

# ***Analysis of the Current Situation, Opportunities, Challenges and Countermeasures of China's Digital Payment System in the Post-epidemic Era***

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**Abstract:** In recent years, under the influence of the COVID-19 pandemic, China's digital payment system has encountered significant opportunities, challenges, and changes. The digital payment system mainly includes three parts: electronic currency, electronic payment, and digital currency. This paper takes the perspective of the post-pandemic era and integrates the previous research on the digital payment system. It comprehensively analyzes the current situation, challenges, and development opportunities of China's digital payment system from different angles by examining the development of China's digital payment market. It is found that the pandemic has stimulated the continuous development of digital payment, gradually replacing cash settlement. In the post-pandemic era, emerging industries have shown strong vitality for digital payment. However, digital payment also has risks of inadequate information security, digital divide, and private enterprise monopolies. In the post-pandemic era, digital payment has more development opportunities and presents a sustainable development trend with the promotion of legal digital currency, stimulation of emerging industries, and support of government policies. This article proposes corresponding forward-looking suggestions from the perspectives of governments, companies, and individuals to further promote the development of China's future digital payment system in response to the above risks. Specifically, it should improve risk control and data security protection mechanisms, help vulnerable groups cross the digital divide and mobile payment dilemma, and accelerate the promotion and use of China's legal digital currency.

**Keywords:** digital payments, COVID-19 pandemic, digital currency, financial technology

## **1. Introduction**

Before the COVID-19, China's digital payment industry got its initial formation and continued to develop. Since 2015, digital life concepts such as e-commerce, mobile payment, online dating, online education and telemedicine have been popularized and become an inseparable part of people's lives.

Nowadays, digital payment methods such as QR code payment and face payment have gradually replaced traditional payment methods, and the efficient and convenient payment experience has improved people's quality of life. Digital payment and central bank digital currency have flourished and become the landmark achievement of digital payment in China [1]. Since the new crown epidemic in 2020, all aspects of China's politics and economy have been significantly impacted, and many offline activities have had to be transferred to online. As the "Internet+" era continues to evolve, the payment habits of residents and the business models of merchants have changed significantly. Both businesses and individuals are enjoying the dividends of the "digital" and "non-contact" economy at an unprecedented rate [2]. Behind the rapid development of digital payment, this paper finds that digital payment has the advantages of efficiency, speed and convenience. Along with the continuous change and innovation of technology, digital payment is in line with the rapid development trend of the times. Under the impact of the new crown epidemic, the pace of innovative payment methods has accelerated and the market has shown vigorous development [3]. After the epidemic policy was liberalized, Chinese digital payment industry should seize the opportunity of the times for further development; at the same time, attention should also be paid to identifying potential risks, escorting the safety of the payment system, and improving the user experience, thus facilitating the process of China's economy towards a new era.

But at the same time, the development of digital payment often goes hand in hand with risks. One of them: digital payments are still at risk in the security and safety system. More unscrupulous elements use high technology to commit fraud during the epidemic, and users' payment terminals are vulnerable to Trojan horses and hacker attacks [4]. Second: the digital divide phenomenon remains abrupt. Along with the aging trend of Chinese population, the elderly population has become a major challenge to the popularity of digital payments. During the epidemic, health codes and trip codes are difficult to popularize for the elderly group, so it is a long way to go to assist the elderly group to cross the digital divide. Chinese elderly population has a stable market and strong purchasing power for mobile payment consumption [5]. Third, the current state of Chinese digital payment system is characterized by a serious monopoly by private companies. Today, digital payments in China are dominated by two private companies, Tencent and Alibaba, and there are also significant potential risks. The existence of virtual accounts has promoted the development of online transactions with the advantage of convenience, but there are also many risks in this mode of payment operation [6].

In the main part of this paper, the current situation, risks and development opportunities of Chinese digital payment system in the post-epidemic era are presented through the study and analysis of how to identify the above dilemmas and impacts now and in the future. Firstly, this paper analyzes in detail the current situation of Chinese digital payment system under the impact of the epidemic, which includes the trend of the epidemic promoting the development of Chinese digital payment system, the trend of digital payment gradually replacing cash settlement, and the new industry promoting the popularity of digital payment; secondly, this paper analyzes the opportunities and challenges of Chinese digital payment system in the context of the epidemic, detailing the risks of inadequate information security, the digital divide, and the monopoly of private enterprises. The paper then examines the opportunities and challenges of Chinese digital payment system in the context of the epidemic. The paper also concludes that under this impact, Chinese digital payment system has a rising trend of legal digital currency in the future, the emergence of new industries and technological innovation, and government policies to provide relevant support for the development of digital payment opportunities; finally, the paper provides corresponding suggestions for the development of digital payment system by taking advantage of the current advantages in response to the above impact, namely, improving risk control and data security system protection mechanism, helping disadvantaged groups to cross the digital divide and mobile payment dilemma, and to accelerate the popularization and use of legal digital currency in China.

