ISCTE ◈ IUL
Instituto Universitário de Lisboa

The Research on Customer Structure Characteristics and Marketing Measures of Regional Bank Agency: A case from the Agricultural Bank of China

TIAN Shichuan

Thesis submitted as partial requirement for the conferral of

Doctor of Management

Supervisor:

Professor Álvaro Rosa and Maria Figueiredo, Professor of ISCTE University Institute of Lisbon

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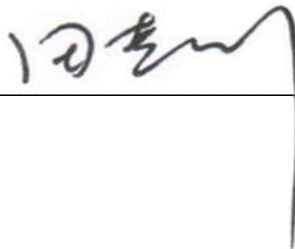Full name _____ TIAN Shichuan _____

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Abstract

With intensified opening degree and increasingly fierce market competition of commercial banks, commercial banks innovate their products constantly and improve their service quality at the same time. The Agricultural Bank of China (ABC) is a state-owned commercial bank that has built branches in all county-level districts. Instead, branches of ABC in county-level have become the weakest links that reduce ABC's competitive power. If the flaws in customer and market maintenance in the county-level branches are ever to be repaired, in my opinion, meeting customer perceived service quality and customer demands efficiently based on understanding of customer needs should be put in the first priority currently.

Firstly, this part studies the customer segmentation of ** branch of Agricultural Bank of China. This thesis puts forward approach to segment bank customers based on the improved k-means clustering. The results show that the improvement algorithm effectively overcomes the defect that traditional k-means algorithm easily falls into local optimal value, increasing the accuracy of customer classification, and contributing to more reasonable clustering results.

Secondly, this thesis uses the econometric panel data model to study the relationship between customer structure and bank performance. The results indicate that a good customer structure can bring benefits for banks and improve their competitiveness.

Thirdly, this part analyzes different service quality requirements of different types customer in the ** branch of Agricultural Bank of China. We combine service quality evaluation theory and the background of Chinese commercial banks, establishing the SERVQUAL model for the ** branch. The Study has shown that the correlation coefficient between overall perception of service quality and customer satisfaction is positive; the overall perception of service quality and customer willingness to recommend are also positively correlated, but the degree of correlation is lower than the correlation between the overall perception of service quality and customer satisfaction; the correlation of overall perceived quality of service for all samples and willingness to accept the services of other banks correlation was not significant. At the same time, there is still a gap between the customer perceived service quality and customer expectation in the ** branch of Agricultural Bank of China.

Finally, according to the results of customer structure classification and service quality survey of the ** branch of Agricultural Bank of China, the marketing strategies for different customer groups are proposed.

Keywords: Agricultural Bank of China; Customer structure; Data mining; Cluster Analysis; SERVQUAL

JEL:M31; C42

Resumo

Com o crescente grau de comercialização da indústria bancária chinesa e a entrada continua de bancos estrangeiros, a competição entre bancos está a tornar-se cada vez mais feroz, e as estratégias dos bancos comerciais com vista a ganhar vantagens competitivas muda gradualmente.

Para além do lançamento de uma variedade de produtos financeiros, os bancos comerciais utilizam serviços diferenciados para poder dar resposta á procura do mercado diversificado de consumidores. Estes bancos estão igualmente a começar a entender que para os bancos gradualmente convergirem devem não só atingir uma vantagem competitiva através da oferta de produtos financeiros bem como serviços diferenciados de alta qualidade. Este meio tornou-se na única forma forma que o banco dispõe para poder vencer a sua competição. Portanto, para os bancos comerciais, estamos num período de inovação onde o aumento da qualidade de serviço é inevitável.

O Agricultural Bank of China é um banco comercial do estado que possui uma filial em todas as regiões administrativas a nível de condado. Ligações e serviços, citadinos e urbanos tem sido a maior vantagem do Agricultural Bank of China, mas a situação actual não é favorável. A filial a nível de condado tem-se tornado na ligação pior e mais fraca da fundação deste banco.

Ao mesmo tempo, bancos privados têm emergido em paridade com o rápido desenvolvimento dos instrumentos financeiros online e, o Agricultural Bank of China, como o representante dos bancos tradicionais está a enfrentar competição feroz. Em especial desvantagem no que toca a recursos ao consumidor e instrumentos online que os outros bancos oferecem.

Os bancos comerciais tradicionais, estão desta forma confrontados com a perda de clientes bem como o elevado custo de adquirir novos clientes. O risco operacional do banco aumenta á medida que a estabilidade do mercado consumidor piora.
Se querem mudar o status quo das filiais a nível de condado, necessitam entender a actual necessidade da qualidade de serviço ao cliente, analisar as características da procura do consumidor e estabelecer um mecanismo de ciclo virtuoso de mercado-consumidor-beneficio - são as maiores prioridades agora.

Baseado nisto, este estudo usará marketing, processo de decisão da gerência, teoria e métodos, mineração de dados, técnicas estatísticas e métodos econométricos para analisar as características de procura do consumidor do Agricultural Bank of China.

Primeiro, utilizar a análise de cluster de mineração de dados para efectuar uma estratificação analítica do grupo de consumidores do banco para manter a estrutura da procura dos consumidores e serviços; classificação da informação de procura dos consumidores, acesso ás tendências de procura dos consumidores do banco e tendência de produtos competitivos; na base de quantificar os requerimentos do consumidor, usamos o painel de dados econométricos para efectuar uma análise empírica sobre a estrutura de procura dos consumidores e a performance do Agricultural Bank of China.

Através do questionario de pesquisa e o modelo SERVQUAL, usando o resultado das classificações para captar a avaliação dos consumidores no que toca aos produtos e serviços do Agricultural Bank of China; por último, de acordo com as características do banco, avançar com sugestões válidas e implementar análise estratégica através da análise de caso, para atingir optimização de alocação de procura de produtos por parte dos consumidores

A tese principal deste estudo inclui os seguintes quatro aspectos:

Primeiro, este estudo pesquisa a segmentação dos clientes do Agricultural Bank of China de forma a melhorar a precisão da segmentação de clientes, avançando com um método de segmentação de clientes do banco, onde os categoriza em quatro classes.

Temos os clientes não-atractivos (classe A), valor actual não é alto, mas também temos clientes com um valor potencial alto (classe B), os clientes cujo valor actual é relativamente alto e com pouco potencial (classe C) e, por fim clientes com valor actual alto e potencial enorme (classe D).

Os resultados sugerem que o algoritmo melhorado pode sobrepor-se ao tradicional algoritmo K, caindo facilmente no valor óptimo local, melhorando a precisão da classificação de clientes e os resultados de agrupamento são mais razoáveis. Portanto, este estudo usará o melhorado algoritmo K para fornecer uma base de estudo para capítulos subsequentes do Agricultural Bank of China, resultados de classificação das filiais a nível de condado.

Em segundo lugar, esta tese estuda a relação entre a estrutura de consumidores e a performance do banco. A parte de acordo com as filiais distritais do Agricultural Bank of China, com 13 bancos comerciais na mesma área (incluindo 4 grandes bancos comerciais e 9 bancos comerciais fundidos) como amostras, dados seleccionados de 2010-2014 como o objecto de pesquisa, estudar o impacto da estrutura de mercado de consumidores do banco na performance do mesmo.

Os resultados mostram que: o valor corrente é relativamente alto mas este valor tem poucos clientes potenciais e tem alto valor corrente e clientes com muito valor potencial - estes dois tipos de clientes têm uma proporção mais alta em todos os grupos de consumidores, com o maior benefício que pode ser atribuído aos bancos comerciais.

A precisão da segmentação de estrutura de consumidores neste estudo tem igualmente de ser provada, este estudo tem grande valor prático na análise da estrutura de consumidores do Agricultural Bank of China.

Em terceiro lugar, baseados na prévia segmentação da estrutura de consumidores, análise da avaliação geral e os requisitos dos diferentes tipos de serviço ao consumidor do Agricultural Bank of China. Baseados na teoria da avaliação de qualidade de serviço e o background dos bancos comerciais chineses, estabelecendo o modelo SERVQUAL para o Agricultural Bank of China. Obtendo a a qualidade de serviço que os consumidores necessitam no Agricultural Bank of China através da análise de questionários.

O estudo demonstra que existe uma correlação positiva entre a qualidade do serviço oferecida e a satisfação dos consumidores, no entanto a correlação entre qualidade do serviço

oferecida e a disponibilidade de aceitação de outros serviços bancários não é forte, sendo em alguns casos apresentada numa correlação negativa. Demonstra que existe uma lacuna entre a qualidade de serviço ao consumidor do Agricultural Bank of China, e a qualidade de serviço esperada.

Finalmente, de acordo com os resultados da pesquisa da classificação da estrutura de consumidores e o resultado da qualidade de serviço do Agricultural Bank of China, apresenta-nos estratégias de marketing correspondentes e diversos meios de marketing para os diferentes grupos de clientes, estabelecer um canal expresso para marketing dos clientes de alta-qualidade e, simultaneamente na alocação de recursos de marketing a diversidade necessita ser contabilizada, de forma a dedicar mais recursos aos clientes de alta qualidade.

Através da comparação dos segundos questionários e análise de casos, os resultados demonstram que um marketing de serviço diferenciado para cada grupo de clientes pode não só melhorar a performance do Agricultural Bank of China como a sua competitividade de mercado.

Palavras Chave: Agricultural Bank of China; a estrutura de consumidores; Mineração de Dados; Análise de Agrupamentos; modelo SERVQUAL

JEL:M31; C42

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Chapter1: Introduction

1.1 Background

In the past twenty years, great changes have taken place in Chinese banking market structure, market competition have been increasingly fierce, the number of banks have increased constantly, the market concentration have declined continually. The constantly emerging of joint-equity commercial banks and city commercial bank has become a non-negligible force in the banking market. Foreign banks enter China with unprecedented speed. Since China joined the WTO, the total assets of foreign banks in China have grown 54% and total loans have increased 84%. The amplification of foreign bank assets is four times state-owned bank assets, twice joint-equity commercial bank assets. Along with fully opening of Chinese banking industry in 2007, foreign banks constantly set up branches in China, Chinese commercial banks faced the great competitive pressure from foreign banks, which symbolized the beginning of an era of overall competition in Chinese banking industry.

The acceleration of market-oriented interest rate reform in china will have a profound impact on the behavior and the competitive landscape of commercial banks. The establishment of the interest rate marketization and the related system will promote the rapid development of small and medium-sized banks, and promote the small and medium-sized banks to adopt a more aggressive competition strategy. At the same time, interest rate marketization promotes rapid development of banking industry, and will intensify the competition among different banks and promote the banking industry evolution.

On November 21, 2014, the People's Bank of China announced that since November 22, RMB loan and deposit rates of financial institutions would be cut, and the five-year term deposit interest rate would be decided by the commercial bank. On November 30, 2014, the People's Bank of China issued *Deposit Insurance Regulations* (Draft), establishing the deposit insurance system as an important prerequisite of interest rate marketization. Deposit interest rate liberalization and establishment of deposit insurance system accelerated the pace of interest rate liberalization in China, and had direct and profound influence on the competition and competitive landscape of commercial banks.

At the same time, Internet finance has become one of popular vocabularies, even 2012 is known as "the first year of Internet finance: Ali Micro-Credit boomed, "Three-Ma" attempted to enter Internet finance, P2P debit and credit surged, 10 large commercial banks respectively

established comprehensive online malls, etc. Internet community changed people's life, changed the mode of making friends and business, achieved the perfect combination of the virtual community and real life, achieved the conversion between the virtual finance and real finance. The development momentum of Internet finance is strong, network banks, financial products online sales, third-party payment, online insurance sales, online micro-credit and a variety of forms come into being. Internet finance directly provides matching platforms for capital supply and demand makes, enables open, interactive and seamless contact with customers, changes the frame of traditional currency financial theory. Represented by mobile payment, cloud computing, social networks and search engines, a new generation of Internet technology extends the social financing from two-dimensional model of direct financing and indirect financing to the third kind of financing mode -Internet financing. The concept of traditional banks is being subverted; the ecological chain of the traditional finance faces a major change.

As it were, Internet finance not only impacts on products and services of commercial banks by channels, but also changes the financing channels of banks, injects fresh blood into commercial banks. The high amalgamation of the Internet and the finance adapts to the current trend of information technology, promotes financial reform and development. For a commercial bank, its influence is both negative and positive:

(1) Weaken the Payment Function of Commercial Banks

Internet finance broke the limit of the time and the space of traditional finance, considerably affects the payment intermediation status of commercial banks. At present, AliPay, TenPay, Quick Money and other online financial products provide customers with payment and settlement business of transfer, remittance, air tickets and train tickets purchasing, credit card repayment, paying fees for gas, water, electricity and insurance. The business has a considerable market share and forms obvious substitution effect of commercial banks. Along with the development of the Internet and e-commerce, the trading volume and turnover of the third-party payment platform and involving user is increasing. The third-party payment has become a huge financial industry; commercial banks' payment function is further weakened.

(2) Accelerate Commercial Bank Financial Disintermediation

Financial disintermediation makes money supply bypass the commercial bank system, directly supplies fund to demanders and raisers, completes the extracorporeal circulation of funds. In traditional financial business, banks act as the intermediary of capital mainly. In the mode of Internet finance, Internet enterprises provide search platforms to capital supply and

requisitioning parties, act as the information intermediary role of capital, which will speed up the financial disintermediation and marginalize capital intermediary function of commercial banks.

(3) Complementary Credit Operation of Commercial Banks

Based on the audit requirements and risk aversion, small enterprises often hardly obtain loans of commercial banks. Nevertheless, Internet finance take the advantage of data information, can directly supply funds to the supply chain and small enterprises. For example, Ali Micro-Credit focuses on small enterprise financing services, develops order loan, credit loans and other micro credit products, customers online accomplish application, approval, acquisition and repayment of loans without any manual participation. Merchants' application only costs 3 minutes, and loans take 1 second to the account. Up to October 2014, Ali Micro-Credit has provided financing services for more than 80 small and medium-sized enterprises, the total loan is more than 200 billion. Meanwhile, benefited from the accurate grasp of consumer behavior and predilection, the non-performing loan ratio of Ali Micro-Credit is slightly lower than commercial banks. Internet finance connects clients which are outside the traditional banking system, fills the gap of credit operations of commercial banks, and plays an important role in gleaning and remedying defects. Then influence on commercial banks is positive and beneficial undoubtedly.

(4) Promote Industrial Innovation of Commercial Banks

The integration of the Internet and finance brings the people's livelihood and personalization of the finance. Commercial banks commit to the industrial innovations, changes model from the product-driven to service-oriented which is the asset allocation and risk-revenue allocation based on the requirement of the customer transformation, from the traditional role of sales agent to the integration of asset management. Internet finance takes advantage of Internet technologies, and gives full expression of financial products' "attention of user experience", "dedication of friendly interface" and other design concepts. Commercial banks pay more attention to the customer experience in the progress of new products. The concept of customer-centric is no longer an empty slogan. Commercial banks launch balance financial products of "baobao category" to deal with Yu'ebao. To deal with P2P, "small business E home" and "Kaixindai" are launched in response to the proper time and conditions. Response to third-party payment, commercial banks launch the banking electric business platform, which relies on its strong credit system, merges financing flow, information flow and logistics, to provide clients with information releasing and trade matching, forms a whole chain of service from payment, custody, guarantee to financing. It is precisely the messing up

of Internet enterprises to commercial banks, commercial banks are forced to seek a new position in the situation of Internet finance and promote industrial upgrading and innovation.

Regardless of Internet finance or commercial banks, the survival and development are both based on the customer. Commercial banks depend on customers to survive. Developing new customers and maintaining good customer resources is the foundation of commercial banks' survival and development, is the fundamental guarantee to obtain enough market shares, and is the source of good economic benefits. Therefore, the focus of the modern commercial banks competition is essentially the customer competition. Whether the business activity or the service product innovation of commercial banks are all customer-oriented to meet customer needs as the prerequisite and aim at customer resources. The good and bad of customer resource determine the business structure, profitability and competitiveness of commercial banks. Therefore, commercial banks' business objective is winning customers with new service products which use new technologies, methods and concepts. Commercial banks' product innovation also gradually changes from product-centric to customer-centric.

In this context, Agricultural Bank of China sets up a management concept of "market-oriented, customer-centric, efficiency as the goal". The market is the direction of the marketing; the customer is the object of the marketing; the benefit is the goal of marketing. In order to meet increasingly complex international financial environment and face the increasingly fierce industrial competition, Agricultural Bank of China fully sets up the consciousness of the market, pays close attention to market changes, sets up the service concept of customer-oriented, adheres to orient, close and care clients, satisfies and leads customer demands to the greatest extent and maximizes the value of the business activities.

The following is the detailed analysis of the present situation to ** Branch of Agricultural Bank of China:

A. Basic Information

a) Business Introduction

** Branch of Agricultural Bank of China was founded on April 1, 1980. It is the second-level branch and has a business department, nine sub-branches, 52 small local branches, 780 formal on-the-job employees. The main businesses include deposits, loans, RMB settlement business, etc.; deposits, loans and settlement business of foreign exchange, etc.; and other businesses approved by the China Banking Regulatory Commission. The details are shown in Table 1-1.

Table1- 1 Scope of Business

Category	Details
RMB Business	RMB deposits, loans, settlement; bill discount; financial bonds agency issue; government bonds agency issue, exchange, sell; agency receipt, payment and agency insurance business; open-end funds agency; telephone banking; online banking, etc.
Foreign Exchange Business	Foreign exchange deposits, loans, remittance, conversion; international settlements; bill acceptance and discount; settlement and sale; abroad credit card agency payment; personal foreign exchange trading; credit investigation; consultation, etc.
Other Business	Other businesses approved by the China Banking Regulatory Commission

Source: Author finishing

b) Customer Structure

The customer types of ** Branch of Agricultural Bank of China over the last two years are shown in Table 1-2.

