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Application Research on Big Data in Material Bidding and Procurement Management

Ze Zhou*

North China Electric Power University, Baoding, Hebei, 071003, China

Abstract: The 21st century is an era of rapid development of informatization. Under the background of the development of this era, people are increasingly researching the application of information technology. The application of big data technology is the development and application trend of an information technology formed after the rapid development of modern information technology. Big data technology has been applied to the development of many industries, including the material bidding and procurement management as well. With the aid of scientific analysis of big data, it is possible to help material procurement management to analyze the corresponding bidding procurement information, which is an important guarantee for improving its bidding procurement management capabilities. In view of this, this article has conducted special research on the application of big data in material bidding and procurement management, hoping to provide references for the application of big data technology in material bidding and procurement management with the help of the research in this article.

Keywords: Big data; Material Bidding; Procurement Management; Applied research

***Corresponding Author:** Ze Zhou, North China Electric Power University, Baoding, Hebei, China. Email: 30887087@*qq.com*

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1. Introduction

In material bidding and procurement management, as there are many factors that need to be analyzed, it is necessary to analyze the various information data and collect the data that needs to be applied in the bidding procurement management in a timely manner. Then, in the process of data collection, the corresponding data information transmission application is timely carried out. Big data analysis information technology has become a technology that must be applied to the management of modern materials bidding and procurement. Only in the process of technology application, can it be clear that technology is applied to the development of the industry, so that the application of technology can be guaranteed. The development of its industry brings economic development benefits.

2. The Development Trend of Material Bidding and Procurement Management in Big Data Era

2.1 Centralization of Bidding

Under the rapid development of big data technology, it has now been integrated into the development of many enterprises. In the development of its enterprises, the application of big data technology can enhance the efficiency of its own business development. As the material bidding management enterprise is in the process of applying big data, due to the change in the development trend of the application of big data technology, the application development of its corresponding bidding data has emerged a trend of centralized development.[1] Under the evolution of this bidding development trend, in order to ensure the improvement of the ability to carry out material bidding, it is also necessary to pay attention to the analysis of various elements in the bidding process, and then in the analysis process, the corresponding bidding management work can be measured.

2.2 Electronization of Bidding

Electronization of Bidding refers to the fact that during the current bidding process, the electronic development of the bidding has been realized. The development of the traditional bidding has changed to the trend of the network bidding. Under the application of this trend, there has been a clear shift in the technical application of the bidding process and the corresponding work deployment principles. The corresponding bid management operators only need to send bidding information to the Internet in a timely manner with the help of big data technology. Through the publicity on the network, the corresponding bidding company can specify the corresponding materials needed in the bidding and take the bidding measures.[2]

2.3 Informatization of Procurement

Contrary to the bidding work, the information management of procurement management is changed. In the traditional material procurement management, the quality of field procurement materials is used for analysis, and then the corresponding procurement work is carried out during the analysis. In the development of the existing procurement management work, a corresponding change

has taken place in the development of the corresponding procurement management. The most direct change is that during the development of procurement management, the corresponding procurement management has achieved information transformation. The transformation of informatization procurement management has become an inevitable trend in the development of big data technology and enterprise material procurement management.[3]

2.4 Systematization of Procurement

In addition to the transformation in procurement information management, the corresponding procurement management has also undergone a systematic transformation in the implementation of material procurement management. The application of big data technology has made the entire procurement management process easier, and the corresponding enterprises are making purchases. In the management process, a special procurement management system can be established through the application of big data technology, and the system can timely process the procurement information needed in procurement management, which is of significance for the improvement of the ability to carry out procurement management.

3. Application on Big Data in Material Bidding

3.1 Analysis on Bidding Subcontract

Bidding subcontracting is a bidding management control factor that must be specified in the management of material bidding. Only the bidding subcontracting management strategy is clearly defined so that the corresponding bidding work can be carried out in a timely manner. As an enterprise in the management of material bidding, it is necessary to analyze the big data in a timely manner according to the needs of its own enterprise materials and materials. Through the analysis of big data technology, it is possible to achieve scientific improvement in the application of bidding subcontracting management strategies. It is of great importance for the improvement of the ability to ensure the implementation of bidding. Through the analysis of the application of big data technology, the corresponding bidding work can be implemented in a timely manner to achieve a sorting process, which facilitates the scientific improvement of the corresponding bidding work, and has certain guarantees for the development of the bidding work.[4]

3.2 Analysis on the Range of Bidding Materials

The analysis of the bidding material range is the second task that needs to be carried out during the bid invitation work. Through analysis of the range of material bidding, it can be clear in a timely manner which bidding applications need to be analyzed in the bidding application of corporate materials, and then in In the analysis process, the corresponding bidding material application requirements can be measured. Through the application of big data technology, it is possible to carry out the analysis of the bidding materials in accordance with their corresponding requirements for the application of bidding materials, and to select the corresponding bidding work according to the different types of applications for bidding materials during the analysis process. Carry out. For example, in the bidding of a company, there are five kinds of materials that need to be bided. According to the different application requirements of the bidding materials, different bidding ranges are formulated. The corresponding bidding management personnel implement the application of big data technology in a timely manner. The range of the corresponding bidding material needs was analyzed. For example, the bidding for food resources needs to be submitted to the catering industry. Other bidding needs to be developed in different bidding directions.[5]

3.3 Material Category and Bidding Matching

Through the analysis of the Bidding work, it is possible to clearly define the Bidding work in a timely manner. The corresponding Bidding work can be applied and implemented. In the implementation of the Bidding management work, the application of big data technology can be applied to the corresponding bidding material category. And in the process of the bidding work in this link, the corresponding bidding management work can be carried out in a timely manner.[6] The application of big data technology can help the bidding company to analyze the application ability of the bidding work in a timely manner. In the analysis process, it can timely carry out the corresponding bidding material work according to the results in the data analysis. For example, in the course of carrying out the bidding work, a certain enterprise needs the types of bidding materials such as steel bars, cement, concrete and sandstone. By clarifying the specific application requirements for bidding materials, different bidding data analysis was carried out according to the corresponding types of bidding materials, and then a scientific bidding scheme was formulated during the data analysis process.

3.4 Analysis on the Method of Bidding Evaluation

The analysis of bidding evaluation method is a bidding management factor that needs to be studied in the bidding process, and only the scientific evaluation method in the bid management work is guaranteed, so that the corresponding bidding management can be carried out in a timely manner. Through the bidding management work, it provides guarantees for the operation of material bidding and bidding management applied by enterprises. The application of big data technology can timely coordinate the relevant bidding management development factors, which

is of importance for the promotion of the bidding operation capability in the entire bidding process. Under the application of big data technology, it can timely measure the corresponding bidding evaluation method, for example, by evaluating the material supply information of each bid enterprise during the development of the bidding work, and measuring the hidden value in the corresponding bidding information, so as to facilitate the corresponding The bidding management staff timely carried out the bidding work in accordance with the application of the bid evaluation method.[7]

3.5 Analysis on the Rate of Winning the Bidding

The analysis on the rate of winning the bidding is also a working analysis that needs to be carried out during the bidding work. As the bidder's analysis of the bidding work, it should use the application of big data technology to analyze the various factors in the corresponding bidding work in a timely manner. In the analysis process, according to the specific bidding work, carry out the corresponding bid rate analysis. For example, in the work of carrying out material bidding, the corresponding bidding manager, according to the needs of the bidding work, analyzed all the participating companies and found that through the analysis of the data, the entire bidding process was carried out and the corresponding bids were submitted. The application requirements provided by companies for bidding programs to meet the needs of the enterprises themselves are relatively large, in this situation, it is necessary to measure the probability of successful bids for each bidding company and ensure that the corresponding bidding work can be carried out well in the analysis process of winning the bidding.

4. Application on Big Data in Procurement Management

4.1 Analysis on Materials

In the material procurement management, in order to ensure the improvement of the overall procurement management capability, the corresponding procurement managers perform the procurement management process and use the big data technology to analyze the corresponding materials. Through the application of big data technology, the corresponding material data application will be analyzed in a timely manner.[8] For example, in the process of using big data, timely analysis is performed through the corresponding materials needed for material procurement. In the analysis process, the required material information is summarized, and each material is timely applied through the application of big data technology. The application of data is analyzed to analyze the corresponding procurement areas for procurement materials and the application requirements for the corresponding procurement materials in the procurement process. Through this procurement technology, the final procurement data can be guaranteed to be scientific and easy to use. The timely implementation of procurement management technology has certain guarantees for the scientific improvement of procurement.

4.2 Analysis on Bidding

After clarifying the material data that needs to be applied in procurement management, the corresponding management personnel should conduct a bidding analysis according to the requirements of the corresponding procurement materials in a timely manner, and collect the necessary materials according to the different types of materials and analyze the corresponding bidding data. During the data bidding summary analysis process, it is possible to timely conduct a comprehensive analysis of the bidding management factors that need to be coordinated in the feasibility of bidding and bidding management. With the analysis of the bidding management factors, the bid invitation can be handled in a timely manner. The management of scientific bidding management factors, for the implementation of the overall bidding management work with the help of big data technology can make a scientific analysis. For example, when an enterprise conducts procurement management, it summarizes the application requirements of the corresponding procurement materials for the application of basic materials and phased material applications, including gasoline, diesel, gravel, and cement and asphalt. After clarifying this point, the company carried out a bidding analysis, analyzed the situation with different materials using different biddings, analyzed the 15 companies bidding with big data technology, and selected the corresponding bidding company.[9]

4.3 Analysis on Suppliers

Supplier analysis is also a data analysis element that must be dealt with during the procurement management work. Only in the analysis of suppliers, the supplier can analyze and process the corresponding information in a timely manner, including the suppliers' material supply capabilities. The material quality of supplier's products and corresponding industry evaluation information, etc., can be comprehensively analyzed with the help of the application of big data technology. Through the implementation of this analysis technology, the implementation of procurement management technology can ensure the corresponding procurement. The supplier research has a certain degree of scientificity, and only the basic information of the procurement supplier is guaranteed to be accurate, so as to facilitate the purchase management enterprise to carry out the procurement cooperation in a timely manner. For example, through the application of big data technology, one

by one, the suppliers participating in the bidding are compared. By comparing the information of each supplier, it is possible to find a supplier that is suitable for the cooperation of enterprise procurement management (measure the supplier's price of material supply, and compare different suppliers' purchasing information and clearly identify the corresponding advantages and disadvantages of purchasing suppliers.[10]

4.4 Expert Analysis

Expert analysis is the last link in material procurement management. The application of big data technology can help the corresponding enterprise material procurement managers to analyze the corresponding procurement management information in a timely manner. For the implementation of procurement work, it is of significance for the importance of procurement management research. In the process of analysis of procurement management experts, the long-term development of the corresponding supply procurement management business can be timely applied to the formulation of procurement management strategies with the help of the application of big data technology. For example, during the course of carrying out material procurement management, a construction project carried out a scientific expert analysis of the procurement of construction materials in the construction management of the first phase of the East Fourth Ring project. Through the application of big data technology, several common procurement projects were used. Material analysis was conducted. Through the analysis of procurement materials, it was found that the application of certain procurement materials can select new material applications, and the price of the corresponding new material application is obviously different from the price of existing material applications. Next, according to the actual needs of the project construction, the corresponding material procurement information should be measured in a timely manner to measure the application of materials in procurement management from the perspective of long-term development, and guarantee the scientific nature of procurement material management.

5. Conclusion

In summary, under the development of modern science and technology, big data technology has been applied to the development of China's information industry. With the application of its technology, it can collect and analyze the information and data in various industries, facilitating the process of information analysis. In order to formulate a relatively complete development strategy plan in accordance with the current state of enterprise development. The application of big data technology in material bidding procurement management is also extensive. With the help of big data technology, the scientific nature of material bidding procurement management has been promoted, and the scientific development of enterprises has been ensured. Through the research and analysis of this paper, the application of big data in material bidding and material procurement management is summarized as the following: First, the application in bidding management is divided into bidding subcontract analysis, bidding material range analysis, bidding materials category Match with biddings, analysis of bid evaluation methods, and bid rate analysis. The second is the application in procurement management, which is divided into material analysis, bidding analysis, supplier analysis and expert analysis.

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The Research on the Money Supply of Central Bank Digital Currency

Yuxuan Chen Kejie Zhou* Wenhao Yang Sisi Liu
Nanjing Audit University, Nanjing, Jiangsu, 211815, China

Abstract: Currently, the only central bank digital currencies (CBDC) in the world is Venezuela's currency—Petro. Nowadays, the IMF, BIS, and major countries have conducted a lot of research on CBDC. It's an urgent issue for the central bank to issue CBDC, determine and formulate the circulation of CBDC and the issuance speed, and supervise it. Therefore, establishing ARMA and VARs by sorting out literature, the paper uses the characteristics of CBDC--cash, and similarities with third-party payment in terms of payment to determine the circulation of CDBC by third-party payment users and currency in circulation. The model calculates and predicts the speed of circulation of digital currency. The issuance of CBDC will accelerate the circulation of money. In this regard, we will explore the impact of money supply on monetary policy and make relevant recommendations.

Keywords: Money supply; Central bank digital currency; ARMA model VAR model

***Corresponding Author:** Kejie Zhou,Nanjing Audit University, Nanjing, Jiangsu, China, No. 86, Yushan West Road, Jiangpu street, Pukou District, Nanjing, Jiangsu, China E-mail: 958225371*@qq.com*

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1. Introduction

With the emergence of bitcoin a few years ago, digital currency has gradually entered the field of vision.

Bitcoin is a cipher currency generated by block chain technology. People can freely participate in the bitcoin transaction, and the record information generated by each exchange will be broadcast to the whole network and will be collate on the only data chain of the whole network. Therefore, bitcoin has the characteristics of anonymity and security. However, the bitcoin system has a serious defect: firstly, a large amount of energy is consumed to produce bitcoin and secure the safe circulation of bitcoin; secondly, the throughput of the system is very low, and it is difficult to support the daily transactions of the legal money.[1](Qin Bo, 2017, "Bitcoin and Digital Fiat Currency" , "Journal of Cryptologic Research"). And there is a great credit risk. Though, it is difficult to be widely used in economic activities.

In this paper, the central bank digital currencies (Hereinafter referred to as "CBDC") is defined as the legal currency issued by the central bank, which represents the specific amount of value by encrypted numeric string. It is not a physical entity itself, nor a physical entity as a carrier, but a digital information, which is used for network investment, trading and storage, and represents a certain amount of value. (Liu Xiang min, 2016, "The legal issues of issuing digital money by the central bank ", "China finance" seventeenth phase,17 to 19 pages[2]).

