the three types of WeChat payment application scenarios: daily consumption, online ticketing and online medical care, the total carbon emission reduction through paper saving in the past year is 55,500 tons, and the highest carbon emission reduction scenario is daily consumption (40,200 tons); the total carbon emission reduction through paper saving in the past five years is 188,200 tons, and the highest carbon emission reduction scenario is also daily consumption (138,800 tons). The overall carbon reduction effect is significant.

In terms of the dimension of carbon reduction brought about by travel reduction, the main scenario involved is life payment. In this scenario, since the specific carbon reduction is influenced by the distance traveled, the accounting of carbon reduction data generated through travel reduction requires reasonable assumptions on travel distance. Assuming that a resident travels 2km to pay bills and needs to use public transportation, the total carbon reduction from online life payment through WeChat Pay in the past five years is 3,346,100 tons, and the carbon reduction has been increasing year by year since 2017, and the carbon reduction in the year 2021 alone is close to one million tons, with a significant carbon reduction effect. The number of public WeChat payments in the clean energy scenario is growing significantly, providing a new impetus for the traditional production model to develop in a green and low-carbon direction.

With the continuous development of sharing economy and clean energy industry in recent years, WeChat payment can provide a more convenient channel for the public to consume sharing economy and clean energy products in these two scenarios, on the other hand, the continuous expansion of WeChat payment's own application scope also promotes the development of sharing economy and clean energy industry, thus further guiding the traditional industrial production mode to a green and low-carbon direction.

The number of WeChat payments in public transportation and subway scenes is growing significantly, and the public's willingness to consume green life is gradually increasing.

In the past five years, the total amount of carbon emissions brought by using WeChat payment to choose public transportation and subway travel was 1,874,000 tons, compared to the total carbon emission reduction achieved by high-carbon travel of 4,785,700 tons.

## 6. Conclusion and Suggestions

To promote the development of green payment, stakeholders need to work together and promote together, so as to form a perfect green ecological system and help achieve the goal of carbon neutrality.

First, improve the standards of green payment and deepen the direction of green development. It is suggested that the relevant regulatory authorities should unify the definition and standards of green payment and anchor the direction for the overall development of green payment. At present, the relevant policies specifically for the definition and standards of green payment have not yet been issued, but the relevant policies have clearly guided green consumption, carbon inclusion, green payment and other related contents. Therefore, in terms of policy, it is necessary to further support and encourage the development of green payment, and gradually improve the relevant supporting mechanisms for green payment, enhance the enthusiasm and initiative of the payment industry to innovate green payment products and services through the necessary green attribute recognition, guide the payment industry to develop towards energy conservation, emission reduction and low carbon transformation, give full play to the role of payment as the financial infrastructure of the market economy, and actively explore

green payment through Guiding the low-carbon transformation of society and related industries.

Second, accelerate the integration of digital technology and green payment, and strengthen the green innovation capability. It is recommended that the payment industry should accelerate the development of digital transformation while empowering green payment development and promoting greener, more efficient and more convenient green payments. Green payment development needs the support of technical means. In the context of the country's simultaneous promotion of the data economy and green low-carbon development, green payment is associated with two key development directions at the same time, so it is necessary to effectively combine the two, link related industries and subjects, strengthen green innovation capabilities, and help the low-carbon transformation development of the payment industry with two dimensions of technology and green.

Third, advocate green production and life, and promote the low-carbon transformation of social economy. It is recommended to strengthen the guidance for public green consumption and enterprise green production to provide a better development foundation for green payment development. At the consumption end, it is necessary to strengthen consumer education, popularize the green characteristics of low-carbon products and services, shape the concept of low-carbon consumption, enhance consumer recognition, guide and encourage consumers to purchase and use low-carbon products and services; at the production end, it is necessary to promote enterprises to enhance their awareness of low-carbon transformation, further increase support for green production enterprises, strengthen environmental supervision for non-green production enterprises, and at the same time guide enterprises to Green payment scenarios and green business models should be explored to further strengthen the green attributes of important factors in the green payment ecosystem.

## Acknowledgments

This paper was supported by the National Innovation and Entrepreneurship Training Program for Undergraduates in China (202210378138) and the Undergraduate Research Innovation Fund Project of School of Finance, Anhui University of Finance and Economics (JR2022004).

## References

- [1] An, J.-J., Liu, G.-L., and Di, H. 2021. The effect and catalytic path of Internet payment influencing green consumption--a mediating role test from perception to practice. *Taxation and Economics* 6, 54-60. (in Chinese).
- [2] An, W. 2008. A preliminary study on the connotation, mechanism and practice of green finance. *Economic Survey* 5, 156-158. (in Chinese).
- [3] Banerjee, P., Pal, R., Wossink, A., and Asher, J. 2021. Heterogeneity in farmers' social preferences and the design of green payment schemes. *Environmental and Resource Economics* 78 (2), 201-226.
- [4] Batie, S. S. 2009. Green payments and the US Farm Bill: information and policy challenges. *Frontiers in Ecology and the Environment* 7 (7), 380-388.
- [5] Lee, T.-H., Lee, B., Su, Y.-J., and Chang, H.-H. 2022. Green Payment Programs and Farmland Prices—An Empirical Investigation. *Agriculture* 12, 207.
- [6] Pang, L., Zhu, M. N., and Yu, H. 2022. Is green finance really a blessing for green technology and carbon efficiency? *Energy Economics* 114, 106272.
- [7] Su, D.-W., and Lian, L.-L. 2018. Does green credit affect the investment and financing behavior of heavy polluting enterprises?. *Financial Research* 12, 123-137. (in Chinese).
- [8] Sun, C. 2022. The correlation between green finance and carbon emissions based on improved neural network. *Neural Computing and Applications* 34 (15), 12399-12413.



- [9] Wang, K.-S., Sun, X.-R., and Wang, F.-R. 2019. Green financial development, debt maturity structure and green corporate investment. *Financial Forum* 24 (7), 9-19. (in Chinese).
- [10] Wang, Y., and Zhi, Q. 2016. The role of green finance in environmental protection: Two aspects of market mechanism and policies. *Energy Procedia* 104, 311-316.
- [11] Xia, C.-L. 2018. Green financial development evaluation and statistical supervision and management research. *Finance and Economics* 11, 29-35. (in Chinese).
- [12] Zhang, Z.-X. 2017. Research on the application of green finance in the economic transformation of resource-based cities in China. *Finance and Economics* 12, 63-64. (in Chinese).