As shown in Table 1-2, 2013, high quality customers of enterprise loans account for 15.19%, high-end customers of enterprise loans account for 19.71%, personal high-value customers account for 0.33%;2013, high quality customers of enterprise loans account for 17.43%, high-end customers of enterprise loans account for 18.90%, personal high-value customers account for 0.37%.

Table1- 2 Customer Type

Definition	Corporate					Personal	
	Loan			Deposit		High-value	General
	High quality (above Level AA)	General (Level AA)	Eliminated (Level B,C)	High-end (More than 1 million average daily)	Medium and low-end (200,000 to 1 million average daily)	More than 100,000 average daily deposit	Less than 100,000 average daily deposit
2013	48	101	167	311	1267	3806	1.164 million
2014	57	132	138	349	1498	4721	1.255 million

Source: The data are derived from the annual service statistics of the ** Branch of Agricultural Bank of China

c) Service Concept

At present, the service consciousness of ** Branch of Agricultural Bank of China is bank-centric and product-centric. Service manners mainly include counter service, self-service, customer manager service, online banking service and other services. Counter service is the main way of service, accepts all service demands of customers. Self-service is specific to the customers with Golden Spike Card. Customer manager service includes many content, such as: holding the post of the lobby manager, bill passing, counter service, serve large customers, etc. Service products is the product developed or agent by the bank, such as deposits, loans, insurance, funds, treasuries, foreign-exchange-related financial products, RMB financial products, etc. The volume of business of every service manner in 2014 is shown in Table 1-3.

Table1- 3 Volume of Business of Service Manners

Definition	Volume Average Daily	Proportion
Counter Service	247	51.24%
Self-service	105	21.78%
Customer Manager Service	38	7.88%
Online Banking Service	92	19.10%
Total	482	100.00%

Source: The data are derived from the annual service statistics of the ** Branch of Agricultural Bank of China

d) Business Process

** Branch of Agricultural Bank of China is a state-owned commercial bank adopting multi-level hierarchical structure model. The institutional framework is divided into the city branch, the sub-branch and the small local branch. The important business process is from the sub-branch to the city branch. For instance, the process of a housing mortgage loan is the small local branch inquiring, the sub-branch auditing and the city branch ratifying. No matter high quality corporate clients or high-end personal clients deal with business in bank outlets must be in accordance with the order queue. New product is mainly exploited by relevant departments as the leadership instructed.

e) Customer Manager System

** Branch of Agricultural Bank of China has 124 customer managers which accounts for 15.90% of the total number of employees.107 of them achieved junior college or above degrees. Customer manager is transferred from lending officers, teller with good family background and some directors or vice directors of small local branches. In the existing customer managers, there are 85 managers engaging in liability business, there are 28 comprehensive managers engaging in assets, liability, and intermediary business.

The marketing work of ** Branch managers is mainly composed of relationship marketing from relatives, classmates and friends. Portfolio marketing, differentiation marketing and incremental marketing are not included. Only 21 customer managers master the marketing skills, legal knowledge, communication and other knowledge. Customer managers are widely distributed in grass-roots outlets, the income is double evaluated by the small local branch and their own performance.

B. Defects in the Customer Management

** Branch of Agricultural Bank of China carries out the customer data collection and concentration, builds customer basic data platform, facilitates the use and analysis of customers' information, fosters the auxiliary decision-making as the management concept of "market-oriented, customer-centric, efficiency as the goal", which greatly promotes the change from product-centric to customer-centric of the operation mode and improves the enterprise competitiveness.

1. The existing customers' information is not fully and effectively utilized.

The personal customer's relationship management of ** Branch of Agricultural Bank of China hasn't got effective management and enough attention in a very long time. The traditional management concept is that bank clients always seem to be endless. With the amount of customers constantly surging, ** Branch of Agricultural Bank of China doesn't need to worry about the customer source, also doesn't need to worry about the source of business and benefit. It has accumulated a lot of customer information in the database of ** Branch of Agricultural Bank of China, but the information is widely and scattered distributed in various banking business systems, which makes a lot of valuable information idle, buried and waste without playing their roles effectively. In fact, inaccurate data will make banks detrimentally affected in many ways.

2. Poor Coordination between Business Processes

"The process is formulated for the organization" is the most basic principle the in process setting of ** Branch of Agricultural Bank of China, which means that setting up the business process in order to adapt to existing organizational structure and meet the needs of the management. This principle puts the cart before the horse which usually cuts out the complete business process. Although ** Branch of Agricultural Bank of China has carried on the reform for many times, but the reform is generally designing the connection between departments after organization restructured, or just repairing the business process, which can't form a business process of customer convenience. In addition, the performance of the poor coordination between business processes is in the following:

i.   Every administration of business is lack of coordination with each other.

Each administration of business gives operational guidance to subordinate branches separately which causes bull management and dissipates the force of ** Branch of Agricultural Bank of China. Each administration of business makes service process by itself, which causes the lack of communication and coordination between departments and generates repetition and conflicts.

ii. Singleness of Process Designing

** Branch of Agricultural Bank of China divides the administrative authority simply according to the amount of business without process design following clients, risk, and customer segmentation. This simple design makes that the more high-quality and large customers, the more complex business processes, which resulting in the loss of a large number of customers easily.

iii. Absence of Effective, Unified Customer Information Management Platforms

There is no effective and unified management platform of customer information in ** Branch of Agricultural Bank of China. Especially the corporate and the private business implement their own systems, customer information can't achieve full sharing between departments, the front and back office, the company and individuals or departments cannot get a good coordination, which not only causes great waste of resources, but also greatly decrease of the service efficiency at the same time.

iv. Absence of Unified Information Flow

The business operation and management departments have their own customer relationship management processes for their own needs. The information cannot be shared between processes and inputted repeated. More serious is that inconsistent data of different departments brings the confusion and low-efficiency of management.

3. Facing the other banks' pressure of competition, the lack of comprehensive analysis of customer churn problem caused the agricultural bank branch existing customer loss. One of the most important reasons of customer loss is that: part of the customer relationship built on policy makers in personal relationships with the bank, which let the customer relationships with banks into the relationships between individuals. Once the managers have the relationship of decision making leave the current position, the resource have a lot of investment is used to establish customer relationship is likely to be lost or transferred to other Banks.

Now, the agricultural bank ** branch has learned that the seriousness of customer churn, but didn't use database data to make comprehensive analysis and research the real reason and

didn't able to take effective measures to control and manage the loss.

According to related studies show that if the bank customer churn rate can be reduced by 5%, then the bank profits can be increased by 25% to 25%. Above all, the agricultural bank ** branch has an urgent need to solve the following problems: how to carry on the comprehensive analysis of customer churn problem, how to maintain valuable customers.

4. Lack of effective classification and analysis of the individual client

Agricultural bank ** branch lack of effective classification and analysis of the individual customers, mainly manifested in two aspects:

(1) Lack of effective classification for individual customers. When products and services are launched, there is no clear target market positioning, pertinence is not strong enough to achieve the desired purpose which caused the waste of time and effort. The branch only for individual customers take the traditional pattern of "equally" service didn't according to different levels of customers to make different service, can't adapt to the ever-changing customer change and provide one-on-one service for customers.

(2) The analysis of the existing personal customer information is not scientific. Although, in the database of the ** branch of agricultural bank has accumulated a lot of customer information, but the lack of effective data mining tools was analyzed, and the bank can't get correct, effective information to provide the correct decision support for the bank's management. So, the bank's competition ability and profit ability is extremely unfavorable. Branch bank will lose a comprehensive understanding of the customer for lacking of providing customers with considerate service.

5. The domestic economy rapid development, the national demand for financial continually increase. Agricultural bank ** branch targets a vast domestic market, in recent years, constantly opening of a branch in the mainland, to expand the market. However, due to the agricultural bank ** branch management ability, a large part of potential customers didn't get development.

Potential customers refer to those have kept a stable customer relationship with the bank, but after the bank maintain itself or customers' potential need may possible to establish a relationship of enterprise legal person or natural person, is the reserve resources for bank, and is also a prerequisite of the development of commercial Banks. The greater the number of potential customers to reserve the higher quality, the greater the bank's future development potential. While retaining old customers, banks also need constantly develop new customers, which can be transformed by the potential clients to enhance the profitability of the Banks and this sustainable development can play an important role.

How to integrate the existing customer information effectively, and make classification and analysis, fully excavate potential customers, cultivate the loyalty of customers, improve the competitiveness of the bank are the agricultural bank ** branch existing business application system most important issues.

On one hand current financial institutions benefit from national monopoly on financial industry protection policy from the aspects of market access, service, price and other innate advantages and conditions. On the other hand, under the aegis of the state monopoly policy, banking reform and development of endogenous power is insufficient, operation mode and service levels at a low level for a long time development, product innovation and the lag of customer service, product homogeneity and extensive and operation of all the management goal task of multiple pressure lead to competition is particularly fierce. Agricultural bank has branches in all the county administrative region is a state-owned commercial bank that links in urban and rural areas is the biggest advantage of ABC originally, but actually the county branch became the most vulnerable part based on the worst agricultural competitiveness. At the same time due to the economic globalization and the implementation of e-commerce, agriculture Banks are facing fiercer competition, especially the competition of customer resources globalization, and the drastic competition for high value customer, which makes customer disturbance intensifies, the customer drains seriously, customer acquisition costs increase, increased risk of bank management. The stability of the customer and market maintenance is no longer existed. To change this situation, understanding customer demand characteristics, establishing the mechanism of market, customers to build a benefit virtuous cycle has become the urgent matter.

1.2 Problems and research significance

The survival and development of commercial Banks are based on the customer. Developing new customers and maintaining good customer resources are the foundation of the survival and development of commercial Banks and the fundamental guarantee to get enough market share and good economic benefits. Therefore, the point of the modern commercial bank competition is essentially the customer competition. Aiming at for the customer resources, whether the business activities of commercial Banks or service product innovation are all take the customer as center to meet their needs as the prerequisite. The pros and cons of customer resource determine the business structure, profitability and competitiveness of commercial Banks. Therefore, commercial bank management goal is to

use new technology, method and idea to create new service products to win customers. Products innovation also gradually transfers from the products of commercial Banks as the core to take the customer as the core.

As China's commercial Banks are more open than before, the rise of the internet financial China commercial bank market competition is increasingly fierce. China's commercial Banks have to change their strategy to seek competitive advantage. On the one hand, commercial Banks to actively launch the diversification of products or services to meet customer demand, on the other hand, the enterprise also realize that, as Banks service convergence of products, can't simply rely on product competitive advantage, provide high quality service has become an important means to build commercial bank competitive advantage. Therefore, commercial Banks in product innovation at the same time, improving the service quality is inevitable.

In this case, studying the following problems in depth through analyzing the background of the Agricultural Bank of China is necessary. (1) Agricultural Bank's customer demand structure, combined with customer perceived service quality, accurately grasp the customer demand trends. (2) What kind of relationship between customer market structure and bank performance. (3) What is the most effective customer marketing strategy driven by the customer structure?

Based on this, this thesis takes the Agricultural Bank of China as the background, using the market marketing, management, decision theory and method, technology of data mining, statistics and econometrics methods to analyze customer structure of ** branch of Agricultural Bank of China. First of all, from the perspective of qualitative and quantitative, through questionnaire survey and SERVQUAL model to discuss the customers' estimation of the agricultural banks' product and service quality. Using Data mining and clustering analysis method to divide customers' demand structure based on the agricultural bank customer groups and service requirements. And make hierarchical Analysis to classify customer demand information access to the ABC bank customer demand trends and the product competition. After on the basis of quantitative customer requirements, using econometric panel data of customer demand structure and the relationship between agricultural bank performance to make empirical analysis to discuss the optimal marketing strategy of ** branch to realize the maximization of Banks' benefits.

Therefore, this research project has certain theoretical perspective, but also has strong pertinence of meeting customers' individual needs and economical allocation of resources under the mechanism of customer relationship management (CRM) which has certain

academic value. It can also provide some reference and guide for other commercial banks regarding real customer relationship management.

1. Improve the level of ** branch of Agricultural Bank of China information and comprehensive management of customer data. Through the application of customer relationship management (CRM), the scattered customer information should be centralized management. Data mining can be timely and accurate understanding of the old customers and new customer information. In this way not only to improve the information level of the bank, also can realize comprehensive dynamic management of customer data.

2. Improve customer satisfaction. Optimization between customers and Banks has a wide variety of forms of communication channels, at the same time can keep data consistency and continuity. Through the study of the data analysis, banks make quick and accurate response according to the personalized needs of customers. Make the customer satisfied when buying bank products at the same time can also keep effective communication to the bank. In addition, by understanding more comprehensive customer information can be more timely and accurate handling of customer complaints and Suggestions, so as to improve customer satisfaction.

3. Improve the bank's competitive advantages. Realize ** branch of Agricultural Bank of China customer classification processing to improve customer satisfaction and loyalty, this can not only maintain existing customers and also extend the influence of the bank's good image, and constantly increase the accumulation of new customers, greatly reduce operating costs, improve profitability. Customer relationship management (CRM) at the same time focus on long-term relationships with customers and bank has the sustainable advantage in the competition.

1.3 The research content and structure arrangement

Because of the deepening reform of financial system in our country at present, and under the impact of foreign Banks of entering the domestic market situation, ** branch of agricultural bank faces much fiercer competition. In this background, this article takes agricultural bank that one of China's four big state-owned Banks as the research background to research the mechanism of bank customers demand characteristics of mining and propose the optimal configuration for the agricultural bank of product.

This article will use the marketing, management, decision theory, technology of data mining, statistics and econometrics methods to analyze ** branch of agricultural bank of

customer demand features. First of all, from the perspective of qualitative and quantitative, through questionnaire survey and SERVQUAL model to discuss the customer to the results of the agricultural bank of product and service quality, on this basis, the use of data mining, data mining, clustering analysis ((Cluster Analysis) customer demand structure to the agricultural bank customer groups (customer demand structure) and service; hierarchical analysis to classify customer demand information that access to the ABC bank customer demand trends and the product competition. On the basis of quantitative in front of the customer requirements, using econometric panel data model to research the customer demand structure and the relationship between agricultural bank performance, and make an empirical analysis on the basis of the research in front to discuss the optimal customer ** branch of agricultural bank marketing strategy. And eventually achieve the maximization of Banks' earnings. In this thesis the research content is mainly concentrated in the following three aspects.

This thesis is divided into seven chapters; each chapter of the specific research contents is arranged as following.

The first chapter is introduction. Mainly contains the topic basis, background, research significance, and the research ideas and methods.

In the second chapter of this thesis involves the related theory and literature review. Such as commercial bank customer management and segmentation theory, theory of data mining and its application in the commercial bank, SERVQUAL service quality theory and the bank of the relationship between market structure and performance.

The third chapter is the agricultural bank of customer needs and market structure analysis. In order to make a better ** branch of Agricultural Bank of China customer structure classification, first of all, the K - means algorithm of data mining classification technology was modified to improve the accuracy of classification. Finally using the empirical analysis combined with the bank customer segmentation to grasp the current ** branch of Agricultural Bank of China customer structure status.

External environment: Financial system reform, Banking market structural changes	Internal environment: Agricultural banking products and services is lag

More intense competition(Joint-stock commercial banks, city commercial banks, foreign banks are emerging)

Through questionnaire survey and SERVRQUL, we gain a comprehensive understanding of customer needs and Perceived service quality of the XX branch of ABC

Methods: Using Cluster Analysis to classify the customer structure, and then Combined with the SERVQUAL model to analyze the customer perceived service quality, obtaining the trends of customers' needs and products competitive

Characteristic Analysis of customer needs and market structure level of the XX branch of ABC

The research of the relationship market structure and performance of the XX branch of ABC

Collaborative product design research of customers participating

Methods: Using Data Mining and statistics method to get the actual weight of the customer, and get customer needs and product formation mapping

Methods: Building the real model of the relationship of performance of the XX branch of ABC and its market structure using panel data model

The products optimal allocation based on customer needs of the XX branch of ABC

Methods: From the ontology similarity calculate, establishing correspondence between a customer and product, then achieving optimal allocation of products of customer needs

Proposing effective measures of customer development and product design for the XX branch of ABC

Figure1- 1 Technology roadmap

Source: Author finishing

The fourth chapter mainly discusses the agricultural bank customer relationship between market structure and performance of the bank. Using econometric panel data to build demand models between market structure and bank performance, based on the results to analyze the market structure and performance between Banks is positive correlation or negative correlation, and therefore gives suggestions for the agricultural bank of product design and marketing strategy.

The fifth chapter is for demand structure driven by the agricultural bank of complex quality measures. First an overview of the banking service quality, according to the research contents of the third chapter, and based on the SERVQUAL service quality theory, we set up for ** branch of Agricultural Bank of China service quality measurement model. And then makes an empirical analysis through the questionnaire survey, get the ** branch of Agricultural Bank of China the current situation of customer perception of service quality.

The sixth chapter structure oriented agricultural bank service for the customer quality optimization strategy research. Provide optimal strategy recommendations according to the analysis results given above.

The seventh chapter is for the full text of the summary and outlook. Make a summarization of research structure and the direction about the future research prospects. The technical route of this thesis is shown in figure 1-1.

1.4 The research methods and main innovation points

1.4.1 Research methods

Combined with the current situation of the development of commercial bank and agricultural bank of China ** branch development of customer relationship research progress, this thesis uses marketing, management, decision theory, technology of data mining, statistics and econometrics methods to make in-depth analysis of ** branch of agricultural bank about customer structure, and provide theoretical basis and policy suggestions for agricultural banks' customer oriented products and marketing strategy. Use data mining techniques, first of all, on the K - means algorithm is proposed to improve for ** branch of agricultural bank of customer classification structure, based on this, through the questionnaire survey and SERVQUAL model to discuss the service quality evaluation of the results. And then, on the basis of previous research on customer relationship, established an econometric panel model to make an empirical analysis of customer relationship between market structure and bank performance. Finally, based on customer demand oriented, using the theory of marketing, management, decision theory and methods for ** branch of Agricultural Bank of China service quality optimization and marketing strategy to provide theoretical basis and policy Suggestions, realizing the maximization earnings of ** branch.