At present, the only CBDC in the world is the "Petro", introduced by Venezuela, which will be supported by resources such as oil and gold. The Venezuelan government hopes to save money system which is deeply in the face of inflation and collapse. In addition to Venezuela, Russia, Israel and other countries are also planning to issue their own CBDC in order to resist economic sanctions from the West. Sweden, Singapore and other countries also plan to issue CBDC instead of traditional currencies due to the decrease in cash usage.

Taking Venezuela for example, the country's "Petro" uses the ERC20 standard, which is pre mined and issued by the government. And it will be traded on the two-level market at both national and international digital encryption currency exchanges. Although, the Venezuelan gov-

ernment has repeatedly said it is the first digital currency supported by sovereign states and resources such as oil and gold in the world. But its essence is similar to stocks or bonds, which is quite different from the CBDC defined in this paper. The digital currency ecological environment is still in the process of construction and perfection, and its explicit issuance and supervision system can't be known.

According to the results published by the central bank's digital money research project group, the preliminary conception of the CBDC prototype is shown in Figure 1, consists of a template, two libraries, and three centers, which connect the mobile terminal of the user to issue and circulate the digital money. At the same time, this paper will be based on the assumption that the central bank is the only subject of issuing, and the multi- basis of "Central Bank - Commercial Bank" will be discussed.[3] (Qiu Xun, 2017, "China Central Bank issues digital money: path, problem and coping strategy", "southwest finance" third issue)

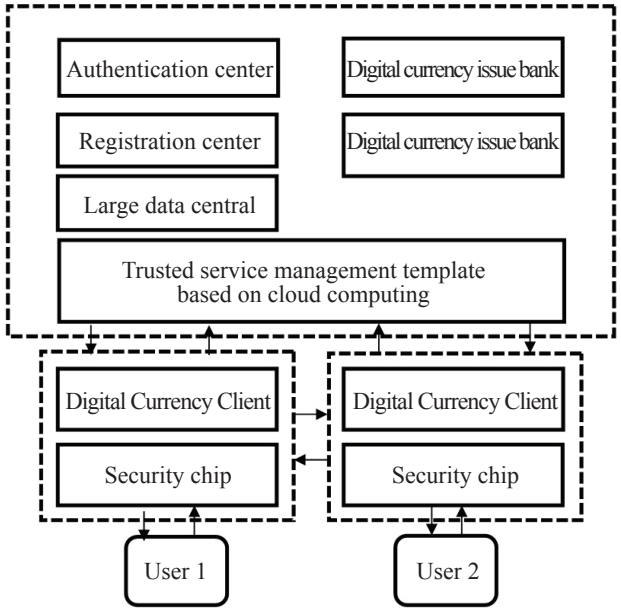

Figure 1. Central Bank Digital Currency Prototype Concept

Under this model, the CBDC has both advantages of digital currency while solving its loopholes in regulation and circulation.

At present, the research on CBDC mostly stays in the mechanism of issuing and supervising, but not quantitative research on the supply of legal digital money. In this paper, we assume that the initial issuance of statutory digital currency is 2 trillion and 420 billion 21 million yuan in 2018. Through mathematical modeling, we will further study the determination of the supply of legal digital money.

2. Review

For the issuance and circulation of central bank digital currencies(CBDC), academics, central banks and governments are mostly at the theoretical stage.

2.1 Status Quo of Central Bank Digital Currencies Research

Domestic and foreign research on CBDC is basically based on macro-impact perspectives. It studies the issue model of CBDC, the implications of CBDC circulation, the risks that CBDC will bring in the market circulation, and how to prevent the risk of CBDC.

Organizations such as G20 and IMF have conducted corresponding research and discussion on the issuance and circulation of CBDC, especially cross-border payment systems. There are three modes for the global cross-border payment path. The first one is led by the International Monetary Fund and all member states are involved. The second is the CBDC cross-border payment form in which the major countries are dominant and other countries participate in voluntary participation. The third kind is a form of payment in which both the IMF and the state participate. Each major country is also learning and storing related knowledge and technology among its own. In the research on the issuance of legal digital currency system in China, there is a central system and a binary system. The one central system is issued by the central bank directly to the masses. The binary system is for the central bank to entrust commercial banks to issue CBDC to the public.

The UK conducted a study on the impact of the issuance of CBDC in 2016 and published a related paper - "Macroeconomics of the Central Bank's Issuing Digital Currency". The study found that the issuance of CBDC could improve GDP for the financial sector. Tax and currency costs have a certain impact, and can significantly increase the central bank's ability to stabilize the economic cycle.[4] (John Barrdear and Michael Kumhof, 2016, 7)

The issue of CBDC, scholars carried out relevant research, think that the convenience and benefits brought by it are larger than the paper money, but the risks cannot be ignored. For example, the application of laws and regulations is low, and the regulatory system is not perfect; hardware and software systems of CBDC have high requirements because there are certain distances in technology implementation; financial risks such as money-laundering crimes will be amplified.

Some countries have studied laws and regulations concerning CBDC, and have conducted certain legal supervision on CBDC: Russia is about to enact laws and regulations on digital currency policies; states in the United States have submitted digital currency proposals; Swiss government also had a research on CBDC laws.

Some scholars also put forward corresponding supervision measures on related risks. There are five forms of supervision over digital currencies in various countries: moral advice, market access, improvement of existing laws and regulations, general supervision, and total prohibition. By referring to the supervision of digital currency, some suggestions are made on CBDC: improving the legal system and regulatory framework, promoting technical upgrading, implementing targeted supervision and ensuring the effectiveness of monetary policy.

2.2 Status Quo of Central Bank Digital Currencies Supply

This article focuses on the determination of CBDC supply method. Some scholars have made more precise explanations on the definition and circulation of CBDC. Baoshan Chen (2017)[5] believes that the principle of issuance of CBDC embodies the essence of currency and believes that its issuance must be under the category of national currency. Wenting Li[6]thinks that CBDC itself is cash that can be paid.

Furthermore, by analyzing the currency circulation speed, we can see that the role of CBDC in replacing electronic money is obvious. Priyatama (2010) and Apriansah (2010) studied the currency market in Indonesia and believes that the use of electronic money will greatly speed up the circulation of cash, thus reducing the cash holdings. Domestic scholars also conducted similar research. Xue Yu (2012)[7] studied the influence of electronic money on money demand from Friedman's Demand Theory, Keynesian Money Demand Theory, and Fisher's Equation Theory. The conclusions derived from formula derivation are generally consistent with the conclusions and expectations. Guangyou Zhou (2007)[8] not only demonstrated the correlation between money demand and currency circulation speed, but also further empirically analyzed the impact of electronic money on the velocity of money circulation at all levels. Yongjun Zhao (2014)[9] analyzed monetary policy from the perspective of internet finance, and took third-party payment as an example to analyze and draw the conclusion that the circulation rate of broad money will decline, but no relevant arguments have been made for cash and narrow money.

Since the statutory digital currency has not yet been issued, considering that the effect of CBDC is similar to cash that can be paid and the payment currency is similar to the third party in terms of convenience and so on. Therefore, with the aid of cash supply and the impact of third-party payment on the impact of the money demand model, this paper measures and predicts the impact of CBDC on the impact of the money demand model to determine the supply of legal digital currency.

3. Research on the relationship Between the legal digital currency and the circulation of money

In the study, we focus on the money supply of legal digital currency. However, the velocity of circulation is not well researched previously. Luckily, we find that legal digital which combine advantages of cash payment and third-party payment, have the basic function of cash and electronic payment method in the third part. Therefore, the velocity of circulation of legal digital currency could refer to the velocity of third-party payment.

3.1 There Are Many Similarities Between the Third-Party Payment and the Legal Digital Currency

For one thing, there is no difference between the two in the aspect of several functions of money. As an electronic form of traditional currency, third-party payment is only a trading medium of traditional currency, which does not affect the function of currency. The legal digital currency, as the legal tender of our country, obviously has the same function. For another thing, both are based on the development of Internet computer technology. In terms of velocity of circulation, third-party payment is not much different from legal digital currency in users' experience. In third-party payment, consumers and merchants complete the transaction through the intermediary of the third-party payment agency. In the use of the legal digital currency, the point-to-point transaction eliminates the third-party payment agency. But the users' experience is almost the same for both consumers and businesses.

3.2 The Calculation of the Circulation of Legal Digital Money

The legal digital currency has the basic function of money and is managed by the central bank, which has the credit of the government. So, before the determination of legal digital currency in circulation, this article will refer to the circling velocity of the third party to determine the cash in circulation the number of Internet users use percentage to determine legal digital currency circulation to calculate the initial issue amount of legal digital currency. Set y as the initial legal digital currency circulation. M_0 in circulation in 2016 is 6830387 billion yuan, and in 2016, the third-party payment of Internet users is 490 million. In 2016, the number of China's population is 1.383 billion. The legal digital currency circulation formula is as follows:

$$y = M_0 * \frac{q}{p}$$

The numerical value is calculated by the formula.

y=68303.87*4.9/13.83= ￥2420.021 billion

Reasoning after the above formula calculated roughly,

demand for legal digital currency is ￥2.420021 trillion in 2016. Due to the use of third party payment of Internet users accounted for calculating the circulation of legal digital currency, therefore, the legal digital currency circulation that is calculated by the formula assuming the volume of the third party payment of Internet users to be converted into the demand of the legal digital currency. Therefore, the legal digital currency circulation is the maximum of the legal digital money demand according to the formula.

3.3 Theory and Model Assumptions

Since the digital currency has not been released yet, there is no data for the time being, so it is not possible to model the time series directly according to the digital money quantity. Consider the similarities between the third-party payment currency and the convenience of the digital currency, therefore this article takes into account the impact on money demand model with third-party payment currency measure and forecast the influence of monetary shocks on money demand model assuming the velocity and impact of shocks are the same between third-party payment and digital currency.

According to Keynes's monetary demand model, monetary demand is related to inflation, interest rates and GDP. This paper ignores the impact of inflation and interest rates on the demand for money in short-term digital currencies, or between 2010 and 2017, when China's inflation and financial asset prices remained stable. The issue of digital currency, as well as third-party payment transactions in currency trading, formed a part of the M_0, M1 and M_2 in currencies into M_0, and money velocity also changed correspondingly. This paper creatively divides the M into M_0,M_1 and M_2 in the Keynesian monetary demand model, and respectively multiply the contribution coefficient a, b, c for the GDP circulation, so that the model can be established as follows:

$$\frac{aM_0 + bM_1 + CM_2}{P} = \mathrm{VY}$$

Further, the above can be rewritten as:

$$\frac{aM_0}{P} = V_0\mathrm{Y}$$

$$\frac{bM_1}{P} = V_1\mathrm{Y}$$

$$\frac{cM_2}{P} = V_2\mathrm{Y}$$

In the short term, monetary liquidity increases due to third party payment, If M_0 is not controlled in time, the money supply will exceed demand in the long term, causing inflation and other phenomena. However, this is only the result of the application of the formula, and it is necessary to further examine whether such influence exists in reality and the direction of this effect.

3.4 The Empirical Analysis of the Influence of Third-Party Payment on the Velocity of Money Circulation

3.4.1 A Brief Introduction to the Empirical Analysis

On one hand, map the variables after the removal of seasonal effects, according to the trend term and intercept term, the ADF (Augment dickey-fuller) test was performed. On the other hand, the ARMA (Auto Regression Moving Average) model is established with a stable variable, and the model is used for prediction and analysis. What is more, the model of the Vector Auto Regression model is established, namely, the promotion model of AR, to examine the relationships of the endogenous variables and make a dynamic prediction

3.4.2 Variable Selection and Data Source

Empirical study involved five variables in all, including GDP, M_0, M_1, M_2, recycle its work out corresponding variables, namely the money velocity V, this paper adopts the quotient of GDP and currency. Due to the difference in the monetary level, the corresponding velocity will be different. Therefore, the velocity of money circulation at different levels is interpreted in terms of V0=GDP/M0, V1=GDP/M1, and V2=GDP/M2, which is derived from the national bureau of statistics. Another variable is the influence factor e of the third-party payment to the traditional payment, and the total amount of third-party Internet payment is selected from Analysis International. Since Internet payments are ascendent, the data range is from the fourth quarter of 2010 to the third quarter of 2017.

3.4.3 Stationarity Test of Time Series of Each Variable

Before further research on the data, it is necessary to determine the stationarity of the sequence. Since the data selected in this article are quarterly, in order to guarantee the time series stationarity, according to the experience of the existing research, v0, v1, v2, MOBPAY respectively take logarithm lnv0, lnv1, lnv2, lnmobpay to enhance stability. Below lnv0, lnv1, lnv2, lnmobpay time series stationarity is studied. First, use Eviews to map each variable to determine whether there is a trend item and intercept term to ensure the accuracy of ADF test. From the graph, each variable has a trend and intercept term. The ADF can be used to test the stationarity test according to the characteristics of each graph, and the changes of each variable are shown in figure 2, figure 3 and figure 4. Lnv0_sa and lnv1_sa were stable after seasonal adjustment of 10% significance level. After the first order difference lnv0_sa,

lnv1_sa, lnv2_sa under 5% significance level is smooth.

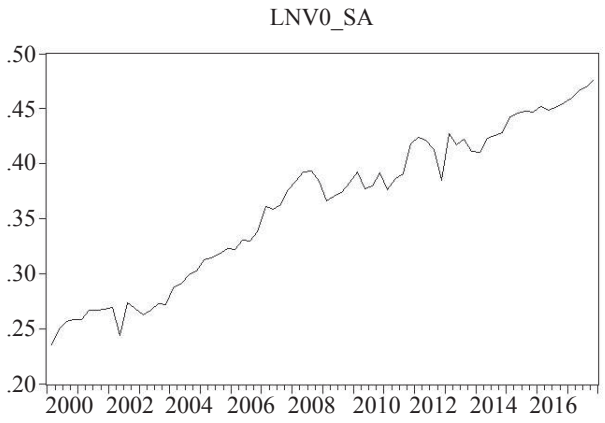

Figure 2.

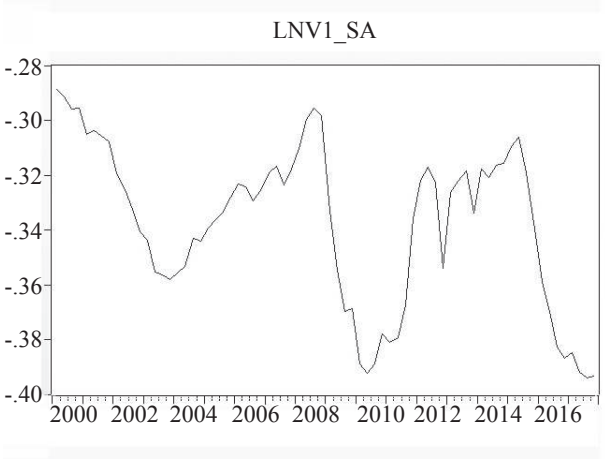

Figure 3.