This paper provides theoretical support for the future development of digital payment systems by sorting out and integrating the dilemmas faced by the development of digital economy so far, and concludes that digital payment still has great room for development and challenges in the future through research and analysis of the above risks and opportunities. This paper will provide a comprehensive analysis of the current situation, risks and future opportunities of Chinese digital payment system, and provide some forward-looking suggestions for the risks and challenges faced, so as to promote better development of the digital payment industry in the post-epidemic era and in China in the future.

## **2. Analysis of the Current Situation of China's Digital Payment Under the Background of the Epidemic**

### **2.1. Epidemic Spurs China's Digital Payment Scale to Grow**

The innovative development of science and technology has promoted the construction of information infrastructure. my country has achieved the popularization of the Internet and smartphones, and there are also a variety of digital payment software, such as WeChat, Alipay, and Cloud QuickPass. In the early stage of the epidemic, in order to minimize the risk of people gathering in the payment process and being exposed to the virus, the country vigorously promoted "contactless" and "contact-free" payments. With the blessing of many favorable conditions, more and more consumers and enterprises choose to use digital payments. Among them, the advantages of convenience, traceability and free change of digital payment are favored by the public. In China, 82% of adults will use digital payments to pay merchants in 2021, of which more than 100 million adults are trying digital payments for the first time after the outbreak began.

### **2.2. Digital Payment Gradually Replaces Cash Settlement Under the Epidemic**

In the early days of the epidemic, face-to-face transactions hardly existed in the market, and cash transactions were extremely marginalized. The COVID-19 pandemic has brought the growth of the global economy in traditional fields to a near standstill, and cooperation between them has fallen into a "zero-sum game" situation. And the emerging economic fields represented by the digital economy will have great potential. The development of the digital economy is inseparable from the construction of mobile payment, which is also the proper meaning of the "dual cycle". Therefore, during the epidemic period, the People's Bank of China issued the "Notice of the General Office of the People's Bank of China on Doing a Good Job in Payment and Settlement During the Prevention and Control of the New Coronary Pneumonia Epidemic", detailed the implementation of banks, and encouraged banking institutions to handle all kinds of transactions through out-of-the-counter methods. Payment business, encouraging non-bank payment institutions to further expand online business. The People's Bank of China, the Ministry of Finance, the China Banking and Insurance Regulatory Commission, the China Securities Regulatory Commission, and the State Administration of Foreign Exchange issued the "Notice on Further Strengthening Financial Support to Prevent and Control the Epidemic of Novel Coronavirus Infection Pneumonia", proposing to "increase the protection of electronic payment services. Banking financial institutions, non- Bank payment institutions should strengthen electronic channel service guarantees, flexibly adjust relevant business limits, and guide customers to conduct online payment and settlement business through electronic channels such as electronic commercial draft system, personal online banking, corporate online banking, mobile banking, and payment service APP [7] ." This has led to the continuous shrinking of the share of cash settlement, and compared with digital finance, it has shown a trend of ebb and flow.

With the development of the Internet, digital payment has become faster, with more transactions and higher transaction efficiency. Compared with banknotes, it can not only avoid the trouble of

changing, but also reduce the risk of virus transmission. More and more consumers Accept and choose digital payments. Taking the questionnaire survey of 50 merchants and 100 people in Jingchuan County, Pingliang City, Gansu Province as an example, during the epidemic prevention period, various QR code transactions accounted for as high as 86%, and the signing rate of mobile banking in Jingchuan County increased by 13%. Utilization increased by 27% [8].

### **2.3. The Rise of Emerging Industries Has Ushered in a Wave of Digital Payments**

Affected by the epidemic, online education, online medical care, remote office, e-commerce live broadcast, online short video and other fields have seen explosive growth, and digital payment is highly integrated with these emerging industries, which objectively also drives digital payment business volume growth [9]. Emerging industries continue to grow with the support of the development of digital payment, and digital payment is also developing faster under the impetus of the epidemic.