1.4.2 Main innovation points

This thesis takes ** branch of Agricultural Bank of China as the research background, use data mining method, SERVQUAL service quality measurement model, econometric method to make a research of structure of bank customers, customer demand oriented optimal and bank marketing strategy to improve the Banks' earnings. This thesis mainly innovation points are as follows.

Firstly, in view of the k-means clustering algorithm in the deficiency of the existence of the limit of bank customer segmentation process, this thesis proposed an improved k-means clustering bank customer segmentation algorithm, and carried on the empirical analysis. Bank

customer segmentation results show that the improved algorithm clustering results are more accurate and more fit for the actual situation of bank customer segmentation.

Secondly, on the basis of customer segmentation, this thesis using the SERVQUAL model to quantify the bank service quality perception which discussed from the angle of quantitative ** branch of agricultural bank of China customer perceived service quality, and based on this to provide a reference for product development and marketing strategy.

Chapter 2: The Related theory and literature review

2.1 Related Theories on Customer Management of Commercial Bank

2.1.1 Theories on Customer Relationship Management

Customer Relationship Management (CRM), currently the common focus of international management circle and information technology world, has become one of the most rapidly developing fields in these two communities in recent years. A review of the growth of the Western marketing theories, from which CRM was derived, helps us have an overall view of its trends and retrospect its theoretical origin and development course.

Renowned marketing scientist Phillip Kotler (1988) outlined the five stages in the progress of marketing concepts, namely, production, product, promoting, marketing and social marketing Raju. The first three stages have certain common features: customer needs were not given enough attention, trade was only regarded as the basis of marketing, harvesting the maximum benefits from trade was the only pursuit while establishing and keeping intimate extensive relationships with customers was not highly valued. Megamarketing, the study of a company's marketing in the global market, has advanced from the former ones: it highlights sharing interests with customers and adopting appropriate attitudes and actions to reach mutual assistance and benefits as well as harmony.

Since 1990s, with the arrival of the era of knowledge-driven economy and the widespread of information technology, we have witnessed a profound change in company's market idea and strategy. Personalized customers' needs have attracted unprecedented attention, businesses aim at customer satisfaction and loyalty and new concepts such as relationship marketing and database marketing are emerging one after another. Relationship Marketing sticks to the idea that firms should use various tools and methods to cultivate, develop and maintain intimate relationships with customers, so as to effectively retain them. In general, Relationship Marketing has drawn advantages from precedent counterparts and pays attention to combine with new technologies, with a purpose of effectively managing customer relations. The central aspect of this idea is to keep long-term relationship between a firm and its customers, it first emphasizes the role and position of customer relationship in company strategy and marketing, so many scholars regard it as the cornerstone of customer relationship management.

Relationship Marketing was first proposed by Berry (1982), who defined it as

"cultivating, maintaining and strengthening customer relationship". Later, Berry (1995:53) further referred it as "to meet customer's requirements and needs, thus win their preferences and loyalty". McKenna (1993:100) sorted the tenets of Relationship Marketing as "to aggregate customers, suppliers and other partners to the development and marketing activities of a firm," i.e., to establish and develop intensive interactions among customers, suppliers and other members who are in the value chain.

Payne and Holt (2002) took Relationship Marketing as the extended sphere of traditional marketing. He proposed the famous Six Markets Framework, in which he believed a firm faced six markets: internal, customer, supplier, influence, employees and presenter market. Therefore, if a company wants to maintain and extend customer value, apart from paying high attention to customers, a sound relationship with suppliers, internal employees and other stakeholders must be built. Payne and Frow (2005) formed a crossed CRM framework, which mainly includes five procedures, namely strategy development, value creation, multi-channel integration, information management and performance assessment. It is helpful to understand CRM and lift the role of customer value. Khodakarami and Chan (2014) inspected the role of CRM in the process of creating customer knowledge. The study shows that the operation system facilitates customer socialization, while the coordination system is used in organization socialization.

Customer data is the basis in carrying out CRM. Without reasonably enough information resource, CRM is like a stream without origin, or a tree without root. Database is a relatively mature and widely used technology in dealing with such problems in the current world. In CRM, the goal of database is to help make decisions. This technology has made remarkable achievements in improving trade system data.

Chris (2015) believed, to implement customized marketing, it was necessary to obtain as much customer demographic and behavioral information as possible. However, only by the CRM centered database that was built through extraction, transfer, and load (ETL) could this need be met. With the application of database technology, more and more firms have seized large amounts of customer data. When they have scaled to mass data, the application of data mining in CRM will become a necessity. In the past, firms were not able to master customer behavior because of too little data obtained, but now, they were lost in too much customer data. Obviously, to find valuable information from today's numerous data volumes cannot be realized by solely relying on manpower. Data mining is to dig out the potential and hidden trend or model from the "mine" of customer data, so as to enable a business to better manage customer relationships.

Berson et al (2000) proposed that data mining would help salesman make the orientation of sales activity more accurate, and the activity be intensively combined with the needs, inspirations and status of existing and potential customers. Data mining software is able to automatically pick good perspective model of customer buying behavior. They believed, techniques like audit, proximity, cluster, decision tree, neural network, rule induction, etc., could give out important business value in customer profitability analysis, customer acquisition, customer retention, customer segmentation, cross marketing, and other aspects.

Linoff and Berry (2011) believed that data mining was playing a leading role in CRM, only through the use of data mining technology could large firms turn the huge data in customer database into figures depicting customer features. At present, the perspective of Ronald and William, et al., is relatively across-the-board in this field. They believe, both database and data mining are the indispensable content in CRM, without the combined use of these two techniques, the role of CRM system cannot be given full play. Though the foregoing concepts stress the importance of technology in different degrees, they all stick to the idea that technology should be put under the guidance of business target, otherwise a perfect combination of business and technology cannot be realized.

2.1.2 Theory of Customer Value

Through the summary and analysis of related research outcome, Ulaga (2001) believed there were three different perspectives in the study of customer value: the buyer's perspective, the seller's perspective and the buyer-seller perspective. From buyer's perspective, the customer value was revealed in the value of the service and product provided by a firm, i.e., customer perceived value; customer value from the seller's perspective referred to a firm's value profit brought by customer equity, i.e., customer value, and; customer value from the buyer-seller perspective referred to the value brought by the relationship and cooperation between the two parties (Ulaga and Chacour,2001).

Traditionally, the object of marketing, the study object of the marketing strategy management theory, was divided into three major categories: consumer goods, industrial products and service. Because of the persistence and continuity in the production process of industrial products, the supply side and demand side pursue long-term cooperation relationships from the beginning. Therefore, Relationship Marketing has always been the basic strategy of industry products marketing. Whereas, in consumer goods industry, the limit and elasticity in meeting customer needs determines the strong discontinuity and selectivity of consumption behavior (Robertson and Yu, 2001). In this industry, firms have long paid more

attention on in time exchange, rather than long-term relationships with customers.

For a long period of time, the focus on customer relationship has always been the subject of industrial products marketing, a character different from consumer goods market and service market. Leek et al (2004) found that the character determining the investigation of industrial goods market on relationship was not based on customer value at the very beginning. Consumer goods market and service market, which focus on exchange marketing, face a great deal of customer selections in the process that exchange marketing transfers to relationship marketing. As a result, the primary problem a company faces is how to ensure its profit from selecting customers. Compared with consumer goods, service consumption requires further, deeper and more direct customer intervention, service providers maintain more intimate relationships with recipients than consumer goods providers do with their customers. Customer relationship is far more important to service industry than to manufacturing industry.

Reichheld and Teal (2001), two representative scholars in customer value study, referred it to nine industries, including advertisement agent, bank, credit card, car/family insurance, and others. Study object of Peppers and Rogers (2002) included catering and advertisement, etc. Wayland and Cole (1997) took car service, IT and many other industries as their object, but the content was still customer value of service demand. Ryals (2005) studied the customer value and the CRM strategy which was based on customer value in retail industry. Koslowsky (2001) studied customer value and marketing strategy in financial service sector.

Therefore, the concept on customer loyalty, customer satisfactory and customer value, combined with its management strategy, was first developed in marketing strategy management in service sector. It was proved to be one of the most successful means in customer maintenance and development. Cretu and Brodie (2007), taking small businesses as the empirical object, studied the relationship between brand imagine and customer value. The study shows that brand imagine has greater influence on customer perception of product and service quality, while a business's reputation has longer influence on the perception of customer value and loyalty. In their study on customer value, Weinstein and Pohlman (2015) proposed a four-stage value hopper model and provided a new idea-dynamics of salesman. Hinterhuber (2008) proposed a commercial market model in which customer value was idealized, offering references for the study.

Customer value has diversified contribution factors, which is revealed in the different viewpoints of scholars on the definition and computation of customer value. Therefore, the determination of contribution factors should be based on actual situations. This is very

important to empirical study and the planning of specific business strategy.

2.1.3 Research Status of Bank Customer Segmentation

The past studies on customer segmentation, restricted both by the segmentation theory and information technology, only focused on the investigation and simple analysis of customer's identity and characteristics (Jenkins and McDonald, 1997). The main method occurred was to divide customers into groups on the basis of their basic demographic information, such as gender, living place, age, etc (Rück and Mende, 2008). It stayed in the primary stage in terms of dimension and technology. Today, segmentation method not only enjoys wider range in dimension but also has introduced many up-to-date mathematical and statistical tools in technology.

Foreign commercial banks are actively devoting to study segmentation methods that can predict customer action, identify potential customer, so as to achieve better decision-making. In this stage, the transfer of market from product orientated to market or customer oriented has provided a fundamental driving force for the improvement of segmentation method. Moreover, the development and widespread of information technology, as well as the integration of other disciplinary technologies such as mathematical and statistical tools, have further bolstered this technology, making outcome such as fitting analysis, cluster analysis, factor analysis, etc.

For example, the salesmen of the Royal Bank of Canada analyzed large amounts of data on the database by using analysis models and tools, obtaining analysis results such as life circle, risk, buying intention, profit contribution, the possibility of loss, customer potential, channel selection, to mention a few (Davenport and Harris, 2007). Such results are used to implement customer segmentation, with an outcome of 2000 segments. Besides helping salesman make sales decisions, these segmentation information help provide customer contact point to branches, service centers and other departments, which may be used in the active or passive customer service to obtain possible customer tendencies, improve service quality and cultivate relationships. Another example, Bank of America, by using the outcome of customer segmentation, made great success in credit card business expansion. In a credit card promotion activity, the sales department picked 250 thousand customers from the segmentation results of the database (Linoff and Berry, 2011). These people had credit card consumption habits, steady incomes, good credit but not using the Bank's credit cards. The company sent them completed application forms, on which a customer only needed to sign his name, and then he would get a credit card of that Bank, and was committed with some

discounts. The activity got a respond rate of 23%, from which the Bank got 60 thousand credit card customers with high contribution rates.

Compared with foreign countries, China lags far behind on the study and practice of customer segmentation. This has not only shown in the lack of discuss on related theories in domestic prestigious and important documents, the related reports on practical application and discussion on problems in the application process are also very scarce. We can say, related studies on customer segmentation, no matter in scholar research or in practice reports, still remain at the primary stage at home. The lag on research and practice result is to some extend related with the degree of market development and advancement. The emergence of a theory is closely connected with the raise of practical questions, and the fundamental reason is the basic driving force of customer segmentation comes from market competition.

Currently, China's commercial banks are unable to formulate scientific strategies in fostering and retaining key customers: no scientific standards and methods in customer segmentation are found, the target customers are not explicit, and it is hard to divide customers according to variables such as their potentials and requirement characters. We haven't done enough in accurately analyzing and mastering customer needs and features, their expected benefits, ways of using financial products, attitudes and preferences, and other aspects. Consequently, some of our commercial banks are unable to fully excavate and reveal the many advantages in various resources.

2.2 Related theory of data mining

2.2.1 An overview of data mining research

Data Mining (DM), a process to extract the implicit but useful information and knowledge, which the company does not know in advance, from a large number of incomplete, disruptive, fuzzy and random data. Data mining is also called knowledge discovery in databases (KDD). Shao Fengjing and Yu Zhongqing (2003) pointed out that Technical personnel engaged in research in the technical fields such as database system (knowledge-based system), machine learning, artificial intelligence, knowledge acquisition, statistics, data visualization all take great interests in DM technology. In fact, ranging from the traditional expert system to the emerging network information services, DM technology is needed to get a better understanding of the customer's behavior so as to improve the competitiveness of enterprises. Currently, data mining algorithms consist of neural network, decision tree, genetic algorithm, rough set, fuzzy set, association rules and some other

methods.

Clustering algorithm is a kind of association rule, it classifies a set of physical or abstract objects into several categories according to their similarity, and is also called "unsupervised classification." The goal is to narrow the distance between objects in the same category and meanwhile enlarge the distance between objects in different categories as far as possible. For a large multi-dimensional data set, data points in the data space often distribute evenly. Data clustering method is helpful to find the sparse and dense position, and then discover the whole distribution model of the data set. In this thesis, K-means algorithm of clustering method is mainly used to the classification of bank customers. K-means clustering analysis, namely Quick Cluster Analysis, is a stepwise cluster analysis of sample data whose number of categories appointed by the user. It first classifies the data initially, then makes a gradual adjustment and last gets the final classification.

2. Customer segmentation and K-means clustering analysis

With the progress of database technology, more and more data are accumulated, and there is a lot of valuable information hiding behind data. At present, the database can be used to achieve data entry, query and statistics, but it cannot find out the inherent relationships and rules among data. What's more, data cannot be effectively applied to develop marketing. While, data mining technology is helpful to make customer segmentation and thus find useful information and knowledge hidden in the customer-related data, which contributes to helping a bank discover its potential marketing opportunities. In addition, it is conductive for banks to grasp the opportunity and occupy an initiative position in the fierce market competition so as to improve the core competitiveness of commercial banks. At the same time, data mining technology has also brought great developmental space for its application in banking industry.

K-means quick cluster method, a relatively strong algorithm in data mining technology, is very suitable for customer segmentation. Based on this kind of analysis technology, we can classify the bank customers quickly and effectively. Commercial banks have accumulated a large amount of customer data, in details of customer's deposits, consumption status, work status, credit records, and birthdays and so on. By using K-means clustering algorithm in data mining, we can analyze customers' data, to make a scientific and effective segmentation so as to identify the customer and the potential customer in different levels and with different contribution. In view of the different customer classes, commercial banks can design and introduce financial products and services pointedly, create suitable financial products for each customer and implement personalized service, improve the pertinence and effectiveness of marketing policies in order to attract the largest contribution customer, gain initiative in the

fierce market competition, thereby improve the commercial bank's profit and competitiveness.

2.2.2 Review of the application of data mining in the study of bank customers

As Chinese reforming and opening force further increases, a large number of foreign banks enter Chinese market, domestic commercial banks thereby are facing a sharp increase in competitive pressure. As a result, customers have become the competition focus among commercial banks, especially high-quality customers with large contribution. According to Pareto principle, the bank with a large amount of high-quality customers has a better advantage in competition. Aiming at a preferable marketing strategy, commercial banks must conduct a reasonable classification of customers to identify such high-quality customers and try to tap the potential customers. Bank customer classification divides the customer group into different levels in accordance with their characteristics and explores the common elements. Moreover, research on customer's psychology and demand has been carried out respectively to evaluate the valid customers and make a rational allocation of service resources, thus enable bank customer strategy can be successfully implemented. Therefore, the accuracy of bank customer strategy means a lot. As a result, Zhang and Liu (2007) found that bank customer classification algorithm has been a hot choice for research.

Usually, traditional commercial bank customer classifications are based on two algorithms: empirical classification and simple statistical classification. At first, Liu Yingzi and Wu Hao (2006) studied the bank customer classification. They found out that bank customer classification was finished according to the former one, which characterized with a high subjectivity, irrationality and a low precision. Customer classification result based on the latter algorithm has a lot with the selection criteria of classification, this kind of method analyzes the past and present value of a customer in accordance with his or her past data in banks, but it ignores the customer's future value and potential value. So Ma et al (2003) found that sometimes the result of this classification does not match with the actual situation, resulting in a large classification error.

In recent years, as China's commercial banks has accelerated the construction of information, a large number of customer's past transaction data have been saved. Faced with these massive data, the traditional classification methods are no longer suitable for the requirements of modern commercial banks to make customer classification, and meanwhile plunge the banks into a plight of "rich data, poor knowledge". Data mining is acted as a new technology to extract and discover knowledge from data, K-means algorithm in it is one of the

best clustering methods, which provides a new approach for commercial banks to make customer classification. However, K-means clustering algorithm usually fixes the initial cluster center to determine the category of customers when commercial banks classified their customers, which results in a low accuracy rate. Therefore, Kuo et al (2002) found that how to select the initial cluster centers becomes an important factor to affect the customer classification results. Fan Ning (2011) improved K-means algorithm when he used this algorithm to study the customer segmentation of Chinese commercial bank, providing an effective reference for the decision-making of commercial banks and meanwhile bringing them much more profits. By combining the advantages of support vector machine and K-means, Farquad et al. (2014) proposed a hybrid classification method, which turns out to improving the accuracy of bank customer classification.

2.3 Service Quality Theory

2.3.1 The Application of SERVQUAL Model in Various Industries

In abroad, SERVQUAL model has been widely used in various industries. Scholars by using the SERVQUAL model for banks, credit cards, household appliances maintenance and long distance telephone, the four industry on the basis of the investigation, it is concluded that the five dimensions of SERVQUAL model, the reliability is one of the most important dimension, and empathy is the least important dimension, the other three dimensions of importance are also different in the different industry. At the same time, the scale, some scholars also questioned. Carmen(1990)used the SERVQUAL to business school center, tire shop, dental clinics, and hospitals measured, which proves the reliability of questionnaire, points out that the SERVQUAL stability is better, but five factors is not neutral indicators, for different industries do not completely applicability. Parasuraman et al (1991) on the scale was improved and re-evaluated, changed the way of some statements project, such as the expected part of the project statement "should be" to "will", perceived negative tone to certain part of the project the narrative tone of the sentence. Study to test the reliability and validity of the scale, put forward to continue studying the problems, such as are there the correlation between the five dimensions? Is there a difference between tangibility of two dimensions (equipment and personnel) on the relative importance of the customer? Also stressed scale is still building basic "skeleton" of the service quality, application can moderate modification project, but try to keep the integrity.