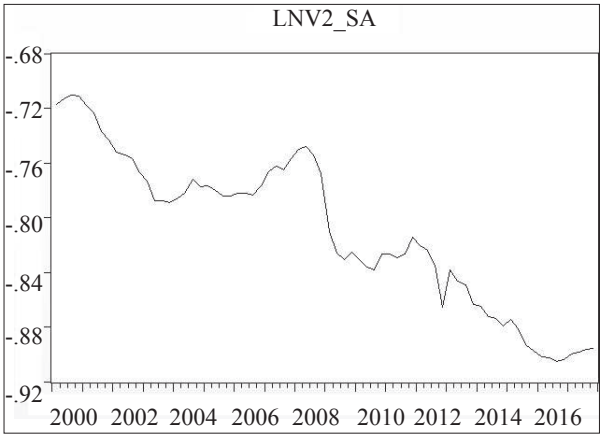

Figure 4.

Because the seasonal adjustments may cause ADF test, use the function in Eviews 9.0 of X12 Seasonal adjustment to realize the seasonal adjustments of data. Judging from Q statistics which is the complicated index of seasonal adjustments, accept or not. If Q<1, then accept.

Table 1. The seasonal adjustment test

Variables	Judgments	Q statistics
lnv0_sa	Accept	0.39
lnv1_sa	Accept	0.32
lnv2_sa	Accept	0.30

3.4.4 Build the ARMA model

1) According to the results of ADF test lnv0_sa, lnv0_sa can be initially determined to be stable. Therefore, the self-correlation and partial correlation coefficient of the variable is studied, and the results show that the partial correlation exists at the end of the first order. Then the ARMA model of AR(1) is tried, and AR(1) is appropriate according to the minimum principle of AIC and SC information and the stability of the model. The equation is

$$\widehat{y_t} = 0.357565 + 0.994565y_{t-1}$$

Where y is lnv0_sa and the subscript t is the period t, and u is the residual.

Table 2. AF and PAF of lnv0_sa

Autocorrelation	Partial Correlation	series	AC	PAC	Q-Stat	Prob
.|*******	.|*******	1	0.945	0.945	66.962	0.000
.|******|	.|*. |	2	0.901	0.084	128.80	0.000
.|******|	.| . |	3	0.859	0.002	185.84	0.000
.|******|	.| . |	4	0.821	0.011	238.61	0.000
.*| . |	.| . |	32	-0.151	-0.022	611.56	0.000

Table 3. ARMA(2,1) of lnv0_sa

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.357565	0.100972	3.541215	0.0007
AR(1)	0.994565	0.021497	46.26590	0.0000
SIGMASQ	0.000129	1.45E-05	8.907370	0.0000
R-squared	0.973336	Mean dependent var		0.361728
Adjusted R-squared	0.972563	S.D. dependent var		0.070020
S.E. of regression	0.011598	Akaike info criterion		-5.972327
Sum squared resid	0.009282	Schwarz criterion		-5.877466
Log likelihood	218.0038	Hannan-Quinn criter.		-5.934563
F-statistic	1259.388	Durbin-Watson stat		2.337515
Prob(F-statistic)	0.000000			
Inverted AR Roots	.99			

From the AF and PAF graph of lnv0_sa residual, the residual does not appear any AF or PAF. It must be a white-noise series. So, the model is appropriate. The following graph depicts the estimation of lnvo_sa in 2018.

2) Since the P value of lnv1_sa is not significant under the ADF test, it cannot reject the unsteady original hypothesis, so the ARMA model is established with a stable first-order difference Dlnv1_sa. According to the minimum principle of AIC and SC information and the stability of the model, it is appropriate to establish ARMA(1,2) without intercept term.

$$y_t = -0.726897y_{t-1} + 1.094688u_{t-1} + 0.493064u_{t-2}$$

3) Similarly, since the P value of lnv2_sa is not significant under the ADF test, it cannot reject the unsteady original hypothesis, so the ARMA model is established with a stable first-order lnv2_sa. It is appropriate to establish ARMA(1,2) according to the minimum principle of AIC and SC information and the stability of the model.

$$y_t = -0.003 - 1.605y_{t-1} - 0.5y_{t-1} + 0.221y_{t-1} + 1.826u_{t-1} + 0.941u_{t-2}$$

(0.001) (0.124) (0.231) (0.127) (0.029) (0.027)

3.4.5 Establishing the VAR model

The VAR model and ARMA model are different from the requirements of the assumption of variable stability. Multivariate autoregressive model is the most dependent variable for the early information of independent variables, and the dependent variable is required to pass granger causality test. Because Internet payment appears late, so choose the fourth quarter of 2011 to 2011 in the third quarter of the four indicators lnv0, lnv1, lnv2, lnmobpay quarterly value, using VAR model to measure lnmobpay lnv0, lnv1, lnv2 dynamic effect.

First, we use the VAR function in Eviews to determine the lagged order number. Based on the minimum considerations of AIC, SC and LR, select the most appropriate order. In the table, addind * represents that the lag order selecting is according to the test criteria, and the second order delay term is selected for the three VAR models.

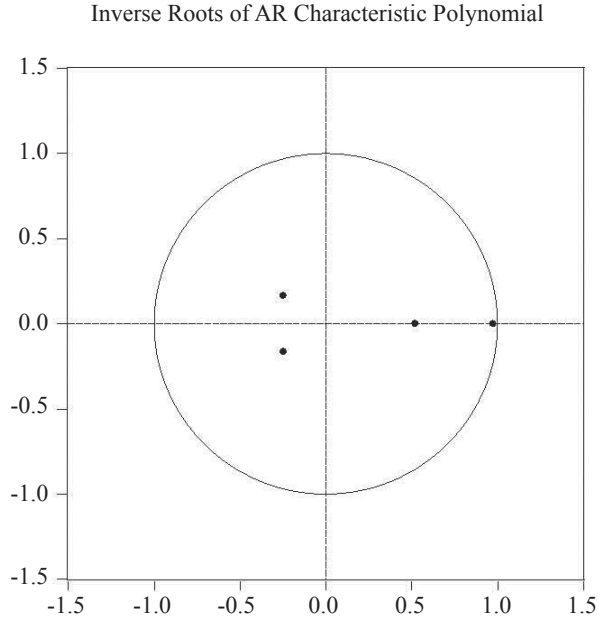

Figure 5. Root test of VAR model of lnv0 and lnmobpay

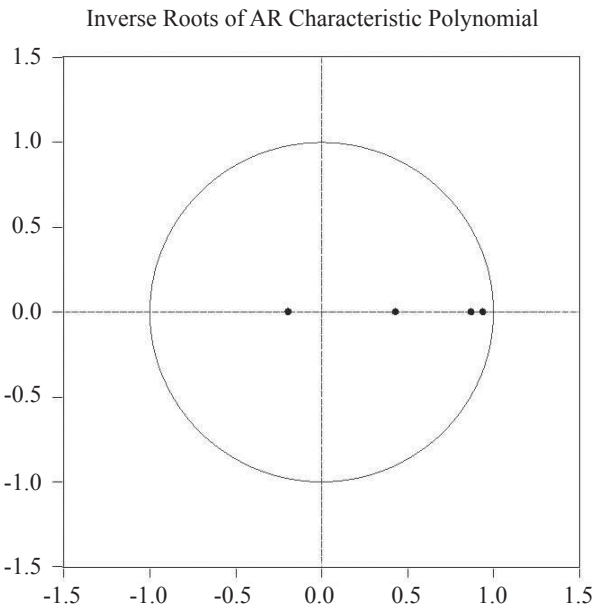

Figure 6. Root test of VAR model of lnv1 amd lnmobpay

It can be seen from the graph that the reciprocal absolute value of the characteristic root of AR equation is less than 1, namely, in the unit circle, the model is stable.

Granger Causality Tests to test whether the independent variable has a so-called "causal" relationship to the dependent variable. It is defined as, if the conditional distribution of y_t determined by the lagged value of y_t and x_t is the same as the condition distribution of x_t determined by the lag value of y_t, that is:

$$f(y_t|y_{t-1}, \dots, x_{t-1} \dots) = f(y_t|y_{t-1}, \dots)$$

It is said that x_(t-1) has granger causality for y_t. The original hypothesis of granger causality test is that the independent variable has no granger causality effect on the dependent variable.

It can be seen from the following table that lnmobpay has a significant p value for lnv0 granger causality test, rejecting the original hypothesis and having a "causal" relationship. Lnv0 has a p value of over 5% for lnmobpay, and it is difficult to reject the original hypothesis. In the same way, lnmobpay has a significant p value for lnv1 granger causality test. In contrast, lnmobpay does not have a significant p value for lnv1 granger causality test, so VAR model cannot be established.

At last, VAR estimation equation is used to establish the VAR (5) model. List according to the equation of the parameter t test results may not be significant owing to not screening out. Because VAR model does not value individual test results, but the overall effect of the model. Not to analyze the significance of the equations, but to analyze

the analysis, variance, and impulse response.

Table 4. Granger Causality Tests

Null Hypothesis:	Obs	F-Statistic	Prob.
LNMOBPAY_SA does not Granger Cause LNV0_SA	22	5.09539	0.0185
LNV0_SA does not Granger Cause LNMOBPAY_SA		1.97360	0.1695
LNMOBPAY_SA does not Granger Cause LNV1_SA		9.65671	0.0016
LNV1_SA does not Granger Cause LNMOBPAY_SA		1.27559	0.3047
LNMOBPAY_SA does not Granger Cause LNV2_SA		1.72645	0.2077
LNV2_SA does not Granger Cause LNMOBPAY_SA		0.71607	0.5028

$$\begin{bmatrix} lnv0_{sa_t} \\ lnmobpay_t \end{bmatrix} = \begin{bmatrix} 0.237022 & -0.015283 \\ 0.950404 & 0.765244 \end{bmatrix} \begin{bmatrix} lnv0_{sa_{t-1}} \\ lnmobpay_{t-1} \end{bmatrix} + \begin{bmatrix} 0.186451 & 0.058238 \\ -0.282403 & 0.152194 \end{bmatrix} \begin{bmatrix} lnv0_{sa_{t-2}} \\ lnmobpay_{t-2} \end{bmatrix} + \begin{bmatrix} 0.066195 \\ 0.121490 \end{bmatrix}$$

$$\begin{bmatrix} lnv1sa_t \\ lnmobpay_t \end{bmatrix} = \begin{bmatrix} 1.419633 & -0.281947 \\ 0.544389 & 0.631776 \end{bmatrix} \begin{bmatrix} lnv1sa_{t-1} \\ lnmobpay_{t-1} \end{bmatrix} + \begin{bmatrix} -0.462099 & 0.261679 \\ -0.344117 & 0.342142 \end{bmatrix} \begin{bmatrix} lnv1_{sa_{t-2}} \\ lnmobpay_{t-2} \end{bmatrix} + \begin{bmatrix} 0.084368 \\ 0.240406 \end{bmatrix}$$

Estimation: According to the VAR (2) model, the velocity of M0 and M1 can be predicted steadily. The forecasting method has dynamic prediction and dynamic prediction. The dynamic prediction is to predict with the fitting value of the sample, and the static prediction is to predict with the actual value of the sample. The VAR model is effective in the short term, so to predict the eight quarters after the third quarter of 2017, use the dynamic forecasting method. Result is shown in figure 7, the blue line to predict line, the two red line is the predictive value of standard deviation interval line.

The impulse response function can incorporate all the variables considered into a system to reflect the interplay