## **3. Opportunities and Challenges of China's Digital Payment System in the Context of the Epidemic**

The popularity of the new crown virus has put digital payment systems on the fast track and domestic digital payments have been given many opportunities for growth. However, the digital payment system still faces many challenges and shortcomings. In the context of the epidemic, these challenges require even more attention, with some affecting people's normal daily lives and others limiting the development of digital payments.

Taken together, these opportunities and challenges are needed to be faced up, strive to achieve a diversified competitive landscape in the digital payments market, and make continuous efforts to promote the continued development of the digital payments system.

### **3.1. Opportunities for the Development of Digital Payment Systems in China in the Post-epidemic Era**

#### **3.1.1. The Development Trend of China's Legal Digital Currency Is Unstoppable**

The current trend towards central bank digital currencies is unstoppable. The outbreak has had a serious impact on the economy and has further facilitated the development of central bank digital currencies. Digital currencies can provide a safer, faster and more efficient way to make payments, thereby reducing the physical contact and transmission of physical currency and effectively reducing the risk of the spread of the epidemic. At the same time, digital currencies can also help to enable online remote payments, reduce the gathering of people and reduce cross-contamination of diseases. Therefore, in the context of the epidemic, the application of digital currencies has gradually gained wider recognition and acceptance, and the development trend of central bank digital currencies is unstoppable [10]. In 2020, the KCI Daily reported that digital RMB wallets had been tested internally at the Agricultural Bank and that local civil servants had received part of their transport subsidies in the form of digital RMB. On 25 August, the former director of the Monetary Policy Department of the People's Bank of China said at a State Council policy briefing that the digital RMB pilot would adopt a "4+1" model. In other words, there will be four regions: Shenzhen, Suzhou, Xiong'an and Chengdu; and one scenario: the 2022 Beijing Winter Olympics [11].

Official digital currency has also demonstrated its irreplaceability in other ways besides during the epidemic. It can reduce transaction costs and improve financial efficiency, while also enhancing financial transparency and regulatory control [12]. The development of digital currencies is receiving increasing attention from governments and central banks, and many countries and regions are actively

exploring the development of their own digital currency solutions. According to the latest round of the Bank for International Settlements (BIS) Central Bank Digital Currency Survey released in May this year, 90% of the 81 central banks participating in the survey are conducting research related to digital currencies, and 62% are conducting related experiments or proof of concept. It can be said that the future belongs to digital currencies, which will change the way payments are made, the digital economic model, and may even bring about a revolutionary reorganisation of the new financial sector. Therefore, strengthen the research and application of digital currencies should be strengthened, follow the historical trend and actively adapt to the development trend of the digital era.

### **3.1.2. Emerging Industries and Technological Innovations Will Continue to Drive the Development of Digital Payments in China**

Digital payments in China are growing rapidly as the internet and mobile devices become more popular. The emergence of new industries and technological advances will be the driving force behind the continued development of digital payments in China. Taking blockchain technology as an example, the People's Bank of China has launched the "Yuan Guanjia" digital RMB smart contract solution and is responding to the differentiated market needs of various industries, giving customers with different needs the contracts that best meet their needs and building an ecological service platform for digital RMB smart contracts [13]. Technological advances will also make digital payments more popular, and China's digital infrastructure is developing rapidly. "During the 13th Five-Year Plan period, China built the world's largest fixed and mobile communications network, with the proportion of cities and towns connected to fibre optics and 4G exceeding 98%, and the official commercialisation of 5G, which has become a strong foundation for the rapid development of the digital economy. Of course, the digital payment sector will also face a series of risks and challenges in the future, requiring continuous innovation and enhanced regulation to ensure a healthier development of digital payments.

### **3.1.3. Central and Local Governments Encourage Residents to Use Digital Payments**

In the current trend of economic development, digital payment has become an indispensable payment method. In the case of the new crown epidemic, officials are encouraging residents to use digital payments in order to reduce the frequency with which people visit physical shops and thus reduce the risk of spreading the epidemic [14]. The official encouragement of residents to use digital payments is also in line with the requirements of a modern lifestyle. During the epidemic, the country's economy was greatly affected by the stagnation of a large number of industries as well as the contraction of consumption. In order to promote the stability of the economic system, the government borrowed the digital payment platform to issue a large number of consumption vouchers to the public, involving complexes, supermarkets, restaurants, cars and tourism, etc. The results (Table 1) show that the issuance of consumption vouchers had a good multiplier effect on stimulating consumption.

Table 1: Consumer voucher write-offs in the six cities (Source: various government websites).