Afterwards, SERVQUAL is widely used by a variety of service industries, such as health care,

dentistry, multiple shop, dry cleaner, fast food industry, banks, and so on. Nowadays, SERVQUAL has been the most imprint methods of service quality evaluation. By most scholar's study, it can provide valuable diagnostic information for service firms, and it has great superiority in simplicity of operation, low production cost which is universally applied to a variety of service industries. But in the process of the promotion, it involves the application of the different service industries, so it has some controversial problems. One problem is that five quality dimensions is not prominent in some industry. another one is the number of quality dimensions. However, scholars generally agree that service characteristics lead to customer behavior, but service quality is made up of measurable and flexible service characteristics. We investigate the store service quality system by revising the SERVQUAL. Carman (1990) measured dynamic retailing service quality perception and got desirable result. Ruyter and Wetzels (1997) were based on SERVQUAL further revision, and they considered this kind of service quality mainly included four factors of the enterprise: factors related to the staff, information factors, supply factors and visible factors through studying the food production enterprise. With the development of the market economy, enterprises of our country gradually take service as an important competitive factor, and pay more and more attention to providing high quality service for consumers. But now this field of research is less. McColl-Kennedy and White (1997) used SERVQUAL to measure hotel service quality. He got significant result and the result showed the difference between customer evaluation and self-evaluation of employees. Stafford et al (2011) using the SERVQUAL measure service quality in the insurance industry, through SERVQUAL had certain shortcoming, but also could be used to provide imprint information for managers of the insurance industry. Lupo (2013) used fuzzy set theory and hierarchical analysis as a tool to establish fuzzy SERVQUAL model, measured the uncertainty in the customer perceived service quality factors, and used the model to measure the service quality of high education. Dhillon and Prasher (2014) established a hierarchy of SERVQUAL model, measured the hospital service quality. Based on service management perspective, the user oriented, Xia et al (2015) used the theory of SERVQUAL service quality evaluation system, built rural highways research. The task of this research was to explain that rural public service quality is decided by the user experience and perception.

2.3.2 Literature Review of Bank Service Quality

Since the 1990s, foreign scholars began to study bank service quality evaluation, which was mainly focused on retail banking service quality evaluation research. In the research literature,

most of the empirical study were conducted using the SERVQUAL, and mostly adopted the original or the modified SERVQUAL indicators, but for bank industry, there were never recognized indicator applied to evaluate the quality of bank service.

About the bank service quality measurement, there have been a lot of abroad researches on using the SERVQUAL evaluation of bank service quality. Newman and Cowling (1996) contrasted the research of SERVQUAL and TQM, proved the applicability and usefulness of SERVQUAL. As far as we know, SERVQUAL is a method of service quality measurement. It is used by America's leading Banks, and is studied by many management consultants. But SERVQUAL is based on the dimension of American service quality, never considered the influence of different factors on other countries and regions' quality of service (Lassar *et al.*, 2000). Different cultural background, social conditions and different service content, not only these dimensions determine the level of service quality, so we can conclude that in different circumstances, dimension may increase or reduce the quality of our service.

Bahia and Nantel (2000) had Detailed research on the bank service quality evaluation, they were also based on SERVQUAL model, through the full consideration of other scholar's empirical test results, in Montreal of Canada's national bank, they carried on the questionnaire survey, finally it is concluded that the six properties of bank service quality, and developed the bank service quality evaluation index system. At present, this is the most mature of a set of index system on bank service quality evaluation. Ladhari (2009) used SERVQUAL model to research Canadian 193 banks benefit, found that the bank service quality of employees played a key role to bank competitiveness. Krishnamurthy and SivaKumar (2010) increased the use of SERVQUAL model to discuss the influence of bank service quality on customer satisfaction.

Recently, the country also carries out a lot of the service quality evaluation. Four major state-owned banks import IS09000 quality management system, improve the quality of service, at the same time, they actively learn the foreign advanced management experience, develop their own practice a set of methods to evaluate the quality of the service survey (Zhu *et al.*, 2013). But their evaluation index system is a single and simple, their evaluation scope is very narrow, and cannot accurately know the quality of service expectation and perception for customers. Furthermore, bank service quality research is mostly qualitative, the quantitative study of how to measure the bank service quality are rare.

2.4 Literature Review of bank market structure performance relationship

At present, there are a lot of research literatures on the relationship between market structure and bank performance. Traditional structure (Structure-Conduct- Performance) is the most commonly method to study the relationship between banking market structure and performance. Structure-Conduct- Performance namely SCP analysis paradigm was stemmed from 1930s Chamberlin monopolistic competition theory, and later generations developed it by some cases inspection. Traditional SCP thought exogenous market structure influence bank behavior and, in turn, determines the performance of the bank, in collusion with high market concentration will lead to Banks, their behavior will reduce the degree of market competition, Banks, in turn, may use market forces can obtain excess profits. Berger and Hannan (1989) controlled other factors which might affect bank pricing behavior of the U.S. banking sector, analyzed 1983-1985 panel data, and found that those with high market concentration of market interest rates were significantly lower. Hannan and Berger (1991), Neumark and Sharpe (1992) researched American market, they found the deposit rate of rigid, which proved the existence of market power, also they found that the higher Hector fender index of market is higher interest rates. Ruthenberg (1994) studied the European banking industry and found that there was significant positive correlation between market structure and performance. Goldberg and Rai(1996) directly introduced the efficiency value of parameters to the model, researched the relationship between European banking market structure and performance, this research while not directly proved the existence of positive correlation between high-density banking market concentration and bank performance, but low density was verified bank market positive effect on the performance of false assumption. Dick(2006) studied the relationship between market structure and performance after the establishment of bank branch deregulation of subordinates, research showed that banking market structure of deregulation for consumers to enjoy more convenient service, at the same time, cost, service, credit risk, spreads and so on performance were not affected. Naceur and Omran (2011) considered Middle East and north Africa as objects, studied the development of the banking market structure having influence on bank margins and profitability, research had shown that in addition to inflation, other macroeconomic and financial development indicators had no significant influence on the performance of the bank, but bank branch set up and supervision on the performance of subordinates were significant.

Chinese scholars had more research on the relationship between Chinese banking market structure and performance. Yu Liangchun and Ju Yuan (1999) analyzed concentration and

profit margin on the 14 Bank of China in 1995-1997 data, and found that China's four major state-owned commercial Banks profitability and operating performance were significantly lower than the emerging commercial Banks and foreign Banks, the bank's operational efficiency and profitability basic had nothing to do with the size. Liu Wei and Huang Guitian (2002) criticized the inadaptability of traditional SPC paradigm, after that, they pointed out that the core issue of China's banking sector is property rights not structural problems, but the author in this article has not carried out on the market structure and bank performance empirically. Guo Jingcheng and Yao Xiangguo (2004) discussed China's banking reform from the perspective of the market structure or governance, thought that China's banking reform should start from market structure, but needed to avoid excessive competition in the market. Zhao et al (2001) studied the relationship between China's banking market structure and performance by using the data of four China's state-owned commercial Banks, found that the effect of Chinese banking market structure and performance is not obvious. The key lied on the existing market concentration and the large scale of state-owned Banks are from the traditional system, rather than the efficiency of the results. Qin Wangshun and Ou Yangjun (2001) researches the relation of Market structure, efficiency and performance, they found that our country commercial bank performance mainly depended on bank efficiency, market structure and bank performance level had no significant statistical relationship; And the bank market share was negatively related to the scale efficiency significantly. Deng et al (2005) showed Chinese banking market structure was oligopoly model, and there was only a very weak economy of scale. Tan Pengwan (2007) considered thirty-three commercial Banks as the research objects, using the panel data model to empirical analysis of the banking market structure and performance,

the research showed that market concentration lowering the big four state-owned commercial Banks profitability without a significant impact, but weakening the other joint-stock commercial Banks and city commercial Banks' profitability. Xu jiagen and Chen Ke (2011) considered fifteen china's commercial banks as research objects, using econometric panel data model to empirical analysis of banking market structure and performance, the relationship between the research showed that Chinese banking market also belong to the high degree of monopoly market, and presented the downward trend, and the market showed a negative correlation with performance. Hu Mingchao (2012), in the study of market structure, the relationship between bank performance and financial product, found that the rise of regional competition would improve the average yield of financial products, and reduced the bank's performance level, which was an obvious weakness of Banks in the market. Zeng Jianghong

and Fan Nana (2010) used Hertz fender indices as a measure of market structure, the relationship between market structure and market performance of Chinese commercial Banks carried on the empirical research. They indicated that our country commercial bank market structure was in the monopolistic competition stage, market performance of the shareholding commercial Banks and city commercial was superior to the performance of state-owned Banks, the market structure and scale had a significantly negative influence on our country commercial bank market.

Chapter 3: The structure analysis of customers from agricultural bank

Customer structure is the embodiment of enterprise marketing quality, which relates to the enterprise competitiveness and improves the effectiveness of the potential. At present, structure of customers from agricultural bank is not ideal, which performs many but scattered customers, few high-quality customers and low rate of return on investment. Especially loan clients borrow less but have a large group, and it's hard for them to maintain such small-scale enterprises, many of which are on poor condition: stand still or nearly breakdown. Therefore, reasons for the above discussion cause the huge gap between administration and service of agricultural bank and rate of return on investment from customers. Meanwhile, customer structure still has problem. Hence, it is very imminent for us to research the demand structure for customers from agricultural bank.

3.1 Agricultural Bank customer structure Categories Overview

3.1.1 Customer demand for structural classification

CDRM is the combined product of modern management idea and information technology, which regards information technology as the means and takes means of centralized management for customers. The design of customer-oriented and strategy, structure, technological system for managing enterprises, which produces a automated solution in order to improve loyalty of customers. Hence achieve the growth of enterprise income and improvement of efficiency, which helps win between companies and customers. CDRM is an emerging management mechanism aimed at improving relations between companies and customers, by effective combination of human resources, business processes and professional technology, and ultimately provide the perfect integration for all areas of the customers or consumers, which helps the enterprises satisfied the demands of clients at lower price and higher efficiency.

Customer classification is one of the most significant core parts of CDRM. Accurate customer classification is the basis of enterprises' effective CDRM. Customer classification is based on customer attributes to partition the customer set, through the analysis of the customer category and prediction of customer consumption patterns, establishing one-to-one customer service system and putting differentiated customer management into effect. it mainly refers that the enterprise classifies customers in a clear strategy, business model and

focusing on the market in accordance with customer value, needs and preferences, and other comprehensive factors, which provides targeted products, services, and marketing models to different customer groups. After several years of development, the theory and method of customer classification has been improved, and it has been widely used in marketing practice. Customer classification theory is proposed and applied to a certain objective basis, which is the product of the development of commodity economy and the increasingly fierce market competition.

The main theoretical basis for customer classification, there are two:

First, the heterogeneity of customer demand. In other words, not all customer needs are the same. As long as there are more than two customers, the demands will be different. As the customers' demand, desire and purchase behavior are diverse, the customer demand to meet the difference. The heterogeneity of customer demand is an important basis for market segmentation.

Second, reduce enterprises' resource and effective market competition. Modern enterprises are limited by their own strength, which seem impossible to provide the market with products or services that can meet all needs, and any enterprise, even the market leader, can't be take absolute advantage in the whole process of marketing. In order to carry out effective competition, enterprises must carry out market segmentation, select the most profitable target market segments, focus on enterprise resources and develop effective competitive strategies to achieve and enhance competitive advantage. Therefore, the finiteness of enterprises' resource and the effective competition is the external demand for market segmentation. So is bank, the customer of a bank is varied, each customers' demands are also changing, and the bank cannot meet all the needs of all customers, which is not only restricted by the bank's own conditions, but also undesirable from the perspective of economic efficiency. Therefore, banks should distinguish the most attractive market which bank can effectively serve for, and make best use of the advantages and avoid the disadvantages, rather than hit out in all directions.

3.1.2 Agricultural Bank Customer Classification

For the agricultural bank is the same reason, the agricultural bank has a broad customer base, and these customers differ in thousands of ways. For different customers, their needs are kaleidoscopic. The bank cannot meet all the needs of all customers, which is not only restricted by the bank's own conditions, but also undesirable from the perspective of economic efficiency. Therefore, banks should be able to identify the most valuable customers to serve, and provide more personalized service for them, rather than attacking on all fronts, taking into

account each bank customer.

In terms of customer segmentation, the commercial bank of our country doesn't attach importance to it, whose standards and methods are not very scientific, and target customers are not clear, which makes it difficult to divide the customer group according to the customer's development potential and demand characteristics. And in the specific classification only simply according to customer deposits, population statistics theory to subdivide, such segmentation not only makes result not accurate, but also cannot reflect the current customer demand or achieve aim of tailored financial products for different customers. To make the necessary classification of the customer, it is necessary to sort out the information in the database. There is much information from bank's customers. We need pick out useful information to classify, establishing a reasonable index system to evaluate the customer and customer segmentation classification. Because there is a big difference between individual customers and enterprise customers, when establishing the index system, we should set up the corresponding evaluation index system for these two types of customers.

Therefore, this thesis proposes customer demand classification method based on customer value (value customer, CV) after understanding foreign successful bank customer's relationship management and researching the foreign commercial bank customer segmentation results and application case, combined with the current situation of agricultural bank customer relationship management and customer segmentation.

Customer value refers to the difference between the total customer value (TEV) and the total customer cost (TEC) obtained from the customer in the process of communication with customers. That is to say, $CV = TEV - TEC$. This thesis uses the value classification, which is helpful to establish the theoretical foundation for the following chapters, and to arrange the Chinese strategy around the customer effect.

Customer value segmentation theory has selected two dimensions："The current value of the customer" and "the added value of the customer", each dimension is divided into high and low level, which can be divided into 4 groups of the entire customer base. Among them, the current value of the customer is assumed to maintain the current customer buying patterns and maintaining the existing transaction size, the present value of the bank's total profit creation by customers in future, It is a basic estimate of customer's future profits. The added value of customers refers to the increase of the present value of the bank's total profit in future under conditions of increasing the purchase by customer, that is a gain value, it depends on the possibility and the amount of the incremental purchase of the clients, cross buying and

recommending new customers. Subdivision results use a matrix representation, called the client relative value matrix.
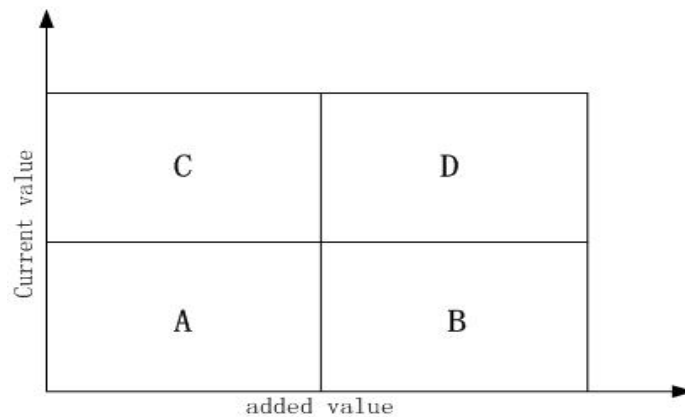
Figure3- 1 Customer relative value matrix

Source: Author finishing

A class of customers: the customer is not attractive, the current value and growth potential are very low for this class customers, or even negative profits. Such customers are usually the burden of the bank. In general, it should not allocate more resources to maintain this type of customer. Of course, if such customer's current value is not high is caused by the high cost of service and marketing costs, It can by seeking ways to reduce costs to increase the value of customers, so that making unprofitable customers to become valuable customers. When the bank has surplus capacity, As long as the marginal customer benefits outweigh the marginal costs for customers, you can take to maintaining policy.

Class B customers: Although the class customer's current value is not high, but there is a very high growth potential, such as the willingness to cooperate on both sides, However, it's still in the case of investigating other side's situation. It is expected that if the reconstruction of the relationship with these customers, then these customers will have the ability to create substantial profits for the bank in future. For such customers, banks should invest adequate resources to promote customer relations' development from the lower stage to the advanced stage, improve customer's loyalty to the bank, thus continue to receive customer's incremental buying, cross purchasing and new customers recommending.

Class C Customer: These customers relative current value is high but has little growth potential. They may have entered a stable client relationship of loyal customers, It is very important to the bank, they provide a very stable profits for the bank. Therefore, banks should devote adequate resources to do everything possible to maintain relationships with such customers, and never allow them to turn to competitors. Of course, to maintain long-term stable relationship with such customers, banks must continue to provide value to them beyond

expectation, let them always firmly believed that this bank is their best service providers.

Class D customers: these customers both have high current value and great value-added potential, which is the most valuable customers. Such customers generally have a higher loyalty, and it is the cornerstone of the bank achieving the sustained profits, the banks should invest major resources to maintain and develop relations with these customers, Designing and implementing strategies for each one of the customers of this type of customer, continuing to provide service to them beyond expectation value, trying to maintain long-term win-win relationship.

3.2 Bank customer classification based cluster analysis

Banking is a typical customer-oriented service industry. The level of information's improving helped the China's financial industry receive a large number electronic data resources of customers, understanding and using of the customer's data play an important role in improving the level of banking services. Traditional technical support has been unable to meet user's requirements, data mining technology is a massive data processing, It extract implicit information from the incomplete, noisy and fuzzy data. Data mining technology can divide banking market and customers into meaningful groups, to assist banks in planning activities and designing new marketing campaign, to analyze and predict customer's spending patterns by obtaining customer category. Accurate customer segmentation enables companies to implement customer relationship management strategy effectively. Therefore, the study of data mining technology, customer classification, CRM strategy's developing based on the classification results have important theoretical value and practical significance.