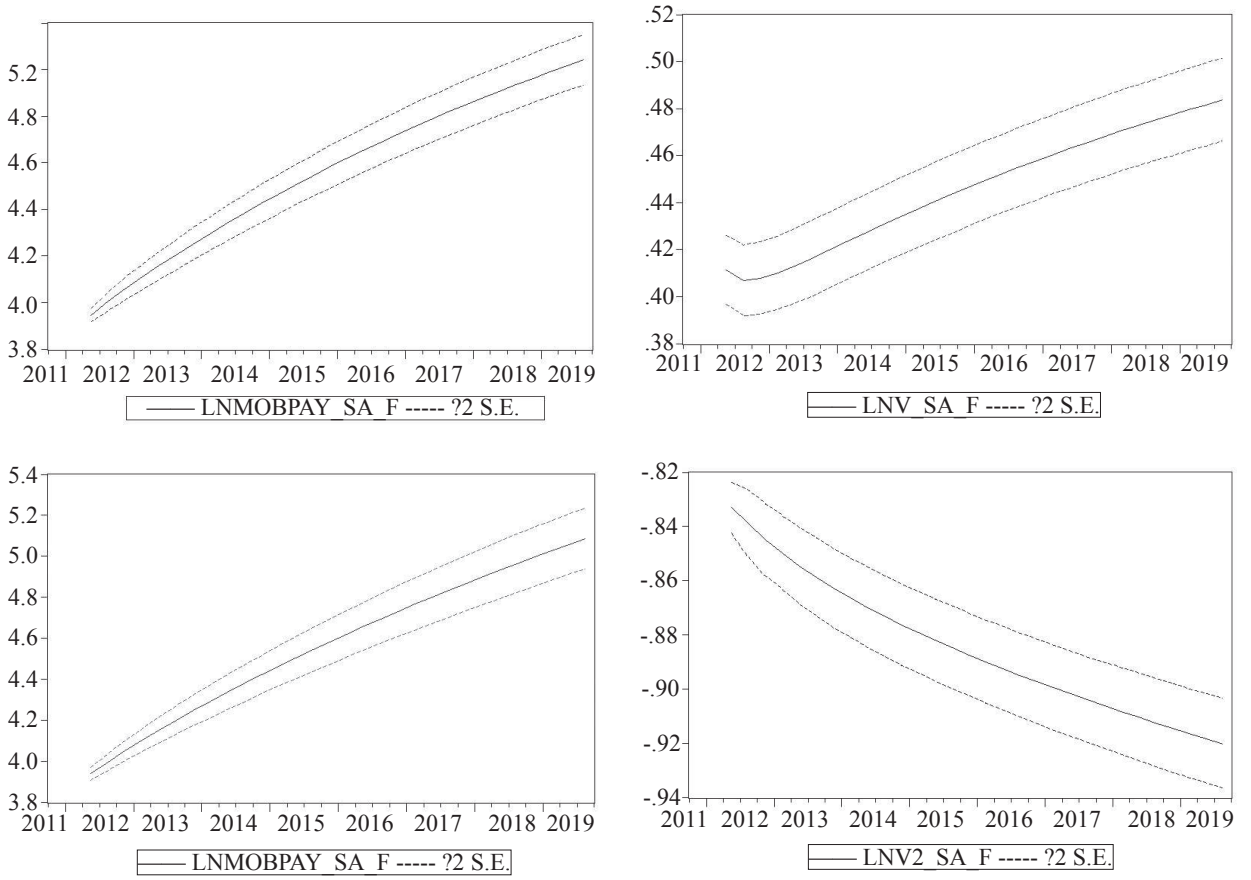

Figure 7. The prediction

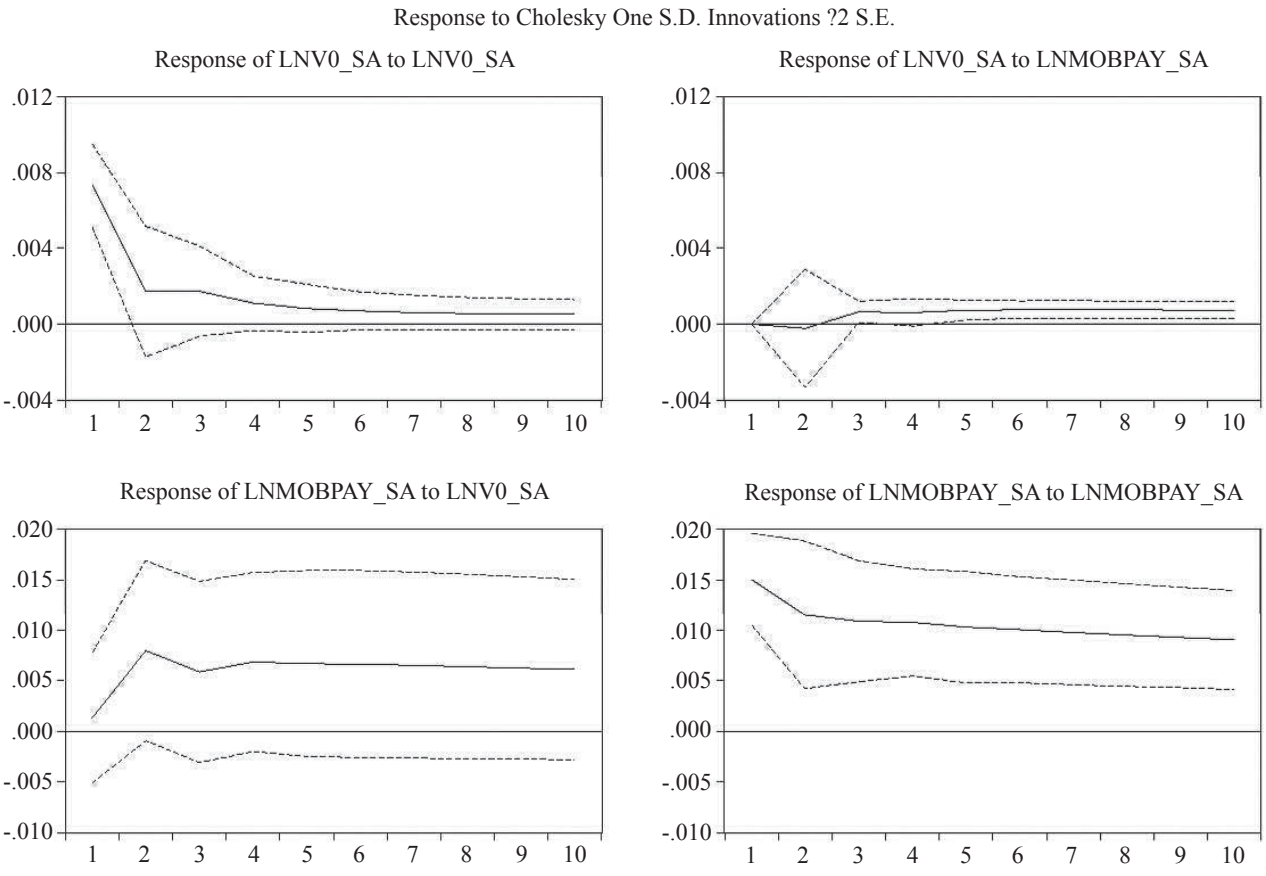

Figure 8. Impulse response of lnv0_sa

of all variables within the system. The impulse response can give the policy effect time delay and time delay interval, and give the degree and direction of the influence. The impulse response function mainly describes the response of an endogenous variable to residual variation. In particular, it is the impact of a standard deviation of random error, having an influence on the endogenous variables and future values. It can be found in the chart that lnv0_sa impacted lnv0_sa on lnmobpay_sa and lnmobpay_sa after 2 periods. The impact of lnv1_sa on lnmobpay_sa and lnmobpay_sa on lnv0_sa was stable after 3 periods.

3.5 Model evaluation

Compared with the ARMA model, VAR model is more suitable for the impact of digital money issuance or third party payment on the velocityof circulation. ARMA model investigates the equilibrium process, and the VAR impulse response and variance decomposition more research on the dynamic process. Professor Wang Zhenlong of Xi'an Institute of Finance and Economics points out that X - 12 - ARMIA seasonally adjusted time series method, the basic process can be divided into three phases, there are modeling, seasonally adjusted, and diagnosis. So can't directly to seasonal data processing and then build model, comparison is needed before and after adjustment, verify the effect of seasonal adjustment. Therefore, after seasonal adjustment, the seasonal fluctuation of the sequence no longer affects the VAR and ARMA model. Limited by space, the author fails to conduct ARMA modeling directly, and also fails to put more variables into the model to investigate the long-term effects. Summary results of money supply:

Table 5. Digital currency supply target-based on VAR model(in billions of yuan)

2018	2019	2020	2021	2022
24200.21	30539.22	39356.82	43870.72	45555.63
2023	2024	2025	2026	2027
50396.71	52772.02	58091.23	73268.90	85556.78

Finally, we further put forward that the initial issue amount of statutory digital currency is 24200.21 billion yuan in 2018. And through the way of mathematical modeling, the supply of legal digital money is given in the table.

3.6 Summary

From the ADF test and the time series equation in the ARMA model, namely the logarithmic velocity leveled

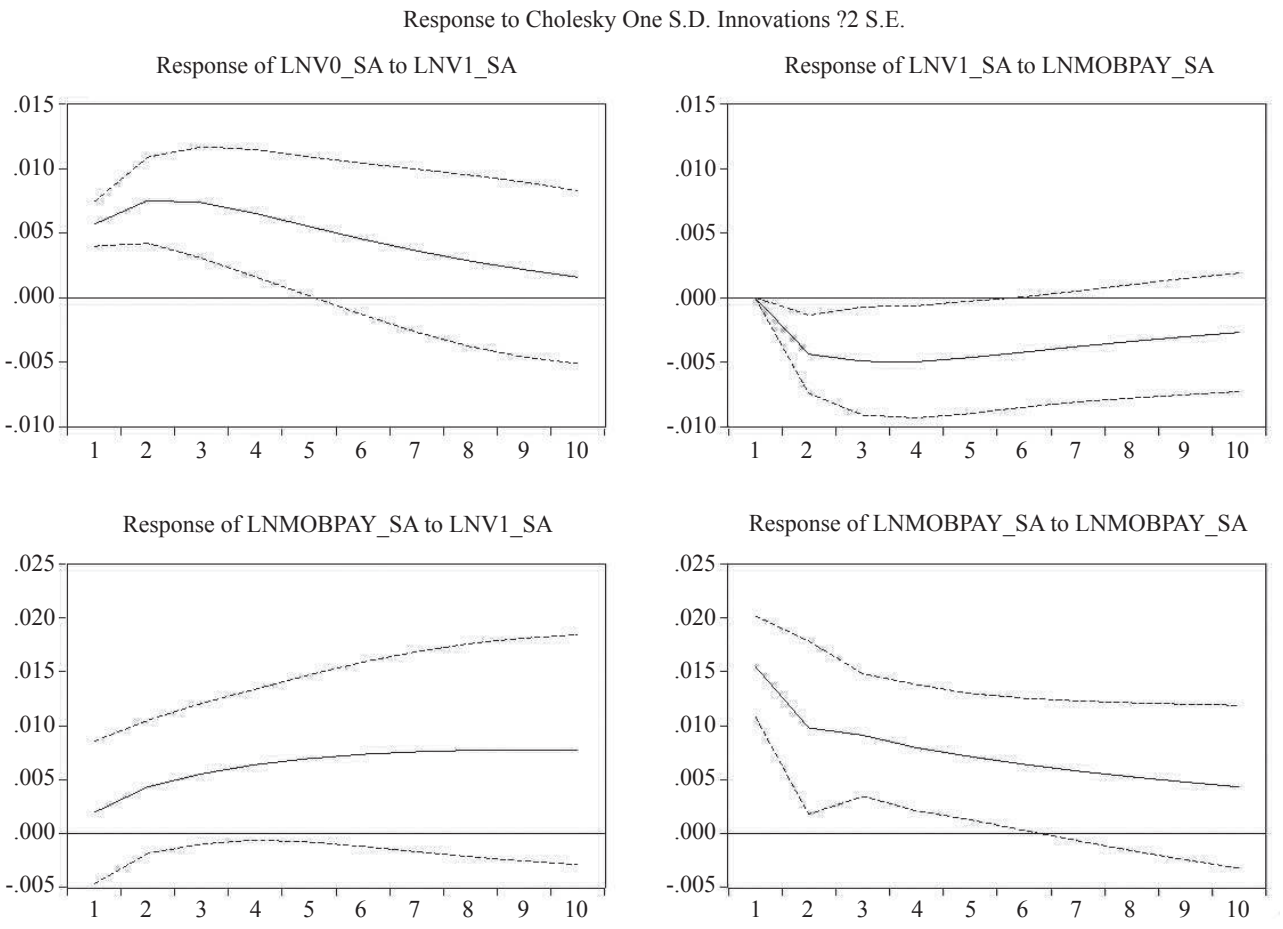

Figure 9. Impulse response of lnv0_sa

off after the first order difference, it can be thought of that monetary velocity fluctuations in the growth or decline of the long term is in a stable range, and there is a certain relation between fluctuation. Later fluctuation is also associated with early disturbances. Therefore, the regulatory authorities should pay close attention to the macroeconomic indicators such as the velocity of money flow, control the rate of monetary growth and the direction of the disturbance factors.

According to the VAR model, conclusions about the effects of exogenous variables on endogenous variables can be drawn. The circulation of digital currency is likely to speed up the circulation of money. Therefore, it is of great importance to control the velocity of digital currency.

According to the impulse response of the VAR model, the impact of exogenous variables on endogenous variables can be digested and decomposed in two cycles (in this model, the cycle is one month). Therefore, the monetary issuing authorities should respond and correct the normal value of the currency circulation and circulation velocity in time, and control the impact of the issue of the digital currency on the macro-economy for a certain period of time.

4. Conclusion

On the one hand, the issuance and circulation of central bank digital currency will inevitably affect the speed of money circulation. The change in the speed of currency circulation has reduced the effectiveness of monetary policy. On the other hand, the digital currency has a significant magnification effect on the currency multiplier, which expands the endogenous effects of the currency and thus reduces the stability of the currency; it makes the money supply increase while the base currency remains unchanged.

According to the theory of endogenous money supply, the amount of money supply is determined by the objective demand of economic operation. It is not that the central bank determines the quantity of money supply independently. Therefore, the money supply depends more on the demand for money.[10] The central bank whose monetary supply is the intermediary target of monetary policy cannot accurately predict the demand for money

when the currency circulation speed changes, and most of the effects of the implemented monetary policy will be unsatisfactory. The change in the money supply brought about by the currency circulation speed has increased the instability of the monetary system. To address this potential problem and to maintain the stability of the monetary system, we propose the following:

1) Set up a professional central bank digital currency supervisory authority to control the supply of money and reduce the impact on the entire monetary system brought about by the statutory digital currency at the management level in use of the exogenous role of money supply;

2) Determining a reasonable amount of money demand as a basis for money supply: In the past, we blindly focused on the determination of money supply, but the endogenous role of the money supply has become more and more intense, particularly, the money supply's uncertainty is further strengthened after the issuance of digital currency. Therefore, we need switch ideas and refocus on the demand for money to achieve the supply and demand balance in currency market;

3) Accelerate the transformation of the monetary policy framework: Promote the transition of China's monetary policy framework from quantitative to price-based, and give full play to the advantages of the "interest rate corridor".[11] Establish a macro-control system with intermediate interest rates as its intermediate goal. The move is to deal with the unpredictability of financial markets caused by the rapid growth of the currency circulation rate. The "interest rate corridor" meets the requirements of this financial environment, which is conducive to exerting a "stabilizer";

To increase the transparency of the policy, for the transparency of monetary policy has the effect of reducing economic fluctuations, and the transparency level of China's monetary policy is relatively low[12]. Thus the central bank should take some measures to strengthen contact with the public and communicate with the market. Meanwhile, the improvement of policy transparency is a long-term process, short-term and temporary communication effects cannot play an important role, and only by normalizing the ditch can policy optimization be really achieved.

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The Ternary Marginal Extension of China's Free Trade Zone Development

Fangfang Wang Juan Liu* Yanru Liu

National Economics Research Center, Guangdong University of Finance and Economics, Guangzhou, Guangdong, 510320, China

Abstract: This paper attempts to establish a framework of upgrading mechanism in China's foreign economic opening strategy in order to conclude the new connotation of upgrade for China's foreign economic opening, with the basic starting point of ternary marginal extension on extensive growth, in the perspective of corporate heterogeneity theory. It also involves the new path of the transformation from "quantity" to "quality" regarding the amounts, models and locations of China's foreign trade and investment. At last, this theoretical frame is complemented upon a case study of free trade zone and regional cooperation of Guangdong, Hong Kong and Macao.