City	Statistics Time period	Total amount disbursed (RMB million)	Amount written off (\$ million)	Write-off rate	Associated consumption	Associated consumption/write-off amounts
Shanghai	Year-round	1,000,000	8576000	85.76%	4,000,000	4
Guiyang	5.28 - 11.10	16000	16000	100%	68000	4.25
Ningbo	02.28-03.31	4400	3774	85.79%		
Chengdu	10.01 - 11.10	15800	14900	94%		
Yunnan	Year-round	19720	13000	66.2%	98200	7.6
Yangjiang	5.1 - 5.7	200.09	133.46	66.7%	1200	6

### 3.2. Remaining Shortcomings and Challenges of China's Digital Payment System

#### 3.2.1. Inadequate Information Security and the Obvious Digital Divide

Although China's digital payment system has developed to a fairly mature stage, there are still certain shortcomings in terms of information security. In this paper, it is believed that inadequate information security is mainly manifested in two aspects: telecommunication network fraud and personal information privacy leakage.

As the market for digital payments in China continues to grow in size, the number of scenarios in which users use mobile payments is also increasing, which provides more viability for telecoms fraud [15]. Especially in the context of the epidemic, many types of fraud related to epidemic prevention and control and the resumption of work and production abound. The People's Bank of China suggested several common types of fraud during the epidemic, such as the false sale of epidemic protection supplies, the promotion of 'special drugs' for the new crown pneumonia, and the collection of donations under the guise of public charities [9]. The lack of awareness of information security precautions among some users has led to the creation of such telecommunication network frauds.

According to the statistics of the security problems encountered by mobile payment users, the highest percentage of 81% of personal information was leaked. The analysis shows that there are several reasons why personal information is leaked when making digital payments: firstly, users' awareness of self-prevention of information is not strong, making it possible for lawless elements to take advantage of the situation; secondly, third-party payment platforms are not good at keeping users' information, and some third-party payment platforms sell users' personal information to unscrupulous elements for profit; thirdly, laws and regulations on the protection of users' personal information are yet to be improved. At present, China has introduced detailed laws and regulations on the access and operation of payment platforms, but there are no clear provisions on the protection of users' rights in case of personal information leakage [16].

To help the development of China's digital payment system in the post-epidemic era, the prevention of telecoms fraud and personal information leakage is an unavoidable and urgent issue in China's mobile payment system.



### **3.2.2. The Digital Divide Still Stands Out**

The phenomenon of the digital divide in China has had a significant impact on the spread of digital payments. The digital divide refers to the phenomenon of differences in the ability to access and use digital information between urban and rural areas, between regions and between different social groups [17]. In China, due to various factors, some regions and groups are lagging behind in digitisation to a high degree and have a very weak ability to have digital payments, or even to use digital payment services.

This creates a lot of difficulties for these people, especially during the epidemic, when more and more people have to use digital payments, the lack of which leaves them behind and causes a lot of inconveniences that cause great problems in their daily lives [18].

In addition, the popularisation of digital payments requires a good infrastructure and technical platform, which also requires the joint efforts and support of the government, enterprises and the community. Only by increasing efforts to improve the digital divide and strengthening the accessibility of digital payment popularisation and universal products can more people enjoy the convenience brought by digital payments.

### **3.2.3. The Monopoly Phenomenon of Platform Companies Is Obvious**

The phenomenon of monopoly by private companies in China has had a certain negative impact on the development of digital payments. Currently, China's Internet giant companies have formed an obvious monopoly in the digital payment field, with Alipay and WeChat Pay having a market share of more than 90% [19] and other digital payment platforms finding it difficult to compete with them.

This monopoly phenomenon limits competition in the digital payment market, preventing the full use of market resources and leaving consumers with relatively little choice. This repressive market pattern may lead to a reduction in the incentive to innovate, resulting in difficulties in the stability and sustainability of the digital payment market.

In addition, due to their control over the digital payment market, monopolies may abuse their market dominance, posing a risk to the safety of consumers' money. In particular, in the absence of competitive pressures, monopolies may set high transfer fees that drain consumers' trust and pose a threat to the healthy development of the digital payments market [20].

Therefore, regulators should strengthen the regulation of the digital payment market, encourage market competition in various aspects, promote the healthy and orderly development of the digital payment market and protect the legitimate rights and interests of consumers.

## **4. Suggestions on the Development of Digital Payment System in the Post-epidemic Era**

### **4.1. Improve the Mechanisms of Risk Control and Data Security System**

#### **4.1.1. Strengthen the Protection of Information**

For potential attacks, digital payment systems should adopt advanced encryption technology and security mechanisms to protect users' privacy and personal information from being leaked or tampered with by attackers while ensuring security [16].