3.2.1 Cluster analysis basic concepts

With the continuous improvement of the degree of banking information, banks have accumulated massive daily business data, it hidden a lot of valuable information behind data, traditional database technology can use for data entry, query and statistical analysis, but can't find internal data relationships and rules, can't be effectively applied to the data bank marketing development, resulting in a "data rich, information poor" Dilemma. Data mining technology can find useful information and knowledge from massive data, segmenting customers, getting customers category according to the customer segmentation, releasing different financial products and providing services for it, providing personalized services for customers, to make the marketing policy more targeted, to attract significant customers, and increase profits and competitiveness of banks.

K-means rapid clustering method is a more robust algorithm in data mining technology, which is well suited for customer segmentation, using this analysis technique that can classify the bank customer quickly and effectively. Commercial banks have accumulated large amounts of customer data, detailed to the customer's deposits, consumption situation, job status, credit history, date of birth and other information, using data mining K-means clustering algorithm can analyze customer's data, achieving customer segmentation scientific and effective, it can identify different levels, the different contribution of customers and find potential customers. For different categories of customers, commercial banks can be targeted to design, launching financial products and providing services, to tailor financial products for customers, implementing personalized service, improving the relevance and effectiveness of the marketing policies, attracting the largest contribution customers, getting the initiative in the fierce market competition, increasing profits and competitiveness of commercial banks. Bank customer segmentation process is shown in Figure 3-2.
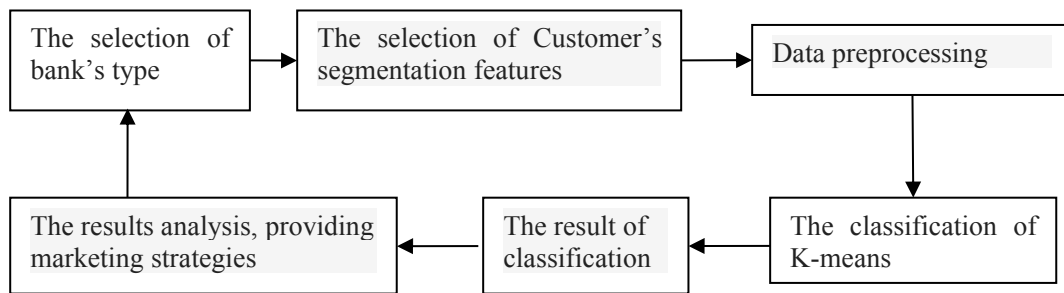
Figure3- 2　Bank customer segmentation process based on the mean K

Source: Author finishing

3.2.2 Traditional K-means clustering method

1. K-means clustering algorithm Introduction

K-means clustering analysis is a fast clustering analysis which is a stepwise cluster analyis on sample data of the user's specified number of categories. It classified the data initially, and then gradually adjusted to obtain the final classification. Target K-means algorithm is based on an input parameter K, dividing the data set into K clusters. Algorithm uses an iterative update method: In each round, the surrounding points were grouped into K clusters based on the K point reference points, and each cluster centroid (i.e. the average of all points in the cluster, which is the geometric center) will be used as reference point for the next round of iteration. Iterative make the selected reference point closer to the real cluster centroid, so that the clustering effect is getting better.

Like hierarchical clustering analysis, Fast clustering analysis also use distance as the sign

of the degree of affinity between the samples. But the difference is that: hierarchical clustering can produce a series of clustering solutions for different number of clusters generated class, and the fast clustering solutions can only produce a fixed number of classes, Users need to pre-specify the number of classes.

Firstly, k-means clustering analysis randomly selected K points as the initial cluster centers, and then calculates the distance from the cluster to each sample, the samples are attributed to the class nearest cluster center; calculating the new cluster center for the adjusted new class, if there is no change in the two adjacent cluster centers, indicating the sample adjustment is completed, clustering criterion function (JC) have converged. Finally, after adjusting the total sample, and then modify the cluster centers, proceeding to the next iteration. If in the first iteration of the algorithm, all samples were correctly classified, there will be no adjustment, Cluster centers will not change, which marks the JC has global convergence, thus it's the end of the algorithm. The algorithm framework as follows:

(1) Assuming the size of the data sample set is n, command I = 1, selecting K initial cluster centers $Z_j(I), j = 1,2,\cdots,k$;

(2) Computing the distance between cluster centers and each data sample: $D(x_i, Z(I)), i = 1,2,\cdots,n; j = 1,2,\cdots k;$ If meet $D(x_i, Z(I)) = \min\{D(x_i, Z_j(I))\}, i = 1,2,\cdots,n$, then $x_i \in w_k$;

(3) Dedicated squared error criterion function of JC is calculated as shown in equation 3-1:

$$JC(I) = \sum_{j=1}^{k} \sum_{k=1}^{n_j} \left\| x_k^j - Z_j(I) \right\|^2 \qquad (3\text{-}1)$$

(4) Analyzing algorithm termination condition dedicatedly: If $\left\| JC(I) - JC(I-1) \right\| < \xi$, then the algorithm ends, otherwise, $I = I + 1$, calculating K new clustering centers, the range in step (2), the new cluster center is calculated as shown in the formula 3-2:

$$Z_j(I+1) = \frac{1}{n_j} \sum_{i=1}^{k} x_i^j, j = 1,2,\cdots,k \qquad (3\text{-}2)$$

From the ideological framework and algorithms above algorithm, we can see, the K initial cluster center's selection has a large impact on the clustering results, because it selects K points randomly as the initial cluster centers in the algorithm. If there is a priori knowledge, that can choose a representative point. In the above algorithm, let each sample point assign to the nearest cluster center of the class, the time complexity of this process is O (nkd). Where n

is the number refers to the total sample points, K is the number of clusters specified, d is the dimension of sample points; There needs to be calculated to produce a new cluster centers after the new classification, the time complexity of this process is O (nd). Therefore, the overall time complexity of the algorithm requires O (nkd).

2. The selection of initial clustering center

In the K-means and added clustering criterion function K-means two algorithms, selecting K clustering centers randomly, at present, there are some selection methods of the initial cluster centers as follows:

(1) Selecting k arbitrarily samples as the initial cluster centers.

(2) Choosing representative point as the starting cluster center with experience. According to the individual nature, observing the data structures, electing more appropriate representative point.

(3) Classifying all the mixed samples into k classes intuitively, calculating the average of all types as initial cluster centers.

(4) By choosing the "density method" to represent the point as the initial cluster centers. The so-called density refers to the density of the sample having a statistical nature. For example, as the center of each sample, giving positive number d1 as the radius, drawing a spherical neighborhood in the feature space, they calculate the number of samples in the neighborhood as the density of the falling point. After calculating the density of each sample point, firstly, selecting the largest sample density as the first initial cluster centers, which corresponds to the density of the sample peak data points; and then, given a positive number d2, leaving the first initial cluster centers from the outside d2, selecting the next larger point density as the second representative point, so that avoiding over-concentration of the representative point; and so on, can select initial cluster centers.

(5) Solving the problem of class representative point K from the (K-1) Clustering Problems. For example, firstly, putting all samples as a whole class, the total sample average point is Class 1's initial cluster centers; then, from a class of the initial cluster centers and a sample from its farthest clusters as the two initial categories centers; and so on, making the representative point (K-1) class and a sample from the furthest as K problem's initial cluster centers.

(6) According to the method of finding the center of the cluster from maximum minimum distance clustering method to determine the initial cluster centers.

(7) Selecting Initial - Clustering several times, to find an optimal set of clustering results.

3.2.3 The Improving of k-means clustering method based on bank customer classification

1. The insufficient analysis of the traditional k-means algorithm

Traditional k-means clustering algorithm has been widely applied in bank customer segmentation due to its simple calculation, the fast speed characteristics in clustering. But in the actual application process, k-means clustering algorithm still has some shortcomings.

(1) How to determine the optimal number of clusters k value. In k-means algorithm, the number of clusters k value has a significant impact on classification accuracy, if choosing inappropriate, the time of clustering is quite long and the convergence rate is very fast. But in the specific classification process, it is very difficult to estimate the k value because it didn't known that a given data set is divided into how many numbers of parts is most appropriate in advance, and the traditional method which is random selection or empirically determined, this will decrease the accuracy of classification because of the k values we obtained with a certain degree of subjectivity.

(2) The selection of the initial cluster centers. Different initial cluster centers often have different results of clustering. Firstly, the traditional k-means algorithm randomly selects k points as initial seed clusters, and then iterative on the basis of the initial cluster centers, positioning the center until the algorithm converges. So, the different initial cluster centers may cause clustering algorithm unstable, it will produce multiple local optimal value. So usually making classification result deviates from the global optimal solution, Therefore, often reach local optimum by iteration.

2. The improved of k-means clustering algorithm

(A) The improvements to the parameter of clustering k value.

In the constraint of practical applications, it's difficult to determine the value of the clustering parameter k and normally the k value predetermined in advance is unscientific, so this pear presents a good way to obtain clustering parameter k value through the guidelines of data set and cluster. In order to obtain accurate clustering parameter k, it is necessary to divide the resulting data set to measure, and we using criteria of effective index to measure the divided data set. To judge the result of divided data set though effective index, to see whether it is reasonable, and then combine traditional clustering algorithms with effective index, in the process of clustering we adjust the parameters k dynamically to obtain the optimal results of cluster. Effective index formula as shown in equation 3-3:

$$Validity\left(k\right) = \frac{\sum\limits_{i=1}^{k}\left\|x - Z_i\right\|^2}{N \cdot \min\left(\left\|Z_i - Z_j\right\|\right)^2} \tag{3-3}$$

Where in, Z_i represents the center of cluster C_i, K represents the number of clusters, N denotes the number of data of the data set. The parameters of cluster k can be determined automatically due to the organic combination of the traditional K-means clustering algorithm with the effective index, and it solves the problem of determining the clustering parameter k in advance.

Supposing there are no input of bank customer's samples, and each sample contains m attributes, the output is the set of the number of clusters k and k clusters, which aims to make the effective index of clustering minimum.

The description of improved solving process of clustering number k is as follows:

(1) The range of the clustering number is $\lfloor 2K_{max} \rfloor$, step length is changeable and not fixed, K_{max} is maximum limit for clustering data;

(2) Randomly select objects as the initial clustering center: $c_1(l), c_2(l), \cdots, c_k(l)$;

(3) Redistribute the clustering center of each object to ensure that the clustering center is nearest to the object;

(4) By formula (3-2), the average value of the objects in each cluster is less than the average value of the objects in the cluster;

(5) Repeat step (3) and step (4) until the end of the clustering center is fixed, for all $C_j(k+1) = C_j(k), j = 1, 2, \cdots k$, if the clustering center no longer changes, then moves to the next step;

(6) Explain the effective index when clustering number is k, which is achieved through formula (3.3);

(7) Compare the *Validity* (k) value, select the smaller *Validity* value and retain the k value;

(8) End the process of selecting clustering number, output optimal clustering number, and the corresponding clustering center and clustering.

(B)　Improvements on the initial clustering center

In order to make the initial clustering center selection is reasonable, it should make its distribution scattered, not too concentrated, so it can create a given distance. This thesis gives the concept of center density defined as follows: centered on an object, a super d the ball with

a radius r, collect the number of objects inside the ball, and this number is referred to as the density of the object. Sorting the density of objects, choose as far as possible objects with larger density as the initial class center. Methods description is as follows:

(1) First, give two positives r and d, which d is the distance of initial class center, r is used to calculate the radius of the density. Then, calculate the density of each object with radius r. Finally sort the objects according to the density, and select the object with largest density as the first class center.

(2) Calculate the distance between the object with the second largest density and the first class center. If the distance is greater than or equal to the distance of initial class center, select it as the center of the second class, otherwise, cancel this point.

(3) Then take the next object, calculate the distance of the former two class center, get the third class center according to the standards of the second class center. The rest can be done in the same manner for the rest of the class center.

Through the method above, the gained distance of initial class center is far apart, dispersedly distributed, and not excessively concentrated. At the same time, after sorting, the center disrupted the original input sequence, overcomes the lack of sensitivity of traditional k-means to the initial value, and consequently gains better clustering effect.

(C)   Improved k-means algorithm of bank customer segmentation process

After the improvement on traditional k-means algorithm we gain the best clustering number K and the clustering center. This solves problem that the clustering effect relies on the initial cluster number and initial cluster center. Applying the improved algorithm to the bank customer segmentation, the specific process is shown in figure 3-3.
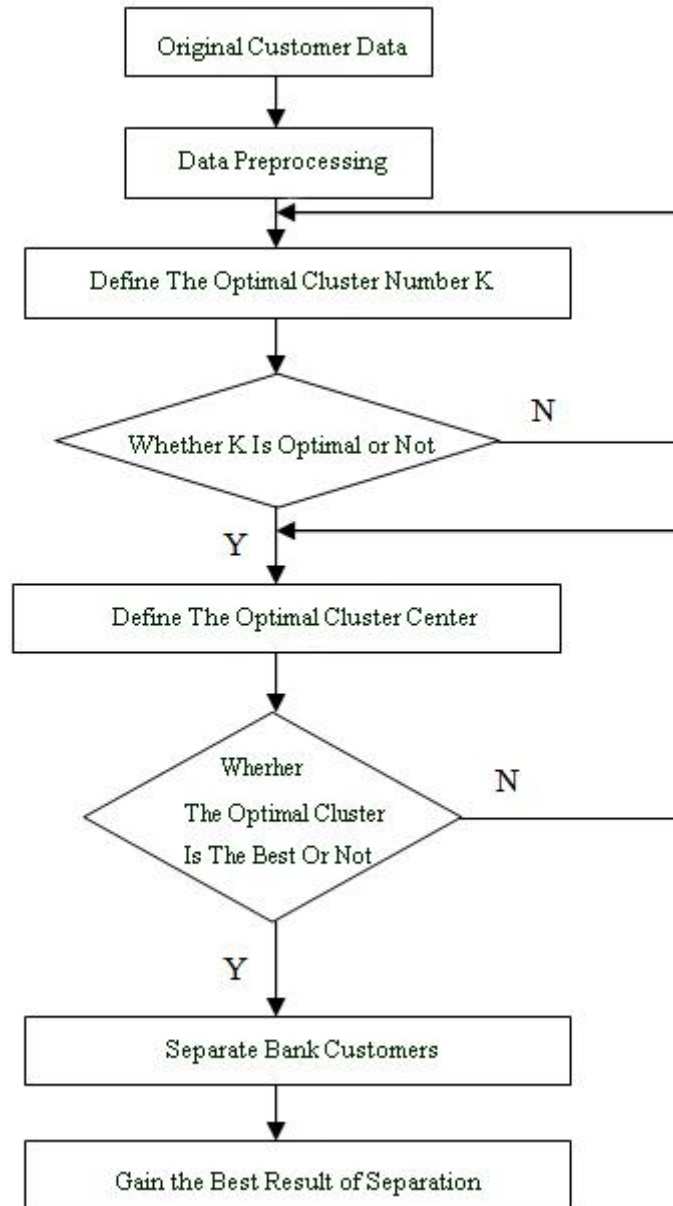
Figure3- 3 Specific Process of Bank Customer Separation Based on Improved K-means Algorithm

Source: Author finishing

3.3 Customer Structure Analysis of Agriculture Bank, ** Branch

3.3.1 Data Description and Preprocessing

1. Data Description

This thesis takes ** secondary branch of Agricultural Bank of China as an example, randomly selects part of the customer data from database of ** secondary branch of Agricultural Bank of China of ** area from Jan. to Dec. 2014. Raw data contains 6079 customers about 600000 individual transactions.

Because the confidential reason of bank information, internal personnel deal with

confidential information before the extraction of data information, the specific raw data model gained is shown in Table 3-1:

Table3- 1 Data Model

Sequence	Property Name	Property Type
1	Serial Number of Business	Interval
2	Client Code	Interval
3	Business Category Code	Interval
4	Transaction Amount	Interval
5	Transaction Time	Nominal

Source: Author finishing

Some customer data models and the specific situation of business category data models are shown in Table 3-2, Table 3-3:

Table3- 2   Customer Data Model

Sequence	Property Name	Property Type
1	Name Code	Nominal
2	Gender	Nominal
3	Age	Interval

Source: Author finishing

Table3- 3Business Category Data Model

Sequence	Property Name	Property Type
1	Charge of Bank	Interval
2	POS Consume	Interval
3	Internet Consume	Interval
4	Assurance	Interval
5	Loan	Interval
……	……	……

Source: Author finishing

2. Data Preprocessing

Because of the artificial deviation in the process of data collection, database contains incomplete or noise data. At the same time, various fields of the records in the data base represent different characteristics, which show that use different units of measurement leads to different value. Therefore, it is necessary to carry out the raw data preprocessing to improve the data quality, and the data mining process is more effective and the classification is more accurate. This thesis takes centralized and standardized transformation methods for the process of prediction. Centralized one is intended to ensure that each field values are at the same basis points. Implement method is though the formula of 3-4:

$$x'_{xj} = x_{ij} - \frac{\sum x_{ij}}{n} \tag{3-4}$$

x_{ij} represents the first i record of the first j field.

Based on centralized method, this thesis transforms through the standardized method to unify each field transformation range. Take the zero-average standardization which depends on mean and standard deviation of the field to carry out standardized process. Implement method is though the formula of 3.5:

$$\left(x'_{ij}\right)' = \frac{(n-1)x'_{ij}}{\sqrt{\sum\left(x_{ij} - x_j\right)}} \tag{3-5}$$

Through the process of data prediction, the basis points and range of each field is the same, the standard deviation is 0, and the mean is 1.