Keywords: Free Trade Zone; Integration of Trade and Investment; Ternary Margin

***Corresponding Author:** Juan Liu; Mailing address: National Economics Research Center, Guangdong University of Finance and Economics, Luntou Road No.21, Haizhu district, Guangzhou, Guangdong, China. E-mail: liujuan_sunny@163.com

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1. Introduction

At present, there are enormous challenges in our foreign economic opening as a whole. The simplex policy, which leans on stimulation of domestic consumption, will confront periodical institutional resistance. Therefore, it seems to be the most straight and effective path in a long-run perspective by deepening foreign economic opening which will force internal systematic reform to release domestic demands. On Sep. 29th in 2013, the Shanghai Free Trade Zone was set up with a strategic mission of expanding China's foreign economic cooperation and "opening to promote reform". A resolution was officially formed during the 3rd plenary session of the 18th CPC central Committee to accelerate the construction of Free Trade Zone. It was made abundantly clear that, besides the on-going pilot projects, other free trade zones (ports) should also be initiated in places with proper conditions. The resolution, accelerating the development of domestic Free Trade Zone, has long-run and great strategic significance.[1] According to the nature of establishment of Shanghai Free Trade Zone, the author believes that the core mission is to force deepening reform and change government functions through opening up. "Opening up" means it should not be limited to only the commitments under WTO, but a wider fields, especially in the service industry (such as finance, medical treatment, education, etc.); "Forcing deepening reform" is the reform and innovations on laws and regulations, system, mechanism forced by opening; "Changing government functions" means that government should undertake its functions on public administration, service and supervision (especially on-site supervision) based on objectives of public policy and enhance its ability of doing that.

With the improvement of China's foreign economic opening, how to use the platform effect of Free Trade Zone? What extension will be explored through Free Trade Zone? The author believes that, with development of Free Trade Zone, it will further stimulate the vitality of production and management of all kinds of corporations and ultimately lead to coordination and unity of development of both domestic and external economy. The author also puts forward that, the establishment of Free Trade

Zones will trigger the shift from internal extensive development to external in China's foreign economic strategy with the effects of free trade, space and network of high-end platform. It is also appeared as the export increase on existing patterns due to the increase of the numbers of corporations with export activities. All these phenomena are collectively known as the effect of expansion of enterprises internalization. In China, especially the coastal area like Guangdong, internal extensive foreign economy development has been playing a major role since the opening policy was initiated 35 years ago. When kinds of disadvantages emerge, the internal extensive export pattern becomes unsustainable. The external extensive pattern will thrust it to a higher top.

There's been a great deal of researches worldwide about the effect and benefit from Free Trade Zones. The author's research indicates that the development of free trade will eventually come to an integration of trade and investment and it will come true through the following three routes :

1) intermediary effect resulted from integration of trade and investment, such as Bernard et al. (2010), Blum et al. (2010), Lu et al. (2010) and Ahn et al. (2010). Data from many countries shows that intermediary trade makes it possible of integration of foreign trade and investment.[2,3,4]

2) Export platform effect of OFDI (outward foreign direct investment). With a comprehensive consideration on the space effect, market potential and production cost, etc., foreign investment through export platform makes it interacted between foreign trade and investment (Ekholm el al., 2007).[5,6,7,8]

3) Trade-arising Effect of OFDI. Because there are intermediate trade and circulation-oriented industries, such as wholesales and retails, the trade-arising OFDI may lead to both export and outward investment. For example, Head and Ries (2001) investigate the complementary effect of intermediate trade and investment. Hanson et al.(2001) inspects circulation-oriented outward foreign investment. Krautheim(2009) puts forward the double functions of trade-arising OFDI and Kleinert and Toubal (2010) constitute a trade-arising OFDI model based on the Firm Heterogeneity.[9,10,11]

Therefore, based on the above research perspective, this paper builds a theoretical framework of the construction of FTA and the increasing the openness of China's opening up. It introduces the free trade zone exogenous space integration variables, and with the corporate heterogeneity theory, it interprets the extensive marginal development of the integration of trade and investment, as well as the dynamic mechanism of stimulating China's opening up.

2. The Theoretical Framework of China's Free Trade Zone Construction and Increasing of the Economy Opening-Up

Based on the theory of firm heterogeneity, from the perspective of the enterprises, there are two important factors to be examined in the process of producing and management, endogenous factors and exogenous factors. Endogenous factors are revealed by the production capacity of enterprises, namely productivity; and external factors are mainly reflected in the cost of production and transportation. The level of productivity is the core variable of the number and mode of production and operation activities and Location expansion, and by the extension of the ternary margin, it will finally improve the competitive advantage of the whole nation. The higher the level of productivity is, the stronger the ability to afford the ternary margin extension will be. But this does not mean that the productivity level is the only factor which determines the ternary marginal extension. Exogenous cost factories also an important factor to determine the ternary marginal expansion of the firm. From the perspective of corporate heterogeneity, the establishment of the free trade zone dedicates to reduce the cost of producing and operating, and through expanding in the amounts, models and location of the enterprises, the overall level of China's opening up has been improved ultimately, and the national competitive advantage is strengthened, and thus the domestic demand is stimulated fully. Therefore, how to realize the extension mechanism of the ternary margin under the condition of free trade zone? Based on these, the author constructs a framework of the construction of the FTA and the ternary marginal theory of the opening up. The theoretical mechanism is shown in Fig1.

First, there is marginal extension of the amount. The construction of the free trade zone will increase our foreign trade and investment significantly, including import, export, FDI and OFDI. The implementation of "negative list approach" and "inside the territory while outside the customs" helps the free trade zone increase its free and efficient management system to an international level, much higher than the level of openness of previous "bonded area". Thus, according to the firm heterogeneity, with the weakening of the role of customs supervision, the cost of the enterprises' overseas economic strategies will be reduced at the utmost extent. And then, it will be easier for the enterprises to conduct foreign trade and investment. Therefore, the free trade zone platform not only encourages more and more Chinese enterprises to invest overseas, but also leads the enterprises which have entered the overseas markets to achieve larger amount and quantity of overseas exports and investment. For foreign-funded en-

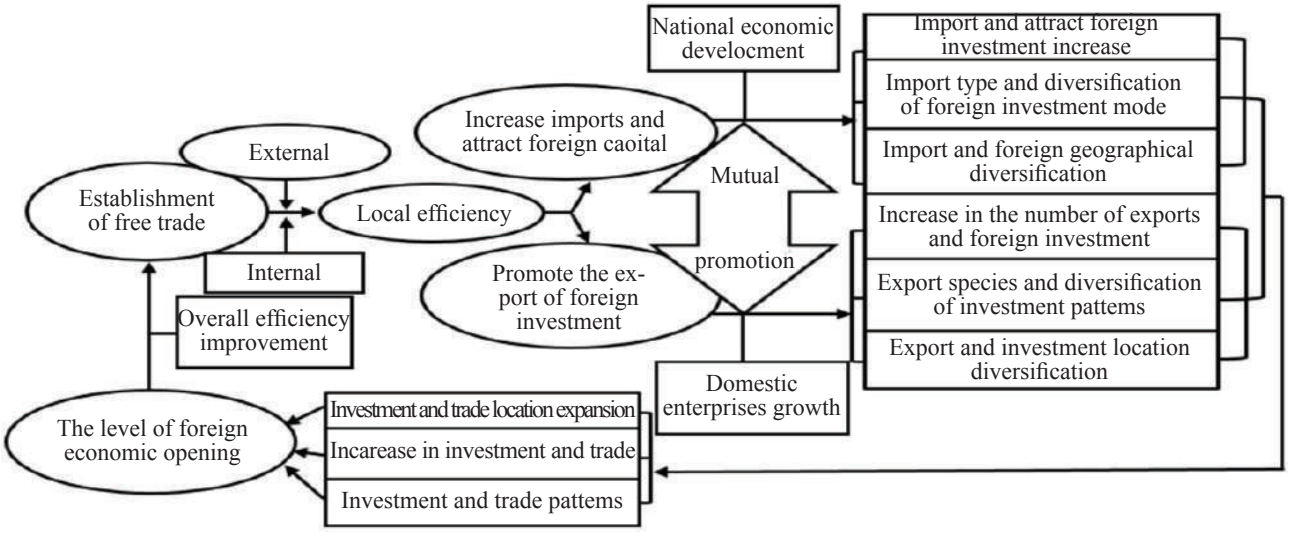

Figure 1. Free Trade Zone Construction and Foreign Economic opening level theoretical framework

terprises, the marginal effects in amount are more obvious. The "Negative List" management model of the free trade zone aims to simplify the administrative examination and approval, improve the efficiency of the government, and reduce the cost of production and operation, as well as absorb more foreign investment. In short, as the effect of the FTA increase by unit, the marginal increase effect in the number of import and export, the absorption of FDI and OFDI will be more obvious.

Second, there is marginal extension of the model. The construction of the free trade zone provides a more convenient service platform for both the domestic and foreign enterprises. For example, the construction of the international trade single window platform and free trade account, as well as the connection of trade and investment platform and financial services platform enable the enterprises to implement a more diversified opening-up strategy. First of all, the firm heterogeneity theory argues that if the threshold of productivity is low, the enterprises preferring to trade overseas before may also conduct their businesses through investment overseas. The establishment of the free trade zone reduces the cost of the trade and investment so extremely that it lower the threshold of productivity for the enterprises to enter the markets. And this creates more opportunities to those enterprises which involves trading activities before, which means they may conduct their businesses overseas through indirect investment and even FDI. The FDI model can be subdivided into three levels. First, the enterprises will invest in those more suitable countries and regions with larger markets, because the productivity thresholds for investing in these countries are relatively low. Second, the pattern of FDI depends on the level of productivity. For enterprises conducting FDI activities, those companies with low productivity tend to enter the host market in the form of cross-border mergers and acquisitions, and enterprises with intermediate productivity may enter the host country through joint ventures, and the companies with the highest productivity will choose green land investment in the host country with sole proprietorship. Thirdly, even the host countries' trade and investment environment is relatively poor, those enterprises with the highest productivity will also increase their overseas investment by establishing more branches.

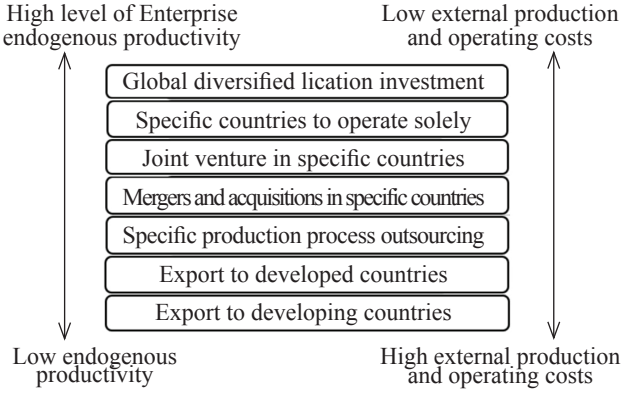

Figure 2. Trade and investment liberalization and enterprise model, location marginal expansion

Third, there is marginal extension of the location. The regional expansion effect of the establishment of the FTA is mainly manifested through the intermediary effect played by the middlemen, which also occurs in both foreign-funded enterprises and Chinese enterprises. On one hand, foreign-funded enterprises have expanded the location choice of the trade and investment to China.

In the free trade zone, due to the development of the logistics network services, especially the large number of distribution and retail brokers, with the help of internet information and big data analytics, the goods from foreign enterprises can be distributed to local demands in different area easily. Furthermore, foreign enterprises make use of their global production and business net, as well as the advantage of China as the core of Asia and treat the Free Trade Zone as a location platform. Through the Free Trade Zone, the production, sales and services are connected and the location diversification of trade and investment is realized, which will bring an obvious effect of development of local demands. On the other hand, Chinese enterprises have more regions to trade and invest abroad. First of all, due to the special arrangement of Free Trade Zone, a close and direct effect of space network has been formed with the other countries in the world. That's to say, since the Free Trade Zone has the function to connect different countries and regions in the world to realize the spillover effect of trade and investment, more co-operations with larger markets has been realized. In the Free Trade Zone, the business network of the larger amount of trade intermediaries have increased the possibility to form a solid business partnership with business organization, Chinese organizations, enterprises alliance abroad, and then the space of foreign trade and investment has been expanded.

3. The Path to Increase the Level of Opening up Strategy: Guangdong Free Trade Zone as an Example

The primary task of Guangdong Free Trade Zone is to incentive the liberalization of service trade among Hong Kong, Macau and Guangdong, so that the facilitation and integration of trade and investment should be realized and a new strategic platform of Guangdong's foreign economic opening up should be formed through the Free Trade Zone. In the Free Trade Zone, Nansha District has an advantage of developing the integration of trade, investment and logistics because of its large area. Hengqin will focus on service trade, while Qianhai will co-operate more with Hong Kong in finance. As a whole, all of these three areas have their own foundation and advantages to become part of Guangdong Free Trade Zone. For many years, Hong Kong has always been Mainland's largest service export destination, origins of imported good trade surplus. ① Hong Kong is under a model of "inside the territory while outside the customs" and its "Pre-establishment National Treatment" and "Negative List Approach" may be learned by Guangdong to establish Guangdong Free Trade Zone. ② [15] For Hong Kong and Macau, the deepening development can motivate their development greatly. For example, the implement of cross-border Renminbi loans significantly strengthen Hong Kong's position as the center of off-shore RMB. Since the implementation of cross-border loans in Qianhai, the amount of off-shore Renminbi in Hong Kong has increased from 6200yi dollars to 8200yi dollars. ③ Nowadays, the industry preferential catalogue in Qianhai has been approved by the State Council. Some of the policies are more favorable than Shanghai Free Trade Zone, including the policies of corporate income tax and the individual income tax which are managed referring to the standards in Hong Kong and Macau. With the implementation of relative arrangement, the relationship between Guangdong and Hong Kong and Macau will be closer.

The trade and investment liberalization effects achieved through the establishment of the Guangdong-Hong Kong-Macao Free Trade Zone have achieved differences in trade and investment patterns at the enterprise level, while at the industrial and national levels, the integration of trade and investment has been achieved. At the same time, since the trade in services in the FTA will occupy an increasingly high proportion, and WTO regards service trade as FDI, from this perspective, the liberalization of trade and investment in Guangdong, Hong Kong and Macao has realized the integration of trade and investment integration ultimately. The liberalization effects played by Guangdong Free Trade Zone will lead to huge differences among heterogeneous firms. Generally speaking, through the play of the three places of trade and investment liberalization effect, the construction of Guangdong free trade zone can produce four effects, namely, self-selection effect of the enterprises, learning effect, spillover effect and merger effect (see Figure 3). Through the mechanism of these four levels, the ternary margin extension of the amount, model and location will be achieved in the free trade zone.