#### **4.1.2. Improve the Laws and Regulations for Digital Payments**

Enhance the regulation of Internet payments to ensure the smooth operation of digital payment systems and the security of users' funds.

### **4.1.3. Enhance the Information Security Awareness of Users**

During the COVID-19 burst, people's awareness of information security has been tested, with fraudsters often falsely deceiving people into providing epidemic supplies and extorting personal payment information [9]. Therefore, Security education in the community is a good idea to raise awareness of the information security on digital payment systems. Users should install anti-virus software, avoid using applications from unknown sources, keep their accounts and passwords secure when using digital payment systems, and not inadvertently divulge personal information to ensure information security.

## **4.2. Help the Vulnerable Bridge the Digital Divide and Mobile Payment Dilemma**

### **4.2.1. Improve Relevant Laws and Regulations**

On the one hand, the government should improve the supervisory mechanism, and work with local administrations to crack down on fraud and other illegal acts committed by lawbreakers against the vulnerable, so as to improve the trust of the disadvantaged in electronic payment platforms; on the other hand, the government should encourage the local organisations to carry out education and popularisation of the digital system in official or unofficial forms, in order to reduce the digital prejudice of the vulnerable and improve their digital literacy [21].

### **4.2.2. Payment Platforms Should Enhance Their Elderly Friendliness**

Payment platforms provide vulnerable groups with as convenient payment methods as possible by opening specific channels and other ways to lower the threshold of technology and knowledge.

### **4.2.3. The Community Establishes a Complete Digital Service Mechanism**

The community should establish offline digital service consultation centers or telephone consultation channels, effectively providing every vulnerable group with legitimate and convenient ways to learn and use mobile payment.

### **4.2.4. Households and Communities Should Work Together to Create a Good Digital Environment**

Families and communities provide help and support to vulnerable groups, including in terms of technical knowledge, and are reasonably concerned about the digital anxieties generated by vulnerable groups [22].

## **4.3. Accelerate the Popularisation and Usage of China's Legal Digital Currency**

People's Bank of China Should Clarify the Legal Attributes of the Digital RMB and Its Monetary Nature, and Use the Country's Credit as a Guarantee to Boost People's Confidence in Investment and Consumption

### **4.3.1. The Government Improves the Relevant Regulatory Mechanism**

The government ensures transparency and legality of transactions and prevents criminal activities such as tax evasion and money laundering by using the traceability of digital RMB. This effectively ensures the legitimate use of digital RMB and protects the legitimate rights and interests of consumers.



### 4.3.2. Strengthen the International Status of the Digital RMB.

As a major player in the digital currency trading industry, China's government should accelerate the development of an international platform for trading the digital RMB, in order to promote the internationalization of the RMB [23].

### 4.3.3. Increase the Publicity of the Digital RMB

Continuously expanding the usage scenarios of China's digital RMB and bringing the legal digital currency into the public eye, it has taken root in the market.

## 5. Conclusion

As a result of the study, this paper finds that the epidemic period has generally contributed more to the booming development of Chinese digital payment industry. This is specifically reflected in the improvement of information infrastructure, financial policy support to provide protection, and the birth and development of new industries derived from the epidemic, respectively. Digital payment is an innovative online payment method based on the development of Internet technology, which greatly facilitates the daily life of users and enables them to meet the lifestyle of a cell phone and a bank card to travel, digital payment has the advantages of efficiency, speed and convenience. The future of Chinese digital payment industry is bright, with the implementation of legal digital currency, technological innovation, and the government encouraging residents to use digital payments during the epidemic, thus exposing more people to digital payments. By studying and analyzing some of the potential risks faced by digital payments in the future development, this paper makes the following recommendations for the post-epidemic era and the future of Chinese digital payment system: first, to strengthen information security and awareness of the digital payment system in all aspects; second, to continuously focus on assisting specific groups to cross the plight of the digital divide in the future; and finally, the Chinese government should accelerate the promotion and popularization of legal digital currency in the future. Finally, the Chinese government should accelerate the pace of promoting the popularization of legal digital currency in the future.

This paper analyzes the current situation and potential risks of digital payment with the aim of promoting Chinese digital payment system to develop better in the post-epidemic era and even in the future, and some of the risks can be analyzed in more detail and more specific recommendations can be made in future studies.

## Authors Contribution

All the authors contributed equally and their names were listed in alphabetical order.

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