After data preprocessing above, gets a preliminary data model for pretreatment shown in Table 3-4:

Table3- 4 Data Model after preprocessing

Sequence	Property	Property Type
1	ID	Interval
2	Gender	Nominal
3	Age	Interval
4	Balance of The Beginning of The Year	Interval
5	POS Consume Number of January	Interval
6	POS Consume Volume of January	Interval
7	Over-the-counter Deposit Number of January	Interval
8	Over-the-counter Deposit Volume of January	Interval
9	Over-the-counter Withdraw Number of January	Interval
10	Over-the-counter Withdraw Volume of January	Interval
11	Over-the-counter Payment Number of January	Interval
12	Over-the-counter Payment	Interval

	Volume of January	
13	Over-the-counter ATM Withdraw Number of January	Interval
14	Over-the-counter ATM Withdraw Volume of January	Interval
15	Assurance Volume of January	Interval
16	Wage Volume of January	Interval
17	Treasury Volume of January	Interval
18	Fund Volume of January	Interval
19	Financial Product Volume of January	Interval
20	Bank deduction of January	Interval
21	Securities Transaction Volume of January	Interval
22	Balance of January	Interval
23	POS Consume Number of February	Interval
……	……	……
264	Balance of December	Interval

Source: Author finishing

Based on that, we analyze the banks' earnings. Then we get the clustering analysis of data model which is shown in Table 3-5:

Table3- 5   Clustering Data Model

Sequence	Property Name	Property Implication	Property Type
1	Client Code(ID)	Client Code for Identification	Interval
2	Income of 1st Quarter(C1)	Income that a customer contributes to bank in the first quarter t, mainly including deposit income, POS consume gains, online consumer income, payment income, etc	Interval
3	Income of 2nd Quarter(C2)	Income that a customer contributes to bank in the second quarter t, mainly including deposit income, POS consume gains, online consumer income, payment income, etc	Interval
4	Income of 3rd Quarter(C3)	Income that a customer contributes to bank in the third quarter t, mainly including deposit income, POS consume gains, online consumer income, payment income, etc	Interval

5	Income of 4th Quarter(C4)	Income that a customer contributes to bank in the fourth quarter t, mainly including deposit income, POS consume gains, online consumer income, payment income, etc	Interval
6	Total Income of the year(all)	Income that a customer contributes to bank during the whole year, mainly including deposit income, POS consume gains, online consumer income, payment income, etc	Interval

Source: Author finishing

Sample data records the various monthly transaction records of customer. We process quarterly data as the unit, sums up each quarter's monthly income of different types of consumption together to get the profits every client brings for banks each quarter, finally gains the total income that each customer brings to bank during the whole year.

3.3.2 Evaluation on the Structure of Customer Classification Result

Based on the processed data of last section, this section uses traditional k-means algorithm and the improved k-means algorithm as two clustering methods with the application of MATLAB to achieve classification of customer requirements for ** secondary branch of Agricultural Bank of China and then analyzes the characteristic of the customer requirements.

The clustering result of traditional k-means algorithm and the improved k-means algorithm in this thesis are shown in the figure 3-4.
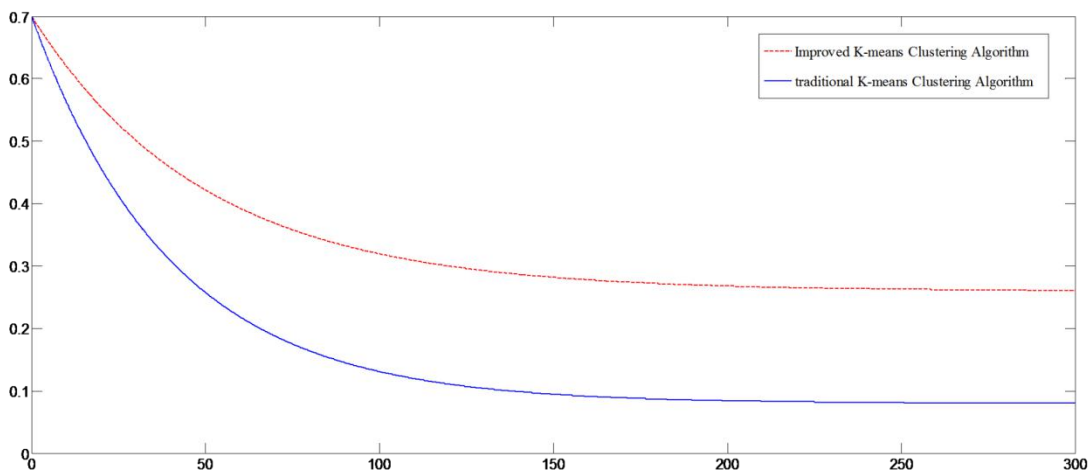
Figure3- 4 Comparison between Improved k-means and traditional k-means convergence speed
Source: Author finishing

From figure 3-4 we find the improved k-means algorithm this thesis puts up significantly accelerates convergence speed, and the solution is optimal value. In the same condition, the convergence speed of traditional k-means is relatively fast but easily plunged into local

optimal value and the result is highly stable. Because this thesis improves the number of cluster K value and the initial clustering center, speeds up the convergence speed and optimal solution can effectively overcome the defects that traditional k-means algorithm is easy to fall into local optimal value.

Then we compare the accuracy of customer segmentation between improved K - means algorithm and the traditional K - means. K = 4 when using traditional k-means cluster and the result is shown in Table 3-6. In this thesis, the improved k-means clustering algorithm input the maximum limit of clustering number $K_{max} = 5$, and the result is in Table 3-6.

Table3- 6 Proportion of Client Category

Client Category	Proportion	Accuracy (%)	
		Traditional K-mean Algorithm	Improved K-mean Algorithm
Clients of Category A	59.37%	88.54	92.38
Clients of Category B	13.51%	80.72	91.31
Clients of Category C	18.34%	81.59	88.77
Clients of Category D	8.78%	83.27	92.22

Source: Author finishing

Table 3-6 shows the improved k-means clustering algorithm this thesis puts up overcomes the defect that the randomly selected the initial point of traditional k-means clustering algorithm causes local optimum and users must give the generated number of clusters Kin advance. And in this thesis, the improved k-means clustering algorithm generates automatically clustering number, reducing the dependence on K value algorithm, and at the same time gains the initial clustering center through analysis of specific sample set which contributes to a more accurate choice of clustering center. Before improvement, the result is not very good and individual customer cannot correctly cluster. Especially if bank focus on the clustering results of class D, the clustering accuracy of unimproved K - means algorithm to improve is 83.27% while the improved clustering accuracy is 92.22%. Before improvement, bank missed nearly 10% of senior customers. It can be seen that the improved algorithm fits better for demand of customer segmentation, and provides a new to solve the problem that how to utilize huge amounts of data to segment clients for banking system.

The Research on Customer Structure Characteristics

Table3- 7 K-means statistical tests

	Cluster		Deviation			
	Mean Square	df	Mean Square	df	F	Sig.
Improved K-mean Algorithm	33.615	3	.126	112	265.980	.000
	24.525	3	.370	112	66.308	.000

To prove the stability of the results of the improved K-mean clustering algorithm, we also made statistical test on the improved K-mean clustering method with test results shown in Table 3-7. According to Table 3-7, Sig. statistics are all less than 0.01, implying that the improved K-mean clustering method produces stable results and enables to classify the e bank's customer structure accurately.

In this section, we conduct empirical research in the utilization of data, taking advantage of the traditional k-means algorithm and the improved k-means algorithm to classify customers. According to different customer's contribution to the banks' earnings value, divide customers of ** branch of Agricultural Bank of China into four categories.

3.4 Conclusion

It is urgent to figure out how to establish the customer management system through modern information technology thus to strengthen the competitiveness of the banks. The key solution to such problem is to implement the bank's customer segmentation based on a large number of customer data through data mining.

This chapter focuses the research on the customer segmentation problem of ** branch of Agricultural Bank of China. Firstly, this thesis summarizes the bank customer segmentation theory, define four categories for the bank customers, respectively are the unattractive customers (category A), the customers with no high current value but are promising (category B), the clients whose current value is relatively high but lack of potential (category C), and clients with very high current value and great potential (category D).

Data mining technology is an important method for the bank customer segmentation. K-means algorithm is sensitive to initial value and is easily to fall into local optimal value, which leads to low accuracy of customer classification. In order to improve the customer segmentation accuracy of ** branch of Agricultural Bank of China, this thesis puts forward an approach to segment bank customers based on the improved k-means clustering. Algorithm

firstly adjusts dynamically the initial clustering number K through effective index method which reduces reliance of the clustering result on initial clustering number K, determines the best density clustering center by adapt to best density radios, reduces the influence of the clustering center on the result of classification, accelerates the speed of clustering, finally confirm bank customer segmentation through the initial clustering number K and clustering center. At last, we use improved k-means algorithm and traditional k-means algorithm to carry on the empirical analysis from the classified customer data of ** branch of Agricultural Bank of China, and the results show that the improvement algorithm effectively overcomes the defect that traditional k-means algorithm easily fall into local optimal value, increases the accuracy of customer classification, and contributes to more reasonable clustering results. Therefore, this thesis will utilize the result of customer classification of sub ** branch of Agricultural Bank of China through the improved k-means algorithm as a basis to conduct research for the subsequent chapters.

Chapter 4: The relationship between customer structure and performance of Agricultural Bank

4.1 Overview of the relationship between customer structure and performance of Agricultural Bank

The operating performance of a commercial bank not only determines its own sustainable business potential on the micro level, but also reflects the allocation efficiency of social resources on the macro level. Changes in market structure, which are characterized by the adjustments of customer structure, will certainly have a profound impact on the performance of banks. Due to some factors, the relationship between market structure and performance shows distinct in different countries, different industries and different development stages of the same industry. Because setting up bank branches had been strictly regulated, making most banks of the United States limited in a small market and local market, the banking has a clear geographical boundary and the banks' products are highly similar. That contributes to the empirical test of industrial organization research, and makes the American scholars early focus on the empirical analysis of the banking's structure and performance. Compared to American, the geographical boundary of European market is not clear, which results in a different conclusion and intensifies the debate whether is an inevitable link between the concentration of the banking market and the bank performance. But there is a basic logical judgment about structure-performance: the monopoly of the banking industry will charge a higher price from consumers, provide products and services below the optimal level, impede capital accumulation, disturb resource allocation, and be not conducive to performance, economic and social welfare.

Is it appropriate to introduce more intense market competition in the banking? The traditional view is that, compared to the concentration which leads to banks' inefficient running and exploits other economy sectors, the competition in the banking is a good thing that will allocation resources efficiently and improve the efficiency of bank. However, the opposite view thinks that it is necessary for concentration because there are Economies of scale, lock-in effect and incomplete information in banking. Allen and Gale made static and dynamic analysis separately with game model, and found that competition will indeed reduce bank profits and motivate bank to take risky behavior. They also proved that market concentration could lead to a more efficient result after considering the lock-in effect, limited

information and the diversity of products. Keeley's study about American banking shows that relaxation of banking regulation in the 70s and 80s of the 20th century increased competition and decreased bank profits, which in turn greatly improves the bank risk-taking incentives, which greatly motivate bank to take risky behavior.

The market structure of China's banking has changed greatly in the past 30 years, and the market competition is becoming increasingly fierce. With the increasing of the number of banks and the decreasing of the market concentration, the commercial banks and the city commercial banks have become an important part in the banking market. As China banking comprehensive opening to the world since 2007, foreign bank sintered into China with an unprecedented speed: the asset growth of foreign banks is more than four times of state-owned bank, and two times of shareholding banks. Meanwhile, the rise of internet finance makes the market competition of banking more fiercely.

4.2 Sample and the related indexes

Data are collected from bank branches of 14 banks in the same locale, which contains the five state-owned commercial banks (Agricultural Bank of China, Industrial and Commercial Bank of China, Bank of China, China Construction Bank and Bank of Communications) and the nine joint-stock commercial banks (China Citic Bank, Huaxia Bank, Minsheng Bank, Ping An Bank, China Merchants Bank, Shanghai Pudong Development Bank, Ever bright Bank and Guangdong Development Bank).The full sample runs from 2010 to 2014 with 65 observations. The variables are described below.

4.2.1 Measurement index of customer structure of commercial bank market

1. Customer structure

In this chapter, in order to further analysis the impact of different customer structure on bank performance, we get customer structure characteristics of 14 bank branches in the sample range,and divide bank customers into four types according to the customer structure classification method in the third chapter: customers without attraction belong to Class A, the ones with low current value but high value-added potential belong to Class B, the ones with high current value but low value-added potential belong to Class C, the ones with high current value and high value-added potential belong to Class D. According to the actual situation, let CS_i denote the sum number of the C and D class customers accounted for a percentage of the total number, as the substitution variable of customer structure.

2. Market share

Market share refers to the enterprise size accounted for a percentage of the overall size of the market. To individual enterprise, a higher market share means bigger size and will bring scale effect, encourage enterprise to improve management level and attach importance to efficiency, which will improve enterprise performance indirectly and receive a high yield. It will make the enterprise have more incentive to grab more market share in turn. Sidney found that in PIMS project in 1960: performance and market share were in a linear relationship, enterprise with different market share had different performance, and every 10% of the market share gap would bring about 5% of the profit gap, the bigger market share gap was, the bigger profit gap was. But this study did not consider the difference between industries and regions, the influence of market structure in different industries on performance may be different, moreover, commercial Bank of China has its particularity, so the study of commercial banks' market share is very necessary.

The formula of market share is shown in (4-1):

$$MS_i = \frac{X_i}{X} \tag{4-1}$$

Where MS_i represents the market share of enterprise i, X_i represents the size of the enterprise i, X represents the overall size of the market.

Banking has its particularity, and what it operates is a particular financial asset: currency. Existing banking product category is relatively single, and according products the banking market can be mainly divided into deposit market, loan market and intermediate business market. The measuring unit of bank's market share uses the market value share instead of the price in accordance with product number, and uses the Average year market share to consider market share from the enterprise's market share.

3. Market concentration

Market concentration is another important indicator to measure market structure. From the existing research, there are different points of view about the influence which market concentration of commercial banks exerts over the banks' performance.

We will mainly analyze the market concentration of our banking with the absolute market concentration (CR_n)and relative market concentration (Herfindahl-Hirschman Index, HHI). Let CR_n denote bank's size, which is equal to sum size of the first n banks accounted for a percentage of the total market size, as shown in (4-2).

$$CR_n = \sum_{i=1}^{n} X_i / X \qquad i = 1, 2, \cdots, n \qquad (4\text{-}2)$$

In general, $n = 4$ or 8, and the bigger CR_4 is, the greater power of effecting the market and controlling external the first four banks has. But it only partially reflects the condition between big Banks and ignores the small and medium-sized Banks. Bain divided the types of monopoly and competition in American under the concentration measure: very high concentration market with CR_4 greater than or equal to 75%, high concentration market with CR_4 greater than 65% and less than 75%, medium on centration market with CR_4 greater than 35% and less than 65%, and low on centration market with CR_4 less than 35%

Herfindahl-Hirschman Index (HHI) refers to the total sum of squares percentage which assets or income of a single enterprise accounts for total assets or income of this industry. It is a measure of change, which can respond to the scattering of enterprise size in the markets, the gap existing among enterprises and the change of large enterprises' market power. Besides, it reflects the relative concentration, better than CR_n, and is more suitable for research on commercial banks. The formula is shown in (4-3)：

$$HHI = \sum_{i=1}^{n} \left(X_i / T \right)^2 \qquad i = 1, 2, \cdots, n \qquad (4\text{-}3)$$

Where X_i represents the size of the enterprise i, T represents the overall size of the market. n represents the number of enterprise.

Table4- 1 market structure classification under HHI index

Market structure	oligopoly type				competitive type	
	High oligopoly type I	High oligopoly type II	low oligopoly type I	low oligopoly type II	competitive type I	competitive type II
HHI	HHI≥3000	3000>HHI ≥1800	1800>HHI ≥1400	1400>HHI ≥1000	1000>HHI ≥500	500>HHI

Note: the U.S. justice department assessment criteria
Source: Author finishing

The value calculated by (4-3) is between 0 and 1; it equals 1 when the market is in perfect monopoly and0 when the market is in perfect competition. The bigger the value is, the higher the degree of the market concentration is. We use the standard of U.S. policy practice and the make value multiplied by 10000, as shown in Table 4-1. Index N is the reciprocal of HHI, which indicates the number of enterprise with similar size intra-industry and makes an

auxiliary instruction.

4. Market differentiation

Differentiation can influence the market structure. Product differentiation can not only affect the enterprise strategy layout, but also be the enterprise's important marketing strategy: On one hand, because individual customers have different preferences for the same products, differentiation products can meet the needs of individual customers, subdivide customer groups, form specific customer groups, create enterprise's competitive advantage, and then lead to the difference of the enterprise performance; on the other hand, the bigger the product differentiation is, the stable position the enterprise hold in the market, and the weaker the new enterprise's ability to adapt to current market and the higher the cost of entering market.

4.2.2 Selection of dependent variables

1. Selection of performance indicators

These indicators, such as return on assets (ROA), return on equity (ROE), net interest margins (NIM), net profit/business revenue, are used to study performance in the past research. But as described in the above analysis, these indexes have drawbacks, and with the deepening of the marketization of China and strengthening risk awareness, it has been difficult to fully reflect the bank's comprehensive profit level to use only the single profit index. Li Jianjun (2004) established a comprehensive evaluation system in the book named state-owned commercial bank performance evaluation——theory, method and empirical. The index system mainly builds from four aspects of financial efficiency, such as liquidity and security, the bank's development ability construction, financial status, etc. In order to response the overall profitability of commercial banks, we give a reasonable weight to every aspect of the financial enterprise performance evaluation system of commercial banks (profitability, risk, liquidity), and then get a performance comprehensive evaluation value denoted by P.

2. Comprehensive performance index

We will calculate the weight of performance evaluation index with analytic hierarchy process (AHP), which was put forward by T. L.Saatyin the early 1970 s. The general steps of AHP are:

Step one: Set up hierarchy model. Decomposed the problem into elements, and establish a hierarchy.