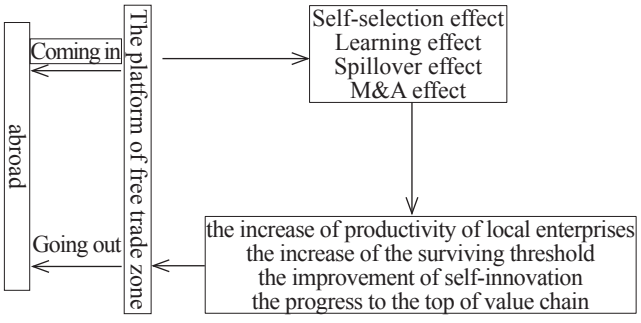

Figure 3. The extension effect of the liberalization of trade and investment

First, there is the self-selection effect. The first change comes from the double increase in imports and amount of foreign enterprises. While domestic enterprises with low

productivity may withdraw from the market, and those with high productivity will continue their producing and operating. Thus, both the import and amount of foreign enterprises have increased which leads to the increase in the threshold of productivity for our enterprises. Second, there is the learning effect. The second change is based on the impact of foreign advanced production management technology on domestic enterprises. As mentioned earlier, companies that can continue to produce and operate have always been those with a high level of productivity. While some of these enterprises import foreign products with higher levels of productivity. And some of the new imported enterprises may significantly improve the productivity. Third, there is the spillover effect. The spillover effect is based on the intangible influence of the existence of the outstanding foreign enterprises on the domestic enterprises and it increases the productivity of the domestic enterprises. In particular, these factors, such as the development of human resources, the origin of transnational corporations, the FDI model (export-oriented or market-oriented), and the absorptive capacity of domestic enterprises have a great influence on the spillover effect. Finally, the M&A effect. The mergers and acquisitions effect should be based on the M&A of the mainland enterprises from the foreign companies. When foreign-funded enterprises enter the domestic market, through the merger with domestic enterprises, the productivity of the merged domestic enterprises will be increased. If the foreign mergers are from developed countries, or if the merged domestic enterprises have a moderate level of productivity, the increase of productivity is more obvious.

3.1 The Amount Marginal Extension Effect of the Construction of Guangdong Free Trade Zone

The amount marginal extension effect of the construction of Guangdong Free Trade Zone is shown from the increasing amount of both Chinese-funded multinational enterprises and foreign enterprises in the Pearl River Delta. With the development of the integration of trade and investment, the basis of international labor division has been transformed from comparative advantage to the competitive advantage arising from the amount of MNEs and the ability to integrate resources in the international context. The establishment of Guangdong Free Trade Zone enables some outstanding Chinese enterprises explore the international market with the help of Guangdong Free Trade Zone as a platform and helps our enterprises "going out". In addition, after the establishment of Guangdong Free Trade Zone, many outstanding MNEs enter the Chinese market, and fierce competition will force Chinese enterprises to improve technological innovation, which will improve the capacity of the enterprises to develop overseas markets, and thus the amount of Chinese MNEs abroad will be increased.

Taking Qianhai as an example, the establishment of Guangdong Free Trade Zone also promotes the "coming in" of foreign MNEs. Till Jan.2014, 2642 enterprises invested in Qianhai, and the amount of registered enterprises has surpassed 11 times of the total cumulative amount in the past. Among which, the amount of financing companies increases obviously and accounts for 70% of total and more new types of financing business have appeared, such as internet finance, factoring, factor trading market, public funds subsidiaries, microfinance companies, and so no. It is shown that from 2012 on, nearly one quarter of funds companies approved by China Securities Regulatory Commission have come into Qianhai, and one third of the subsidiaries in funds and futures industries have been active to enter too. At the same time, due to the reform of the commercial registration system since 2012 in Hengqin, there are more than 3000 enterprises registered in Hengqin and The amount of the enterprises increases at a rate of 8% per day. At present, there are more than 100 Hong Kong and Macau enterprises. Guangdong Free Trade Zone will be more open than Qianhai and Hengqin, and it can be expected that more MNEs will be attracted here.

3.2 The Marginal Extension Effect of the Model of Constructing Guangdong Free Trade Zone

Guangdong Free Trade Zone has facilitated the trade and investment, and with the reduction of producing and operating costs in the Free Trade Zone, the enterprises may carry out overseas strategies through diversified integration of trade and investment. For example, to foreign enterprises which invest in the Free Trade Zone, they may set a branch or subsidiary, and export their commodities to the other areas or provinces in Mainland. More than that, the location effect of Free Trade Zone to overseas may be played, and more flexible and complicated investing models based on trade-platform may be put into effect. The enterprises may make use of the Free Trade Zone to build a closer business network with the other countries or areas.[18] What's more, Mainland enterprises may take the advantage of the efficient and transparent platform of Guangdong Free Trade Zone and set subsidiaries or branches abroad to invest overseas based on Trade-arising Effect. Thus, there will be more spaces for Mainland enterprises to distribute and trade overseas and play the integration effect of foreign trade and investment.

Further, considering the favorable condition of locating near Hong Kong and Macau, Guangdong Free Trade Zone may innovate the co-operation model between Mainland and Hong Kong and Macau. Taking finance innovation as

an example, through the innovation of cross-board CNY business in the Free Trade Zone, RMB offshore market in Hong Kong will interact well with RMB in-shore market in Mainland, and this will benefit the effective circulating of a large amount of RMB stock in Hong Kong, and then guide the off-shore capital to support the development of economy in Guangdong Hong Kong and Macau. And this will have profound influence on Hong Kong to build a more effective and diversified cross-board trading settlement platform, and will develop Hong Kong's comprehensive business model of trade and finance, For instance, through the innovation of RMB investment products in Hong Kong and the guidance of the circulation mechanism, there will be more diversified RMB circulating channels in Mainland, through which, the enterprises and individuals may carry out M&A, greenfield investment and security investment, etc., so as to realize diversified oversea investment strategies.

3.3 The location extension effect of constructing Guangdong Free Trade Zone

As for the location extension effect of constructing Guangdong Free Trade Zone, with the integration of international trade and investment, on one hand, since the barrier of factor movement is lowered, Mainland China will attract more foreign MNEs to enter China to get more profits because of its comparative advantages in endowment. Foreign MNEs set up new companies in Mainland with direct investment and make use of our superior resources to incentive the MNEs to realize location expansion in Mainland. If Guangdong can take advantage of its bordering on Hong Kong and Macau and further explore and innovate new ways and models to co-operate with Hong Kong and Macau, the enterprises in Hong Kong and Macau will invest more to Mainland to explore more investment region in Mainland and this will incentive the development in Mainland after the completion of Guangdong Free Trade Zone. The location extension of Guangdong Free Trade Zone enables the foreign enterprises expand their investment location in China. Making the Free Trade Zone as a platform, the enterprises may realize their diversified choices in location.

On the other hand, with the Free Trade Zone, Mainland enterprises may explore more trading and investing spaces in a more free way. Taking Guangdong Free Trade Zone as a platform to link the domestic and overseas countries and areas, Mainland enterprises may expand their foreign investment location to allocate the world resources in a long-term strategic planning, and create their own competitive advantages. With the development of integration of trade and investment, MNEs carry out vertical M&A in an industry chain in the world, and some intra-industry trade among MNEs may happen within the MNEs. The statistical Bulletin of China's FDI in 2013 published by the Ministry of Commerce has revealed that at the end of 2013, China's stock FDI to Asia and Latin America has reached 432,620,000,000 dollars, which amount to 81.3% of total stock at the end of that year. While China's FDI appeared insufficient in some other areas in the world. The establishment of Guangdong Free Trade Zone will help the growth of China's MNEs, and motivate them to integrate the global resources. With the expansion of FDI location, the space of import and export will be expanded, and the import and export will also be increased. Guangdong Free Trade Zone can not only play the location extension effect, but also it may promote the co-operation of the governments of Guangdong, Hong Kong and Macau. And then, the governments will play a role of intermediaries to provide trade and investment information to the enterprises.

4. Policy support to improve China's open economy with the construction of Free Trade Zone

This paper has constructed a framework of China's open economy base on the Free Trade Zone and it concludes that with the Free Trade Zone our foreign trade and investment amount, models and location may be transformed from "quantity" to "quality", and then the foreign economy will be improved in a whole. Thus, nowadays a number of inland Free Trade Zones have been in vigorous arrangement. Based on the analysis above, from the perspective of the ternary marginal extension, some suggestions are given from the viewpoint of the government, the industry and the enterprise.

For the government, different cities in Guangdong Free Trade Zone should coordinate their laws and regulations and remove the market entrance barriers to incentive the liberalization of investment. Recently, the state council has approved the Preferential Industry Catalogue of Qianhai, including the policies of enterprise income tax and individual income tax. The latter may be managed referring to Hong Kong and Macau and this will incentive some Hong Kong businesses to invest in Mainland. This should be popularized also in Hengqin, Nansha, Baiyun Airport and some other areas in Guangdong Free Trade Zone. Furthermore, cities in the Pearl River Delta should cooperate more and avoid local protectionism. They may make the city's industrial development plan jointly and develop their own competitive industries so as to realize a coordinated development. For Guangdong Free Trade Zone, the construction of "platform economy" should be put emphasis on. The government should make use of the radiating and diffusion effects of the Free Trade Zone to

drive the economic development in Pearl River Delta. At the same time, the government should provide efficient, transparent and clean administrative services. From the experience in Qianhai, part of the provincial management authority should be decentralized to the Free Trade Zone, so that the efficiency of project approval should be improved. From the experience of Hengqin, the commercial registration system should be reformed in the Free Trade Zone to improve the registration efficiency for the business. In the Free Trade Zone, the protection of intellectual property rights should be strengthened. Nowadays, domestic intellectual property protection is not enough, and the incentive for innovative talent is also not enough and this is one of the reasons for the lack of innovation talents in China. In addition, learning from the "negative list approach" of Shanghai Free Trade Zone, Guangdong Free Trade Zone should also fully consider the achievement from the development of service trade liberalization with Hong Kong and Macau and simplify the negative list.

For the industry, the development of finance, trade services, shipping and logistics industry, as well as some other productive services should be the focus. Industry preferential catalogue should be made to encourage their development. The government should encourage the development of the finance and leasing industry, through some measurements, such as abolishing the minimum registered capital limit of the financing and leasing companies, giving them some tax preferential policies and relaxing the business scope of the financing and leasing businesses. Thus their function to serve the real economy should be played. In order to improve the opening lever of finance industry in the Free Trade Zone, the cross-board RMB business should be tried first to join the finance with the real economy, so as to incentive finance to serve for the economy. Also, the industry entry should be relaxed, so that the development of the Mainland's service industry should be promoted by Hong Kong's advanced service industry. In addition, industry environmental protection standards should be made to create a livable environment for the people.

For the enterprises, they should improve their ability to innovate independently and enhance their international competitiveness. The cooperation with universities and institution may also incentive the integration of production, education and research. And the introduction of high-level innovation talents may help to upgrade the enterprises' technological innovation. Also, the enterprises should develop in some high value-added industries and put more funds in R&D to get the independent intellectual property rights and arrive at the top of the industry chain, to obtain more profits. Finally, with the Free Trade Zone Chinese enterprises layout a global industry chain, and integrate cheap resources and make use of other countries' comparative advantages, so as to realize the vertical integration of industry chain.

5. Conclusion

Above all, the ternary extension of amount, models and location of the Free Trade Zone has further deepened the integration of China's foreign trade and investment. The optimization of China's foreign economic structure has been realized and the level of the strategy of opening up has been promoted. At the same time, through competitive effect of foreign enterprises in China and the learning effect of Chinese enterprises overseas, the productivity of Chinese enterprises has been increased further, and the national competitive advantage has been further highlighted. While accelerating the construction of the platform of the Free Trade Zone, governments at all levels can guide their own enterprises to make their own decisions according to different situations (i.e. model marginal extension) and local conditions (i.e. location marginal extension). The enterprises should combine their international strategies and their own competiveness, as well as the external environment to express the ternary marginal extension effects of the Free Trade Zone, and ultimately the overall level of opening up of China's economy will be improved to realize the international participation of more enterprises (i.e. the amount marginal extension).

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Annotation

① Data from the General Administration of Customs of the People's Republic of China reveals that the import and export in China in Feb. 2014 amounts to 260.4 billion dollars with an increase of 29.4% year over year. Among which, the export is 114.5 billion dollars with an increase rate of 18.4%, and the import is 145.9 billion dollars with an increase rate of 39.6%. While in Jan. 2014, the import decreases 15.3%. In Feb.2015, there is a deficit of 31.5 billion dollars in China's global trade and in January, the surplus is 27.3 billion dollars, which is the largest monthly trade deficit since 1990s. And this shows the importance of China's trade surplus to Hong Kong.

② "Pre-establishment National Treatment's to provide national treatment for foreign capital during the entry stage, which means the capital importing country should provide foreign capital treatment that is no less than domestic capital in the pre-establishment stage. "Negative List Approach" identifies sectors and businesses that are off-limits or restricted for investment. All fields not on the negative list are accessible to foreign capital without governmental approval.

③ Nowadays, in China the benchmark interest rate of loans per year is 6% and the rate may float upwards or downwards according to the enterprises' credit rating. Taking a multi-national company with powerful financial strength as example, the rate may float downwards 10% to 5.4% approximately. While, in Hong Kong the foo-shore market rate may be 4% or so with a comparative advantage in financing.

Study on the Relationship between Entrepreneur's Spiritual Capital and Employee Creativity

Xue Chen Jianping Gu* Evan David

School of Business, Nanjing Normal University, Nanjing, Jiangsu, 210097, China

Abstract: Through this research about the relationship between entrepreneur's spiritual capitals and employee creativity, this paper explores the influence mechanism of entrepreneur's spiritual capital on employee creativity, and constructs a mediating model. The research shows that entrepreneur's spiritual capital has positive predictive effect on employee creativity, and organizational innovation atmosphere plays a partial mediating role between them.

Keywords: Entrepreneur's spiritual capital; Employee creativity; Organizational innovation atmosphere

***Corresponding Author:** Jianping Gu, School of Business, Nanjing Normal University, No.122 Ninghai Road, Nanjing, Jiangsu, 210097, China. E-mail: *friendgjp@126.com*

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1. Introduction

Spiritual capital, defined as accomplishment of a vision, belief, and ultimate goal value,[1] is related to the motivational force for an entrepreneur to struggle and gradually has become a force for sustainable enterprise development. So what is entrepreneur's spiritual capital? How does entrepreneurs' spiritual capital affect firm performance? How does employee creativity play a role? This series of problems has attracted the attention of scholars, Entrepreneurs' spiritual capital is the need of entrepreneurs' soul, and become the highest need that pursued by entrepreneurs,[2] Entrepreneurs with high spiritual capital pay more attention to the spiritual needs of employees, integrating between employees' personal dreams and corporate dreams, creating a shared vision, and encouraging employees to pursue their spiritual needs. At present, empirical research has proved that entrepreneurs' spiritual capital can promote the performance of enterprises.[3] This paper attempts to study the mechanism of entrepreneur's spiritual capital more comprehensively, and provides theoretical basis and practical guidance for more effective management of new enterprises.

2. Theoretical Framework and Research Hypothesis

Spiritual capital is also called faith principle. Entrepreneurial spiritual capital has become a hot issue in enterprise management research along with entrepreneurial activities expansion. According to Becker (2010), human capital productivity relies on the person who owned spiritual capital;[4] Bourdieu (1986) divided the capital into three types, those are, economic capital, social capital and cultural capital.[5] Cultural capital is a form of convention, used as a method to obtain and maintain social status, he then; The next researchers make further research of social capital that comes from social organizations (such as institution or trust mechanism) where members collaborate and connect with each other; In recent years, the study of human capital began to focus on leadership role, that is, entrepreneur's spiritual capital is a positive psychological power which affects individuals and organizations' spirit, trust, knowledge and behavior.[6]

Foreign research has proved that the entrepreneur's spiritual capital affects the enterprise performance, the enterprise performance is created by the employee, and employee creativity is an important aspect which affecting the enterprise performance. In this case, the entrepreneur's spiritual capital may have a positive effect on employee creativity. Employee creativity refers to the innovative and useful ideas of employees about products, procedures and processes in their work, which is essential to promote enterprise innovation and success.[7] Entrepreneurs need to have spiritual capital that can make the employees find their self-worthiness, create organization culture based on sympathy-empathy, let employees feel the leader care and appreciation, therefore employees will start caring and

appreciate each other too, and create sense of belonging to the organization (Lei, Wen, Su, & Yang, 2015). Entrepreneur's spiritual capital can improve employee creativity through external skills and internal motivation. Based on the analysis above, the following hypothesis is proposed:

H1: Entrepreneurs' spiritual capital has a positive influence on Employee creativity.

Organizational innovation atmosphere is a state where employees perceived that the organization support for their creativity and innovation.Gelade & Ivery (2003) research shows that organizational management can only play a role by significantly influencing one or several organizational atmosphere dimensions.[8] Organizational atmosphere is the shared knowledge of management system, practical operation and procedure among employees.[9] Organizational innovation atmosphere, when interpreted as organizational environment, refers to the work environment that supports employee's creativity and innovation. Spiritual capital is an accumulation process that brings the vision of the organization, work value and work purpose to employees. Success requires commitment and continuous efforts, continuously train and motivate the employees.[10] In the Internet era, it is important to encourage innovation, filled the organization with innovative atmosphere, let employees dare to innovate because achievements brought by innovation. Therefore, the following hypothesis is proposed:

H2: Organizational innovation atmosphere plays a mediating role between Entrepreneurs' spiritual capital and Employee creativity.

3. Research Design and Empirical Test

The formal survey began in February 2015 and took 3 months of survey. Through the human resources department, 150 enterprises with a year of establishment less than 5 was randomly selected, and 2-3 copies of questionnaire were distributed for each enterprise, which was fill in by the chief executive (main person in charge) of the enterprise. A total of 350 copies were distributed and 305 questionnaires were collected. After eliminating the invalid questionnaire, a total of 224 questionnaires were left and has met the number of samples required for statistical analysis. The condition of the respondents are: male employees 79.4%, female employees 20.6%; Educational background: Postdoctoral students 14.7%, Doctoral students (excluding Postdoctoral) 20.2%, Master students 31.4%, Undergraduate students and lower educational degree 33.7%.

In order to ensure the accuracy and credibility of variables measurement, we try to use the scale with high reliability and validity which have been used by domestic and foreign scholars.

1) The entrepreneur's spiritual capital scale. Because the research on this variable is newly emerged, so there is no fix measurement scale available. Researchers need to refer from domestic and international journal which has relation with entrepreneur's spiritual capital, mainly refers to Fry (2009) about the development of spiritual leadership scale, Robinson,[11] Shaver & Wrightsman (1991) about self-worthiness,[12] Dobrow & Tosti-Kharas (2011) about sense of mission, Li (1998) about view of life. In the scale design process, a thorough bilingual translation，behavioral interview and panel discussion are carried out. Each item is deliberated carefully and repeatedly to ensure the accuracy of the problem description.[13]

2) Employee creativity scale. The scale developed by Farmer is containing 4 items: "he/she (the employee) is always being the first to try new ideas or new methods"; "he/she is always exploring new methods to solve the problem"; "he/she is good at producing breakthrough ideas"; "he/she thinks that he/she is very creative".

3) Organizational innovation atmosphere scale.According to scale which is revised by Liu (2010), is containing 5 items: "there is communication between colleagues so they could share their own views and opinions"; "employees are free to set their own working goal and progress"; "employees can obtain sufficient information and data needed for doing innovation"; "supervisor encourages employees to raise some new ideas"; "company gives appreciation and recognition for the innovative staff".[14]

The SPSS 19.0 software is used to analyze the mean value, standard deviation and correlation between variables. The results are shown in Table 1. These correlations are consistent with the theoretical expectation, which provides initial support for the hypothesis.

The main and moderating effects in this paper are tested by hierarchical regression. Hypothesis 1 proposed that Spiritual capital has a significant positive effect on the Organizational innovation atmosphere. In order to test this hypothesis, the Organizational innovation atmosphere was used as the dependent variable, then we added the control variables (gender, age and job position), finally the independent variable (Spiritual capital) was added to the regression equation.

4. Research Conclusion and Management Suggestion

Based on the theory of spiritual capital, this paper analyzes the effect of Entrepreneur's spiritual capital on Organizational innovation atmosphere, and explores the mechanism effect towards Employee creativity, then creating a new perspective that Entrepreneur's spiritual cap-

Table 1. Descriptive Statistic and Correlation Coefficient Matrix for Each Variable

Variables	M	SD	1	2	3	4	5	6	7	8	9	VIF
1.Gender	1.21	0.41	1									1.107
2.Age	30.49	6.2	-0.01	1								2.279
3.Education Level	2.88	0.72	-0.02	0.05	1							1.052
4.Working Period	2.31	1.04	0.059	0.66**	-0.04	1						1.907
5.Job Position	2	0.97	-0.14*	0.58**	0.09	0.42**	1					1.593
6.Spiritual Capital	3.62	0.74	0.05	0.11	0.15*	0.20**	0.18*	1				2.026
7.Innovation Atmosphere	3.43	0.73	0.05	0.02	0.09	0.08	0.11	0.62**	1			1.963
8.Organizational Commitment	3.66	0.98	0.01	0.01	0.02	0.06	0.02	0.40**	0.35**	1		1.734
9.Creativity	3.37	0.86	0.06	0.07	0.03	0.07	0.09	0.62**	0.63**	0.64**	1	2.781

ital could improve Employee creativity. The result shows that Entrepreneur's spiritual capital has a positive effect on Employee creativity. Entrepreneur's spiritual capital affects the employees' behavior by stimulating and fulfilling the employee's spiritual needs. Spiritual capital is the internalization of psychological and spiritual power of an entrepreneur. An entrepreneur who has spiritual capital will bring a good impact on employees' psychology, build a good superior-subordinate relationship and encourage employee to improve their creativity.

5. Conclusion

Entrepreneur's spiritual capital plays an important role in stimulating Employee creativity, while Organizational innovation atmosphere plays a partial mediating role between them. By studying the mechanism and effect of Entrepreneur's spiritual capital on Employee creativity, it could give a useful practical guidance that leads to innovation and sustainable development of the enterprise. The research on Entrepreneur's spiritual capital is newly emerged, and it is important to enrich and improve it from the theoretical and empirical research perspective. At the same time, this study shows that Organizational innovation atmosphere plays a partial mediating role between Entrepreneur's spiritual capital and Employee creativity, and there could be another mediating variables between them, so we can use another variables for future research, such as consistency between employee and organization goals, etc. In addition, it is necessary to study the mechanism of Entrepreneur's spiritual capital from a dynamic perspective, and also study about the influence of Organizational innovation atmosphere on Employee creativity under different conditions of Organizational commitment.

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Study on the Construction Path of Characteristic Small Cities and Towns from the Perspective of Supply-side Reform
——Taking Zushan Town as an Example

Na Guo*

School of Public Administration, Hebei University of Economics and Business, Shijiazhuang, Hebei, 050061, China

Abstract: Characteristic small cities and towns are the new vehicle for advancing new urbanization construction and supply-side reform. Zushan characteristic towns focus on tourism vacation, ecological livability, integration of production and cities, cultural heritage, poverty alleviation and other functions, and focus on building a new type of "product, city, and people" trinity, is a new benchmark for industrial transformation and upgrading. This article uses field surveys, interviews, and other methods to investigate the status quo of the construction of small towns with Zushan characteristics. Based on this, SWOT analysis of small towns is carried out, and the disadvantages and threats to its development are determined from the nature of towns and cities, infrastructure construction, and townships. Five suggestions were made for the construction of capital, the cultivation of special industries, and the determination of the main body of urban construction.

Keywords: Characteristic small town; SWOT (Superiority Weakness Opportunity Threats) analysis; Construction path; Zushan

***Corresponding Author:** Na Guo, No.47, Xuefu Road, Xinhua District, Shijiazhuang, Hebei, China. E-mail: 1135817775@*qq.com*

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1. Introduction

In 2015, China put forward the "supply-side structural reform" strategy. In 2016, the country pointed out that the current development of tourism in China is in a period of significant contradiction, and tourism supply-side reform should be accelerated. Li Jianjian and other experts also believe that supply-side reform is "13th Five-Year Plan". "The main theme and direction of China's economic development during the period will benefit the modern service industry, bring huge dividends to the tourism industry, and make the tourism industry become the vanguard of supply-side reform.[1] On the other hand, the "Thirteenth Five-Year Plan" released in March 2016 proposes that "accelerating the development of small and medium-sized cities and featured towns, and developing characteristic towns with distinctive characteristics, integrating the production and integration of cities, and full of attractiveness according to local conditions"; In July 2016, the "Circular on Developing Characteristic Townships" pointed out that "by the end of 2020, we will create 1,000 characteristic and vibrant featured towns to drive the development of small towns. "In September 2016, the "Guiding Opinions on Building Characteristic Towns" of the Hebei Provincial People's Government pointed out that "cultivating characteristic towns with distinctive features, strong humanistic atmosphere, beautiful ecological environment, multi-functional integration, and flexible institutional mechanisms".

The construction of characteristic small cities and towns under the new normal is an important way to optimize the industrial structure and promote structural reforms on the supply side. It is an important means to optimize the layout of productive forces and solve the bottleneck of space resources.[2] Foreign studies on characteristic towns were earlier than domestic ones. Lejeune viewed urban development from a global perspective, with particular emphasis on the human-centered approach and the achievement of sustainable and coordinated development of the environment.[3] The study on small towns

was conducted around issues such as sustainable development, the environment, and society.[4-5] In China, Yu Chih-ming interpreted the characteristics of the township's land policy from the macro perspective, and put forward the policy recommendations of "integration of industries and cities, industry first, adherence to intensive land-use and urban-rural development".[6] Chen Wei and Hong Qi believe that the construction of small cities and towns is an important means to balance the urban system and promote economic transition. Small towns should be built with "planning ahead, management and characterization, fiscal and taxation support, and system innovation; highlighting endowments, classification guidance."[7]At the micro level, Lu Pei and Ma Shiliang studied the small towns with musical characteristics in Zhouwo from the perspective of planning, and proposed planning principles such as "overall planning, natural use, and cultural standard".[8] Zhao Jing believes that the development mode of tourism small towns can be divided into three types: tourism reception type, resource-oriented type, and special industry-based type.[9] To sum up, the existing literature studies have mostly studied from the perspectives of sustainable development, land use and urban planning, and have laid a certain theoretical foundation for the construction and development of characteristic small towns. However, existing studies rarely analyze the case of characteristic small towns from the perspective of supply-side reform. This paper conducts on-the-spot investigations of Zushan Town and proposes suggestions for improving the construction of small cities and towns on the basis of SWOT analysis.

2. Overview of the Study Area

Zushan Town is located in the southeastern part of Qingcheng Manchu Autonomous County along the Great Wall. It is known as the "Dongdaemun" of Qinglong. It is only 50km away from Qinhuangdao downtown. It passes through Qinhai Highway and Qinqing Highway through the town. It is Chengde, Inner Mongolia and other places. The location of the throat leading to the sea is excellent (see Figure 1). Zushan Town is a national autonomous region that is rich in resources and economic poverty. It has jurisdiction over 16 administrative villages and has a total area of 354 km2. By the end of 2017, the town has a permanent population of 24,200, a floating population of about 4,000, and a cultivated area of 1,670 hectares. At the end of 2004, the total production value of the town was 3.25 billion yuan. The added value of the first, second and third industries was 70.72 million yuan, 107.45 million yuan, and 100.55 million yuan respectively. The proportion of one, two and three industrial structures is 25.4:38.5:36.1.

Figure 1. Zushan Town Area

3. SWOT Analysis of Zushan Characteristic Town Construction

The construction of characteristic small cities and towns has obvious economic, social, and ecological values, but whether Zushan can effectively promote the construction of characteristic small cities and towns on the basis of existing small towns also requires consideration of its comprehensive construction capabilities. Based on this, this paper carries out a SWOT analysis on the construction of Zushan characteristic small towns.

3.1 Advantage Analysis

First, superior location conditions. Zushan is 50 kilometers away from Qinhuangdao City and is located in the center of the 1-1.5-hour life circle of the Beijing-Tianjin resident and the Bohai Economic Circle. As an important sea estuary in North China and Northwest China, Zushan is extremely advantageous (see Figure 1). Second, rich tourism resources. Zushan is a rare virgin forest park in northern China and has rich ecotourism resources. There are five scenic spots and more than 100 natural attractions (see Table 1); Huachang Memorial Hall and revolutionary martyrs' cemetery are important red tourism demonstration bases; Zushan is located in the Ming Dynasty. Along the Great Wall, it is an important Manchu settlement, with

unique folk customs and profound cultural heritage. Third, a good ecological environment. Zhushan has a good ecological environment, with a forest coverage rate of 70%. It is full of greenery, beautiful scenery, and a pleasant climate. Due to its unique mountain microclimate, it has 2 to 3 more rains and 2 to 3 more snows each year than other surrounding areas.