Step 2: Use one layer as criterion to compare the relative materiality of each element in the next layer in pairs, construct pairwise comparison judgment matrix, assign the judgment matrix elements with 9 scaling method.

step 3: Use normalization method to calculate weight: first, calculate each row's geometric mean of judgment matrix, then calculate weight w as shown in (4-4):

$$w_i = \frac{\overline{M}_i}{\sum_{i=1}^{n} M_i}$$

(4−4)

Step four: the consistency checks of the weight. If $CR_n > 0.1$, it means consistency of the satisfied judgment to recursion order hierarchy in the level of layer n.

$$CR_n = \frac{CI}{RI}$$

(4-5)

Where RI is the average random consistency index, CI is the consistency index and calculated as follow:

$$CI = \frac{\lambda_{max} - n}{n-1}$$

Where λ_{max} represents maximal eigenvector, and calculated through the following steps:

First, set initial vector $W_0 = \left(\frac{1}{n}, \frac{1}{n}, \cdots \frac{1}{n}\right)$ for the vector $A(a_{ij})_{n \times n}$, and calculate $\overline{W}_k = AW_{k-1}$;

Secondly, use the preset threshold $\varepsilon > 0$ to judge $\max\left|w_{k_i} - w_{k_{i-1}}\right|$. If $\max\left|w_{k_i} - w_{k_{i-1}}\right| \geq \varepsilon$, then continue, else stop. w_{k_i} represents the component i of W_{k_i}.

Finally, calculate λ_{max} as follow:

$$\lambda_{max} = \frac{1}{n} \sum_{i=1}^{n} \frac{W_{k_i}}{w_{k_{i-1}}}$$

Table 4-2 gives the meaning of the 1-9 scale of AHP:

Table4- 2 the scales' meaning of analytic hierarchy process (AHP)

scale	meaning
1	Both are equally important
3	The former is more important than the latter
5	The former is more important than the latter obviously
7	The former is more important than the latter very much
9	The former is more important than the latter extremely
2, 4, 6, 8	The intermediate value of the adjacent judgment above

Source: Author finishing

According to the analysis, can get the following performance judgment proof (table 4-3)

Table4- 3the judgment matrix of commercial bank performance composite system

	profitability	risk profile	liquidity
profitability	1	5	3
risk profile	1/5	1	1/3
liquidity	1/3	3	1

Source: Author finishing

According to the above data, we use normalization method to calculate the weight w of each index, and make a consistency check of weights.

$$\bar{M}_1 = \sqrt[3]{1 \times 5 \times 3} = 2.466$$
$$\bar{M}_2 = \sqrt[3]{1/5 \times 1 \times 1/3} = 0.406$$
$$\bar{M}_3 = \sqrt[3]{1/3 \times 3 \times 1} = 1$$

$$w_1 = \frac{\bar{M}_1}{\bar{M}_1 + \bar{M}_2 + \bar{M}_3} = 0.637, \qquad w_2 = 0.105, \qquad w_3 = 0.258$$

Make consistency check of results above:

$$\lambda_{max} = \frac{\left(\dfrac{1.936}{0.637} + \dfrac{0.318}{0.105} + \dfrac{0.785}{0.258}\right)}{3} = 3.0385$$

$$CI = \frac{3.0385 - 3}{3} = 0.0193$$

$$RI = 0.58$$

$$CR = 0.0332 < 0.1$$

The above conditions meet the consistency check, so comprehensive performance indexes is as shown in (4-6).

$$P = 0.637 \times profitability + 0.105 \times risk\ profile + 0.258 \times liquidity \quad (4\text{-}6)$$

We'll use it to calculate P of Agricultural Bank in the following empirical analysis.

4.2.3 Selection of explanatory variables

1. Selection of explanatory variables

Before this part we adopt the market share (MS) and Herfindahl-Hirschman Index (HHI) as the evaluation index of the commercial bank market share, and introduce the bank customer structure characteristic indexes, then make empirical analysis of the influence which customer structure of China commercial bank market has been on performance. Therefore, this part we will select the customer structure index of **bank branch of Agricultural Bank of China, deposit and lending market share MS, intermediary business market shares MS1, average concentration of deposit and lending business HHI, intermediate business market

concentration as the independent variables. As we analysis above, although the intermediary business market share mainly focuses on large commercial banks, intermediate business of joint-stock commercial bank has been developing rapidly and has obvious differences. So we take factor age and commission net income/operating income as the independent variables to capture the influence which differentiation has been on performance. Table 4-4 describes the proportion of factorage and commission in14 commercial banks in the same area:

2. Selection of control variables

We use the cost-income ratio of commercial banks and the growth rate of GDP as control variables. In performance analysis above, we find that the performance of commercial banks is closely related to the whole economic environment, and macroeconomic environment impact on bank performance. In order to eliminate the influence of macroeconomics on the performance of the bank, we choose the GDP as a control variable in the model. In addition, the cost-income ratio is the ratio of operation and administrative expense and operating income, so it can reflect the bank's management level. In order to eliminate influence of the bank's management level on its performance, we also choose the cost-income ratio as a control variable in the model.

Table4- 4Factorage and commission net income/operating income of 14 commercial banks

	2010	2011	2012	2013	2014
Agricultural Bank of China	11.7	16.8	16.6	18.9	18.6
Industrial and Commercial Bank	15.1	19.1	20.5	23.0	21.6
Bank of China	19.1	21.6	21.4	21.3	20.5
China Construction Bank	15.0	18.7	21. 1	22，5	20.9
Bank of Communications	13.2	16.6	16.5	17.8	16.5
China Citic Bank	8.6	11.6	11.3	12.3	13.6
Huaxia Bank	6.0	7.6	7.3	10.1	11.2
Minsheng Bank	13.6	11.9	16.0	19.4	21.4
Ping'an Bank	7.3	9.2	10.2	13.9	16.2
China Merchants Bank	15.9	17.8	17.5	17.7	18.7
Shanghai Pudong Development Bank	6.8	7.4	8.9	10.6	11.2

| Everbright Bank | 10.6 | 14.6 | 14.3 | 16.0 | 16.7 |
| Guangdong Development Bank | 11.5 | 14.7 | 13.4 | 17.6 | 22.4 |

Source: Author finishing

4.3 Empirical analysis of the agricultural bank market structure and performance

4.3.1 Model specification

Smirlock substituted market share for bank efficiency to verify whether two hypotheses were established with the following model (4-7).

$$\pi = \beta_0 + \beta_1 CS + \beta_2 conc + \beta_3 MS + \alpha X \qquad (4\text{-}7)$$

where π represents bank's overall performance, CS represents characteristics of customer structure, $conc$ represents market concentration, MS represents market share, X represents a set of control variables。

In order to investigate the influence of the commercial banking market structure on performance and verify adaptability of the market power hypothesis in China, we construct econometric panel model on the basis of above formula, as shown in in (4-8).

$$P_{it} = \beta_0 + \beta_1 CS_{it} + \beta_2 MS_{it} + \beta_3 MS'_{it} + \beta_4 HHI_{it} + \beta_5 CR_{it} + \beta_6 DF_{it} + \alpha X \quad (4\text{-}8)$$

Where P_{it} represents comprehensive performance of bank i in the year t, CS_{it} represents characteristics of customer structure of bank i in the year t, MS_{it} represents deposit and lending market share of bank i in the year t, MS'_{it} represents intermediary business market share of bank i in the year t, HHI_{it} represents deposit and lending market concentration of bank i in the year t, CR_{it} represents intermediary business market concentration of bank i in the year t, DF_{it} represents factorage and commission net income/operating income of bank i in the year t, X represents a set of control variables which contain cost-income ratio(CI) and the growth rate of GDP.

4.3.2 Empirical results and analysis

Before using the panel data model for analysis, firstly we need to test the steadiness of the explaining variables so as to ensure that data is steady. We used the LLC (Levin-Lin-Chu) test and ADF (Augmented Dickey-Fuller) test where the statistics were all significant according to the significance level - 1% or 5%, indicating that the explaining variables

selected herein are steady and the panel data model can be used for analysis. Detailed steadiness test results are shown in Appendix 1.

In addition, to exclude the existence of multicollinearity characteristics of model selection herein which influences the accuracy of the model estimation results, we use the Pearson correlation coefficient method to estimate the correlation coefficient of variables selected herein. Detailed values of the correlation coefficient are shown in Appendix 2. As indicated by the correlation coefficient values of all variables, all the values are less than 0.5, implying that no significant multicollinearity exists among variables selected herein.

First we make Hausman test for econometric panel model using the statistical software Eview7.0 to determine fixed effect model or random effects model will be adopting in the empirical part. The value of Hausman test is 62.5813 and the one of F-test is 20.5480, which is significant at 0.01 level. So, we use panel data fixed effects model to regression analysis and the results is shown in Table 4-5.

Table4-5 regression results of panel data model

variable	coefficient	S.E.	t-stat	P
C	18.4518	3.1248	7.0554	0.000
CS	0.2034	0.0354	8.4517	0.000
MS	0.1649	0.0246	11.1549	0.000
MS'	-0.3845	0.0314	-10.4870	0.000
HHI	0.0158	0.0101	9.6571	0.012
CR	-0.2419	0.0687	-5.5452	0.000
DF	0.2116	0.0214	14.5837	0.002
CI	0.0343	0.0438	7.7276	0.003
GDP	0.2414	0.0172	8.1121	0.000
R^2	0.6129			
Adj R^2	0.5573			
F-stat	20.5480***			
Hausman test	62.5813***			
D-W stat	2.1428			

note: ***means it has passed 1% significance level
Source: Author finishing

R^2 is not high, only 0.6129, that is mainly due to mixed effect of samples. The value of F-stat is 20.5480, and passed 1% significance level, which suggests that the model has a strong significance。D-W statistic suggests that there is positive autocorrelation among the stochastic error terms, that is to say, there is no autocorrelation in the model. And the explanatory variables have strong significance.

The coefficient of customer structural feature index is 0.2034, significantly greater than zero under 1% significance level, which indicates the significant positive correlation between customer structure characteristics and bank performance. A good customer structure can bring benefits for banks and improve their competitive ability. Retrospecting the customer structure partition method in Chapter 3, we can see that the customers with high current value but low value-added potential (Class C) and the ones with high current value and high value-added potential (Class D) have a higher proportion of all customers, then the commercial banks get a higher efficiency, which proves the accuracy of the customer structure's division and further suggests that it has high practical value to divide the customer structure characteristics of ** bank branch of Agricultural Bank of China.

The empirical results show that performance has significant positive correlation to deposit and lending market share, market concentration, and factorage and commission net income/operating income in the deposit and lending market. It suggests that Chinese commercial banks can obtain high profits by virtue of high market share and differentiation products, which means absolute market hypothesis is false and relative market hypothesis has certain explanatory power in the deposit and lending market among Chinese commercial banks. Besides, we find that cost-income ratio, as a measure of commercial bank management efficiency, has a significant positive correlation to performance, which suggests that high concentration and low management efficiency exist simultaneously in Chinese banking.

Performance has significant negative correlation to the share and concentration of intermediary business market. The higher the degree of competition in the intermediary business market, the greater it impacts on performance. It indicates that market power hypothesis is false in the intermediary business market of China, that is to say, commercial banks can't obtain high profits using market forces from high market share. The most fundamental reason is that the single profit pattern of Chinese commercial banks results in a low contribution rate of intermediary business for the performance. In addition, the rapid development and growth in intermediary business of other commercial banks such as shareholding commercial banks have had a strong impact on large commercial banks.

The proportion of factorage and commission net income accounted for operating income presents a significant positive correlation to performance. It suggests that the non-interest income of commercial Banks has promoting effect to improve banks' performance and commercial banks can keep performance grow continuously through business transformation and development of intermediary business. It is also consistent with earlier in this article the

analysis of conclusion, which is consistent with conclusion of above analysis.

Performance has significant negative correlation to cost-income ratio, which shows that high concentration and low management efficiency exist simultaneously in Chinese commercial banks. Considering the current situation, the improvement of the performance of commercial banks is not driven by their management level. This phenomenon is mainly due to the existence of the traditional extensive operation during the transition period of market economy, which has not radically changed by the reducing the concentration and the increasing of competition at least not yet. Instead, the low management level and low work efficiency, which large Chinese state-owned enterprises have had, exist in the commercial banks, especially in the large commercial banks. This makes the bank bear the huge expenses of operating and management in the process of operation. These reasons lead to positive correlation relationship between performance and cost-income ratio.

The negative correlation relationship between performance and GDP growth rate is due to the different responses of commercial banks to the macro environment's changes: because of higher risk resistance ability, large commercial banks' sensitivity to the macro environment's changes is lower than other banks. It also suggests that using GDP index to stand for the macro environment has its limitations. In conclusion, the influence of market structure of Chinese commercial banks on performance does not conform to the market power hypothesis, but in different market segments the impact of market structure of commercial banks on performance is not the same: relative market hypothesis is roughly set up in deposit and lending market, and its main features are that large monopolistic commercial banks can use their market performance to obtain more monopoly profits in the case of higher deposit and lending market share, higher concentration and more obvious difference; market power hypothesis is false in intermediary business market, as commercial banks' performance are negatively related to the share and concentration of intermediate business market. That is to say, large monopolistic commercial banks can't use their monopoly position to obtain high monopoly profits, and it consistent with the above analysis that the proportion of non-interest income and the growth of performance is developing rapidly in joint-stock commercial banks.

4.4 Conclusions

The changes of market structure, same as the adjustment of customer structure, have necessarily a profound influence on the performance of the banks. This chapter study the influence of customer market structure of ** bank branch of Agricultural Bank on bank

performance, using other 13 commercial banks (including four big commercial banks and nine joint-stock commercial banks) in the same region as samples, and taking the data during 2010-2014 as the research object. First we summarized the relationship between performance and customer market structure of ** bank branch of Agricultural Bank of China. In the process of selecting explanation variable, we set the relevant variables combining with the results of the front section. We chose bank market share, HHI, Banks's overall service quality, cost-income rate and GDP growth as control variable, and built econometric panel model for empirical analysis. The results show that:1) performance has significant positive correlation to deposit and lending market share, market concentration, and factorage and commission net income/operating income in the deposit and lending market. 2) Performance has significant negative correlation to the share and concentration of intermediary business market. The higher the degree of competition in the intermediary business market, the greater it impacts on performance. 3) The proportion of factorage and commission net income accounted for operating income presents a significant positive correlation to performance. It suggests that the non-interest income of commercial banks has promoting effect to improve banks' performance. 4) Performance has significant negative correlation to cost-income ratio, which shows that high concentration and low management efficiency exist simultaneously in Chinese commercial banks.5)The negative correlation relationship between performance and GDP growth rate is due to the different responses of commercial banks to the macro environment's changes: because of higher risk resistance ability, large commercial banks' sensitivity to the macro environment's changes is lower than other banks. 6) Performance has significant positive correlation to the service quality according to different customers.

Lower market concentration is conducive to optimize market structure of Agricultural Bank of China, but the optimization that is mainly derived from the increasing efficiency of other types of commercial bank will lead to an increased market share. The decreasing of market concentration arising from intensifying competition, reduces net interest margin of all commercial banks, reduces the exploitation of other sectors of the economy, and improves the welfare eventually. But for Chinese Banks which overly rely on interest income, the decrease of net interest income caused by increased competition weakened their profitability. In case of intensifying competition and dropping profitability, banks may take riskier behavior.

In conclusion, the** bank branch of Agricultural Bank of China should be reformed in-depth and improve its governance structure, to make itself more sensitive to the change of the market. Secondly it should pay close attention to influence the customer market structure's change on the bank's net interest margin and profitability, and to the compete for high quality

customers with other Banks and internet finance, improve its service quality, and narrow the customers' cognitive gap between perceived service quality and expected quality, in order to enhance bank's anti-risk capacity and improve performance.

Chapter 5: Evaluation of the Agricultural Bank of China's Service Quality under the Drive of Customer Structure

5.1 Overview of commercial banks' service quality

5.1.1 Service quality

A majority of early definitions and studies of quality focus on how to define and measure tangible products' quality. Due to the flourishing development of the service industry in 1980s, lots of scholars began to pay attention to studies of service quality. They made a number of explorations and studies in terms of definition and evaluation dimension of service quality. However, because services are characterized by intangibility, heterogeneity, perishability, inseparability, it is hard to define and weigh services, which can only be described by some words.

Long time ago, scholars thought there was a difference between tangible goods quality and service quality. Definitions of service quality varied but not greatly. Among them, there is an important common ground, i.e. customers are the only evaluator of service quality. People's service and service quality research findings in the past years may be summarized as below based on their main features:

(1) Intangibility: Compared with physical products, services are somehow characterized by intangibility. As a dynamic value of use, services cannot exist independently as a tangible object without service providers and recipients. Before buying a service, a consumer cannot see, listen, taste, touch or smell it. After the service, the consumer obtains an experience of consumption instead of ownership of the service. Due to such intangibility, customers' evaluation of service quality is of strong subjectivity.

(2) Process: Services are a kind of activity or process instead of tangible goods that may be possessed by customers. Services cannot be stored. For an overwhelming majority of services, the process to render a service is also a process to consume it. Therefore, assessment of service quality is not just based on the rendering of services. The process to deliver services should also be taken into consideration.

(3) Interactivity: Different from tangible products, services' rendering and consumption cannot be separated from each other in most cases. Services occur in the process of interaction between a service provider and a service recipient while service quality comes into being in the process of interaction between service rending and consumption. If no customer participates personally in the whole process of a service, then the process of the service

cannot proceed. Therefore, interactivity is an important difference between service quality and tangible product quality.