Table 1. Zushan Town Tourism Resources Classification Table

Name	Type	Location
Zushan	AAA Hill Resort	Zushan Town
Blueberry Industrial Park	Modern Agricultural Tourism Park	Wangtaizi Village
Dingjiahe Agricultural Complex	Outdoor sports tourism, agricultural picking sightseeing park	Zushan Town
Flower Factory	Red tourism, education	Flower Factory
Huaguoshan	Outdoor sports tourism	West of Zushan Town
Ming Great Wall	EBG Great Wall Ruins	Zushan Town to Liangshui River

3.2 Disadvantage Analysis

First, the governing bodies overlap. Judging from the scope of administrative divisions, Zushan Town Scenic Area involves the surrounding areas of Gehetou Town, Shimenzhai Township of the Seaport District, the scope of the garrison towns, and the Daxinzhai Township of Funing District, and is in harmony with the surrounding mountainous area protection and environmental construction. There are difficulties in road construction and other work; from the perspective of administrative supervision, the daily supervision of small towns with Zushan characteristics is jointly handled by the county tourism, industry and commerce, safety supervision, price, transportation, planning and other departments, and there is a lack of comprehensive management in the daily law enforcement supervision process. It is difficult for the agencies to form a unified operation and it is difficult to form a concerted effort. Second, there are insufficient development factors. The development of Zushan Town is dominated by the agricultural economy. Infrastructures such as transportation, water supply, power supply, culture and education are lagging behind. There are no star-rated hotels in Zushan County, and the reception capacity of the Farm House in the tourist season is insufficient. There is a lack of professional management personnel, and the development level of the second and third industries is low. Tourism development lacks strong industrial foundation support. Third, the rationale is diverse. Zushan characteristic small towns have set up a special leading group. However, the government, enterprises, and society have not yet established a mechanism to jointly develop tourism. The initiative and enthusiasm of enterprises to participate in tourism development is not high. Problems have arisen in the project decision-making process. Pushing forward, dealing with multi-headed management and multi-objective coordination has become a major problem in the construction of small towns with distinctive features in Zushan.

3.3 Opportunity Analysis

Priority Policy support. The State issued "some opinions on promoting Tourism Development" and pointed out "the grand goal of cultivating tourism into a strategic pillar industry of the national economy and a more satisfactory modern service industry for the people" The "opinions of the people's Government of Hebei Province on the implementation of Tourism Reform and Development" also pointed out, "relying on the diverse mountainous regions of our province, Forests, grasslands, lakes, wetlands and other ecological resources, and the development of a number of eco-tourism products suitable for leisure and vacation, The government of Qinhuangdao also supports the construction of small towns with special characteristics in land and finance. Second, it has a good development prospect. As a major tourist country in the world, China's tourism industry has entered a period of popular development, and the overall tourism environment has been continuously improved. At the same time, the overall tourism development model also provides a good opportunity for the development of Zushan tourism. Third, there are major strategic opportunities. The construction of small towns with Zushan characteristics is based on the strategic choice of promoting industrial transformation and upgrading, strengthening the new momentum of regional development, and leading the new normal economy. In essence, this is also in line with the economic development of Zushan Town. Under the background of the coordinated development of tourism in Beijing, Tianjin and Hebei, the conditions of inbound tourism are constantly optimized, and leisure and vacation tourism has a huge consumer market. Financial industry and other services are fully integrated to promote the integration of the industry.

3.4 Threat Analysis

First, external competition is fierce. At present, all areas in the country are vigorously developing rural villages. Shimen Town of Lulong County in Qinhuangdao City and Xinghua Village in Luyang City of Luliang City have already begun to take shape; Hebei is rich in tourism resources, scenic spots, tourist attractions, water conservancy scenic spots, Forest parks, geo-parks, theme parks and other tourism resources are highly spatially distributed. The increase in the number of tourist destinations poses a threat to the development of small towns with distinctive features in Zushan. Second, the risk of capital is too high. The government's financial capacity is limited, Zushan's construction and development are facing funding gaps, and the scenic project development market is

predominantly risky.

3.5 SWOT Analysis Matrix

Table 2. SWOT Analysis Matrix for the Construction of Zushan Characteristic Small Towns

	S	W
SWOT analysis, put forward strategy	· Location conditions: Beijing-Tianjin-Hebei economic zone, sea exit	· Management institutions: overlapping management, low efficiency
	· Tourism Resources: Ecotourism, Red Tour, Culture Tour, Rich in Resources	· Development factors: weak facilities, lack of talent
	· Ecological environment: high forest coverage and pleasant climate	· Management objectives: multi-headed management, diverse objectives
External opportunities O	SO strategy: Backward advantage, seize the opportunity	WO Strategy: Seize the opportunity to overcome the disadvantage
· Policy environment: Eco-province, up and down	· Development Goals: To adjust the economic structure and change the mode of development as the main line, in-depth implementation of an industry driven, dedicated to poverty alleviation, to create ecological, wealthy, attractive new ancestors	· Defining the functions of cities and towns: functions of tourism and vacation, poverty alleviation, ecological livability, cultural heritage, integration of production and cities
· Development Prospects: Strong demand, resource monopoly		· Strengthening Departmental Cooperation: Institutional Innovation
· Major strategy: coordinated development, industrial restructuring		· Construction infrastructure: collaborative construction
External threat T	ST Strategy: Use Advantage to Avoid Threats	WT Strategy: Reducing Weaknesses and Avoiding Threats
· Intense competition: similar comparisons, external competition	· Regional tourism cooperation: Based on Beijing-Tianjin-Hebei, relying on Qinhuangdao, all-round cooperation	· Cultivate featured industries: ecotourism, red tour, cultural tour
· Capital risk: limited funds, investment risk	· Improve Tourism Quality: Putting People First, Standardizing Market Order and Improving Service Level	· Tourism Investment Promotion: The government provides policy support, establishes investment platform, and multi-channel funds

4. Research on the Construction of Zushan Characteristic Small Towns

4.1 Defining the Functions of Towns

In the process of the construction of small cities and towns, it is necessary to clarify the functions of towns and towns as the premise and reasonably position the nature of towns. Under the guidance of the multiple goals of the economy, ecology and society, the small towns with unique features in Zushan have determined that "tourism and holiday functions" are the mainstay, supplemented by "helping the poor with poverty", "eco-livable", "cultural heritage" and "integration of cities and towns". The five major functional positioning (see Figure 2). In terms of tourism and vacation, small towns with characteristics of Zushan should focus on building the Great Wall tourism industry zone and agricultural leisure tourism manor, creating the Manchu Grand Courtyard and the Baishu Folk Village, realizing the advantages of the tourism brand, "leading the industry" in economic development, and the integration of production and city should be maintained. The principle of "producing production with cities and promoting production with cities" promotes the development of mining industry and speeds supply-side reforms. It also supports poverty alleviation, builds up cards, and does a good job in accurately identifying and withdrawing the poor. Develop photovoltaic power generation, wild vegetable cultivation and cattle breeding programs, assist poor villages in setting up cooperatives, implement flower planting plants, and assist in poverty alleviation and enrichment projects in Anmeng; ecological livable areas, insist on both scale and quality, increase tree planting and afforestation, and increase green area . Comprehensive management of livestock and poultry manure water pollution and soil pollution and other issues, focus on protecting water sources and improve the overall environment of Zushan Town. Strengthen the comprehensive improvement of Linshui Road in Shanshui, and strive to realize the integration of the three districts of "town, scenic area, and park"; in terms of cultural heritage, establish the Huachang Anti-Japanese Memorial Hall and the Revolutionary Martyrs' Cemetery, build a red tourism demonstration base, and attach importance to the construction of the Manchu style street. Promote Manchu culture.

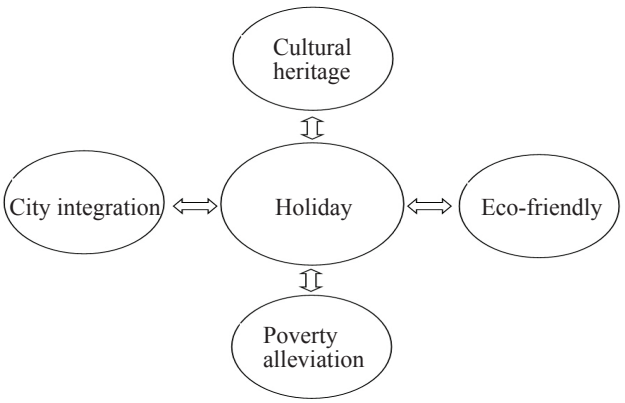

Figure 2. Feature Map of Zushan Featured Small Town

4.2 Strengthening Departmental Cooperation and Building Infrastructure

The construction planning of Zushan characteristic small towns should be coordinated with regional economic and social development planning, urban construction planning, land use planning, traffic system planning, etc. to realize "multi-regulation coordination and multi-regulation linkage". First, small towns with unique Zushan characteristics shall collaborate in building infrastructure such as transportation, water supply, power supply, culture and education; strengthen the construction of flood control dams, river dredging, and intercepting dams; and the accumulation of triangular residents in Huimin Road, main roads, and Jindai Street. District to build new residential areas, improve the value of land use. At the same time, small towns in Zushan should carry out innovations in institutional mechanisms, strengthen cooperation among transportation, information, land and resources, environmental protection, and sanitation, jointly promote the construction of a public service system for small towns with special features in Zushan, and turn small towns with special characteristics in Zushan into logistic services. , Rest and recuperation, culture and entertainment of the back garden.

4.3 Innovative Financing Mechanism, Breaking the "bottleneck" of fund

Funds are the basis for the construction of small cities and towns. In accordance with the principles of market economy and the principle of "linking investment with beneficiaries", small towns with unique features in Zushan have multi-channels to attract funds for the construction of characteristic small cities and towns and construct a multi-subject investment financing system for governments, enterprises, and individuals. In the process of the construction of small cities and towns, there is still a problem of insufficient funds for construction. In order to break through the "bottleneck" of funds, Zushan small towns should do the following: First, strengthen the links with the financial sector and obtain the support of government departments; Second, give full play to comparative advantages in land and taxation, loose policies to attract investment Merchants took root in Zushan Township, such as Enfei Photovoltaic Power Project with an investment of 200 million yuan has already settled in Anmen Village; finally, the Zushan Town Government provided policy support and multi-channels to attract funds to carry out investment and construction of small towns with characteristics of Zushan, and at the same time, use the government Investment activates private capital. Such as the Dingjiahe Agricultural Tourism Complex project franchise or the joint development of the establishment of funds, the use of government financial funds to stimulate social capital to reduce the risk of Zushan small town construction of the capital.

4.4 Focus on the Characteristics of the Town, Nurturing Special Industries

Zushan characteristic small towns should make full use of rich tourism resources and good location conditions to cultivate Zushan special tourism industry. Zushan should vigorously develop ecological tourism, focus on Zushan Scenic Area, carry out high starting point planning, focus on building high-grade scenic spots on the mountain, and lay emphasis on building high-standard supporting service places in Shanshan, and strive to create distinctive leisure agriculture sightseeing gardens and picking gardens. Comprehensive tourist service area; vigorously develop cultural tours, relying on the Huachang Anti-Japanese Memorial Hall and the revolutionary martyrs cemetery, to create a red tourism demonstration base. Taking the theme of "Manchu style, charm Zushan" as its theme, full use of the Manchu style street, carry forward the Manchu culture and drive development. Strengthen the restoration and protection of the Great Wall of Nazi City, actively plan the Great Wall Tourism Project, coordinate the tourism development along the line, and strive to build a number of characteristic tourism demonstration sites; vigorously develop rural tourism, and strive to build Great Wall tourism industry belt and agricultural leisure tourism manor. Guide and encourage "farmhouse" catering services, implement standardized management, improve service reception capacity and service level; vigorously develop farmer's visits, picking tours, feature "feast tofu", "full-fledged feast", and achieve harmonious harmony between man and nature , to attract more tourists to experience natural beauty and enjoy natural life.

4.5 Determine the Rights and Responsibilities of the Entity and Work Together to Develop and Build it

In 2017, the State Council's "Notice on Promoting the Construction of Featured Small Towns" clearly stated that "the operating mode of featured towns is guided by the government and led by the market", and the construction of small cities and towns with characteristics of Zushan should highlight the dominant position of the market and enterprises, making it a feature of Zushan and the protagonist of town development. However, the construction of characteristic small cities and towns cannot be separated from the characteristics of "policy functional areas." The government's top-level design determines the "direction" of construction. While giving full play to the "invisible hand," it should also strengthen the top layer of "visible hand". Design: first of all, it is necessary to delineate the boundaries between government and market functions,

strengthen public service functions, weaken government management functions, and accelerate the pace of decentralization. Enterprises should follow the market rules to conduct specialized market operations. Second, they should stimulate the participation of various entities and attract multiple investors. They should eliminate the "big government, large state-owned enterprises," and encourage governments, enterprises, and individuals to Ways to participate in infrastructure construction and supporting project construction, increase the supply of public goods; Finally, strengthen the inter-subject linkage and cooperation, create a platform for the operation of the mechanism, to the greatest extent to avoid market failure or government failure caused by bad results.

5. Conclusion

The focus of the tourism supply-side reform is to optimize the internal structure and better satisfy people's consumer needs. Zushan should complete the development of characteristic small towns in the above five aspects, and play a new role in tourism poverty alleviation and the construction of beautiful countryside.

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Authors must ensure that all section headings, subheadings and sub-subheadings are differentiated by font size. The bold font must be used for the major headings and subheadings, and italic font must be used for the sub-subheadings in parenthesis.
Example:
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The introduction of the paper should start with an explanation of why a particular research is being conducted and conclude with the selected research approach. Authors must ensure that a non-technical reader would be able to understand the introduction, including the technical goals and objectives, any technical issues faced and its application in the real world. It would be beneficial for the readers if the authors provided a clear, one sentence purpose statement of the research. It would be advisable to keep the length of the introduction to approximately 1/2 page (1-2 paragraphs).

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In this section, authors should state their interpretations and explain the implications of their results and make suggestions for future research. The discussion should be kept as short as possible while clearly and fully stating, supporting, explaining, and defending the author's answers and discussing other important and directly relevant issues. Authors should avoid discussing side issues as it may obscure the message.

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Authors should note that the conclusion is extremely important as it provides a closure for their paper. An effective conclusion would leave the reader feeling satisfied that the concepts have been fully explained. The conclusion should start with a clear and concise statement of principal findings. This would help to set the paper in the context of previous work as this shows the readers how significant or worthy the research is. Recommendations for further research can be included in this section. Please restrain from rewriting the abstract as the conclusion.

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It is the authors' responsibility to declare all financial and non-financial support that may be considered as a source of competing interest in relation to their submitted manuscript in this section. Any grants, royalties, consulting fees are considered as financial supports and must be declared. Other forms of non-financial support that must also be declared are externally-supplied equipment/ biological sources, writing assistance, administrative support, contributions from non-authors etc.

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Any technical details that are necessary to include, but that interrupts the flow of the article, can be attached in the appendix section. Any appendices should be included at the end of the main text of the paper, after the acknowledgments section (if any) but before the

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Some examples:

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- This result was later contradicted by Becker and Seligman[5].
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