(4) Subjectivity: Services are of an experience-based quality characteristic. The quality, such as degree of comfort and degree of warmness, can only be identified after buying or in the process of consumption. The quality of some other services such as online payment & personal online credit services can hardly be evaluated even after consumption. Therefore, the service quality perceived by customers is the quality cognized by them, which is of strong subjectivity and difference. The services provided at different time and by different service providers are different. The services provided by the same service provider at different time are also different. The same customer's recognition to service quality varies at different time. Based on scholars' service quality definitions, the author thinks service quality refers to the service quality perceived by consumers. A Finland scholar brought forth the idea of "customer-perceived service quality" first. In China, service management research scholars often call customer-perceived service quality as service quality for short and use the two concepts alternatively.

5.1.2 Commercial banks' service quality

A commercial bank's major resource is customers. The degree of customer satisfaction has a direct effect on the relationship between a commercial bank and its customers. A commercial bank can attract customers only when it satisfies them. For a commercial bank, degree of customer satisfaction refers to the degree of customers' satisfaction with the bank's products or services, including financial products, counter services, and after-sales services that meet customers' financial demands. Currently, commercial banks in China have realized the importance of customer satisfaction. They bring forth a "customer uppermost, human-based" business concept and insist on increasing the degree of customer satisfaction by listening to customers' opinions, keeping a foothold on customers' demands, improving service quality, and laying stress on customer satisfaction.

Overseas researches of evaluation of service quality in the banking sector started in 1990s and mainly focused on service quality of retail banks. SERVQUAL was used for empirical researches in most of these research documents and original or revised SERVQUAL indicators were used in most cases. For the banking sector, there are no generally-accepted indicators applicable to evaluation of banks' service quality.

In 2000, Canadian scholars, Kmai11a Bahia and Jaeques Nantel made an in-depth study of evaluation of banking service quality. Based on the SERVQUAL model and taking other

scholars' empirical test results into full consideration, they conducted a questionnaire survey in the National Bank of Canada in Montreal. Finally, they found six attributes of banking service quality and developed a system of indicators for evaluating banking service quality. Currently such system is the most mature one. The six attributes and their meanings are detailed as below:

1. Efficiency & credibility: efficiency refers to an employee's competence and speed of response. Credibility refers to a bank's reputation, service safety, empathy, and information exchange.

2. Accessibility: accessibility refers to a bank's ability to receive customers, i.e. the access for customers to enjoy the bank's services.

3. Price: it includes three price items relating specific monetary forms and two more extensive price concepts, such as lack of price and information delay.

4. Tangibles: it refers to the atmosphere and environment where a service is provided, and precision of the service, e.g. brochure.

5. Scope of business: it refers to the services or products provided by a bank.

6. Reliability: it refers to the correctness of services in the process of service delivery.

By now the four major state-owned commercial banks in China have introduced the ISO9000 quality management system to improve service quality. By learning foreign peers' advanced management experience, they have worked out their own ways for evaluating service quality in combination with their practice. However, their evaluation indicator system is simple and has a narrow scope of evaluation and cannot find out customers' true expectations and perceptions for service quality. For example, certain commercial bank evaluated service quality based on eight indicators, i.e. branch environment, service facility & equipment, business category, speed of response, staff's service attitude, means of services available, security measures, and business publicity.

Customers' perceptions of services are complicated dynamic processes, covering lots of intangible and psychological factors. A single indicator, e.g. means of services available, is not enough to help us to learn about customers' perceptions of a bank's actual service quality. Therefore, the ways to evaluating service quality of commercial banks in China have to be improved.

The purpose of this thesis is to determine the keys and steps to improve service quality in the banking sector based on the analysis of Agricultural Bank of China, ** Branch's actualities. Here service quality is defined as the difference between the service quality experienced by customers and the service quality expected by them.

5.2 Build a model for evaluating service quality of commercial banks based on the SERVQUAL

5.2.1 the SERVQUAL model

American marketing scholars brought forth ten intuitional and operable elements influencing service quality, i.e. access, communication, competence, courtesy, creditability, reliability, responsiveness, security, tangibles, and knowing the customers, and indicated that the process for customers to perceive service quality is in fact a process to compare the service quality experienced by them with the service quality expected by them, both of which are influenced simultaneously by the ten elements in the left. Determinants for customers to perceive service quality are shown in Fig. 5.1:
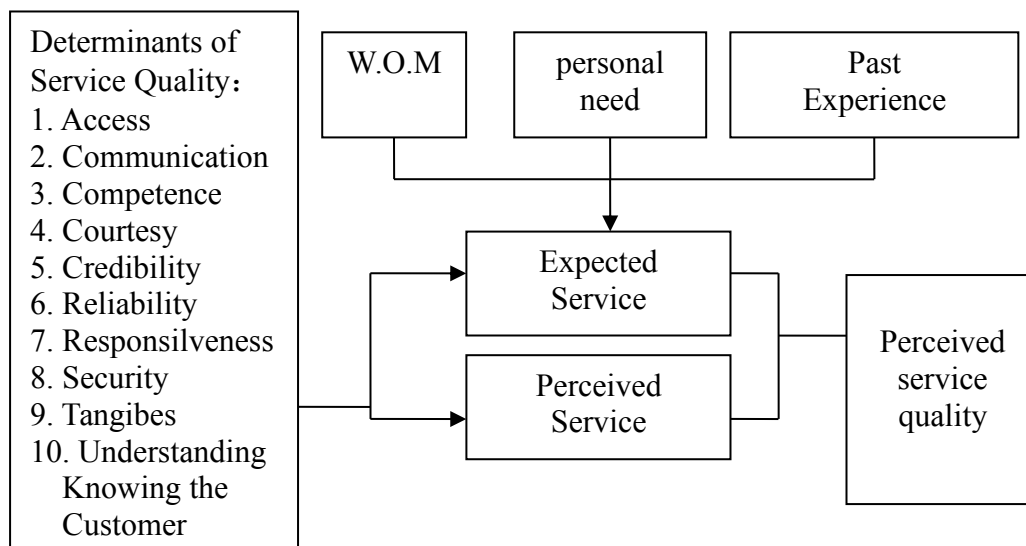
Figure5- 1Determinants for customers to perceive service quality

Source: Author finishing

In 1988, the PZB group published the paper which named "A multiple-item scale for measuring consumer perceptions of service quality" in the Journal of Retailing, An empirical test was conducted in five service sectors, including bank, long-distance telephone company, futures exchange, home appliance repairing shop, and credit card issuer. The above ten elements were collapsed into five factors, i.e. tangibles, reliability, responsiveness, assurance, and empathy, as shown in Table 5-1. In addition, a SERVQUAL measurement scale was brought forth officially.

Table5- 1Five attributes of service quality and explanations

Reliability	Reliability is the ability to perform the promised service in a dependable and accurate manner. Reliable service actions are expected by customers. It means that the services are performed correctly in the same way.
Responsiveness	Responsiveness is the readiness and willingness of employees to help customers by providing prompt timely services.
Assurance	Assurance is the knowledge and courtesy of employees and their ability to convey trust and confidence.
Empathy	Empathy is the provision of caring, individualized attention to customers, with the following features: the ability to access to customers, sensitivity, and attempt to understand customers' demands
Tangibles	Tangibles are physical evidences of service assurance, for instance, physical facilities, tools and equipment, employees, and hardware environments for external communications.

Source: Author finishing

In 1991, the PZB group published the paper which named "Refinement and reassessment of the SRVQUAL Scale" in the Journal of Retailing. In view of the empirical research, Some language descriptions of the 22 items of the SERVQUAL model are modified, so as to determine the overall framework of the 22 projects of the SERVQUAL model. As shown in Table 5-2.

Table5- 2Attribute indicators of the SERVQUAL Model

| Tangibles | 1. The company has advanced equipment
2. The company has attractive and convenient equipment
3. Employees are well-groomed
4. The company has materials that match with the services and can attract consumers | Assurance | 14. Employees' behaviors are creditable to customers
15. Customers feel safe and carefree when transacting with the company's employees
16. Employees are polite
17. Employees can answer customers' questions |
| Reliability | 5. The company fulfills its commitment promptly
6. The company solves customers' problems sincerely
7. The service rendered by the company first is correct
8. The company renders services at | Empathy | 18. The company pays individualized attention to customers
19. The company has convenient business hours
20. Employees provide personalized services to customers.
21. Employees satisfy customers' |

	the promised time 9. The company's records are accurate		specific demands
Responsiveness	10. Employees inform customers of service contents accurately 11. Employees render prompt services 12. Employees are ready to help customers 13. Employees are ready to respond to customers' requirements at any time		

Source: Author finishing

Through repeated corrections and improvements, the SERVQUAL model can better figure out customers' expectations and perceptions of services so as to realize the purpose of improving service quality. The SERVQUAL scale for measuring service quality of five dimensions has been accepted by many marketing experts. Based on it, some empirical researches have been done. Most scholars have acquired ideal results in the study of the SERVQUAL model and they found that the model could help an enterprise know customers' true opinions on the quality of services rendered by the enterprise.

The PZB Team points out that the level of service quality relies on the gap between the service quality perceived by customers and the service quality expected by them. This theory has been widely accepted by scholars and become a classic theoretical foundation for service quality researches. Parasuraman, Zeithaml and Berry (1988) developed the above viewpoint and further pointed out that service quality is a concept similar to "attitude". In their opinions, service quality is a result of customers' comparison between their perceptions of actual performance of factors influencing service quality and the service quality expected by them. Such relation may be expressed by Formula 5-1:

$$Q = P - E \qquad (5\text{-}1)$$

Where P stands for customers' evaluation for the services they receive (i.e. experienced services). E stands for customers' expectations before receiving services. Q stands for service quality evaluation. A conceptual service quality model, shown in Fig. 5.2, indicates the gap possibly in existence and various factors influencing the gap.
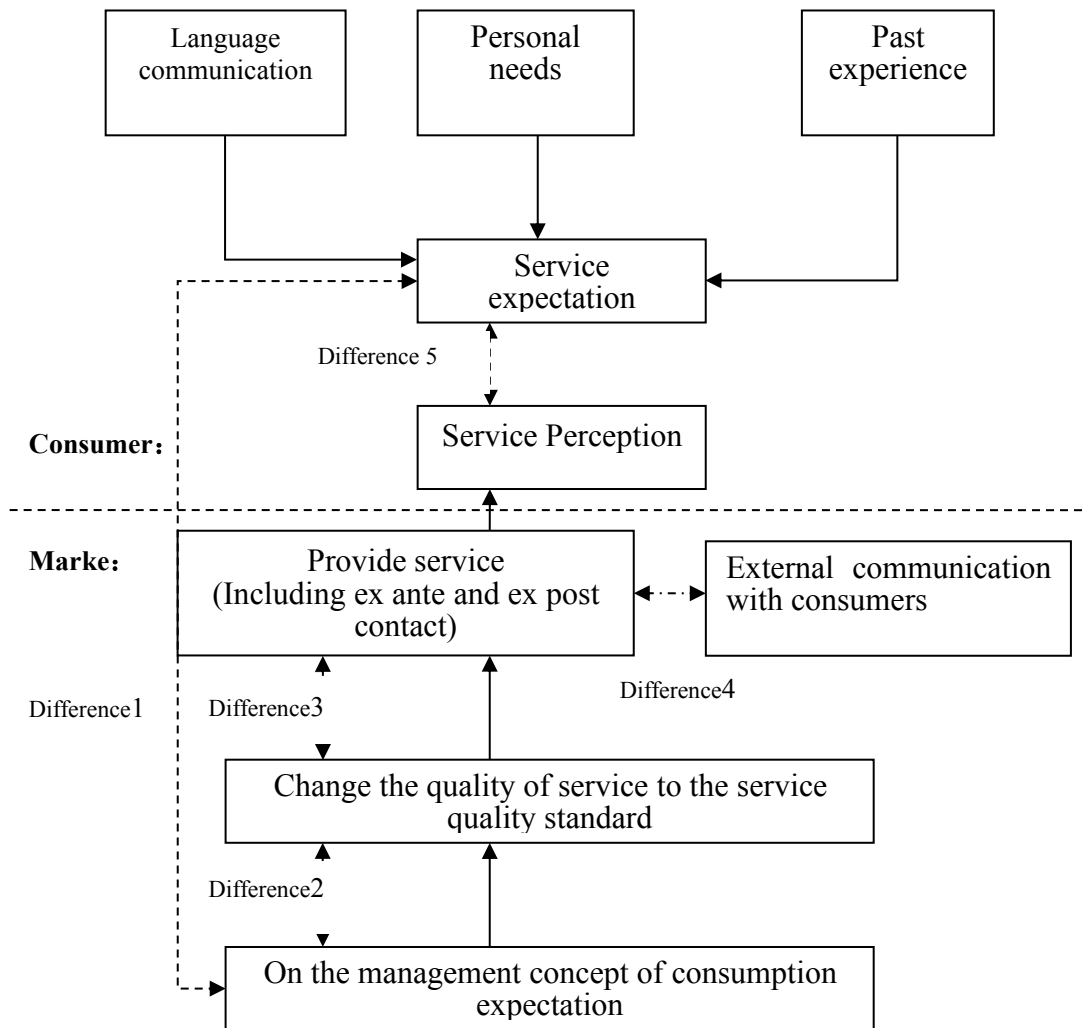
Figure5- 2Conceptual service quality model

Source: Author finishing

When P< E, service quality is lower than the service quality with which customers are satisfied. With the increase of discrepancy between P and E, service quality tends to dissatisfaction. When P=E, service quality is satisfactory. When P> E, service quality will exceed the service quality with which customers are satisfied. With the increase of discrepancy between P and E, service quality tends to perfect quality. In this way, firstly, each indicator's score is figured out according to the weighted average of the perception-expectation difference of each factor influencing service quality. Then the weighted average of all indicators is figured out. Thus, the overall service quality score SERVQUAL is acquired, and it is used twice for each informant. At the first time, the customers' expectations for the quality of services to be received are measured. Such expectations are influenced by such factors as customers' experience and advertisement. At

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the second time, the quality of services experienced by customers is measured. The overall service quality is figured out by using Formula 5-2.

$$Q = \frac{1}{22} \sum_{i=1}^{22} \left(P_i - E_i \right)$$ (5-2)

5.2.2 Set a model for evaluating commercial banks' service quality

From the foregoing theoretical studies, we can see that the SERVQUAL model is an effective tool for measuring commercial banks' service quality. Therefore, the research of models for measuring commercial banks' service quality in this thesis is also based on the SERVQUAL scale. The measurement of service quality hereunder is based on the abovementioned five attributes, i.e. reliability, assurance, responsiveness, empathy, and tangibles. The research model referred to in this thesis is shown in Fig. 5.3.
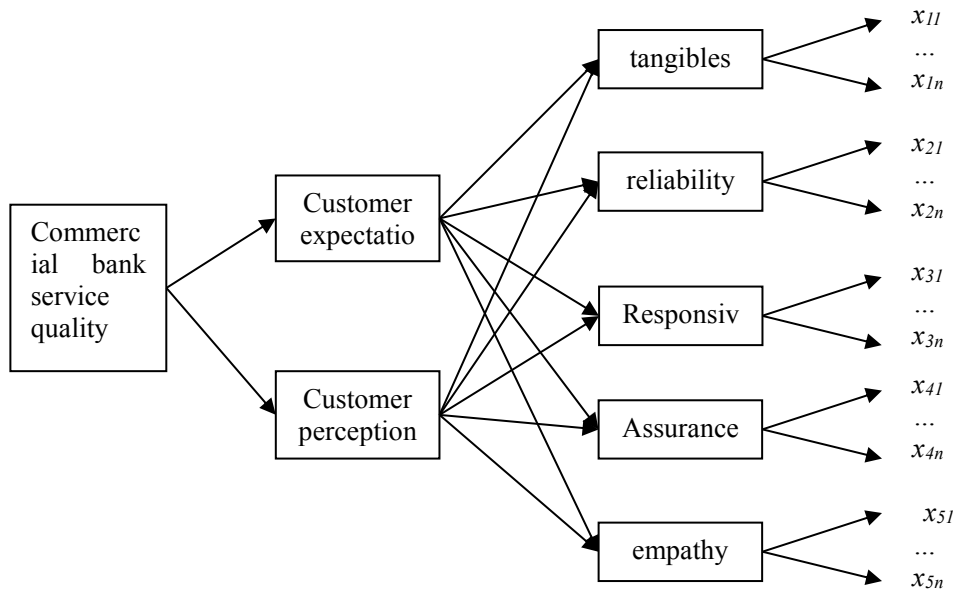
Figure5- 3 Research Model

Source: Author finishing

Customers' overall perceptions and expectations for service quality are acquired by evaluating these five elements' perceptions and expectations. Apparently, each abstract element of service quality is made up of some different service features. While these features are converted into indicator variables that may be measured directly, they become main questions of questionnaires. These questions are operational indicators. By quantifying these indicators, customers' comments on each element of service quality may be obtained. A primary structural model is used to identify evaluation indicators and design a questionnaire. Then the score of perception-expectation difference is figured out based on the statistical

analysis to obtain customers' comments on commercial banks' service quality.

The calculation of the score of customers' comments on perceived service quality is based on the way of calculation in the SERVQUAL model. However, each attribute's importance to service quality evaluation varies in fact. Therefore, mean value analyses and paired sample *T* tests are applied in the research so as to analyze each indicator's relative importance more objectively. At the time of calculating the score of customers' comments on perceived service quality, the method used to calculate the score of perception-expectation difference in the SERVQUAL model is used for reference in this thesis. At the time of calculating the difference score, all service quality attributes are treated equally in the SERVQUAL model. However, the effect of each attribute on customers' service quality evaluation varies in fact. In order to figure out customers' comments on commercial banks' service quality more objectively, each attribute of service quality is weighted to calculate the difference score. The evaluation model's mathematical relationship formula is shown in Formula 5-3.

$$SQ = \sum_{j=1}^{m} W_j \sum_{i=1}^{n} ji W_{ji} \left(P_{ji} - E_{ji} \right) \tag{5-3}$$

Where SQ stands for the overall service quality, E_{ji} for indicator *i*'s service expectation in attribute *j*, P_{ji} for indicator *i*'s service perception in attribute *j*, W_j for attribute *j*'s weight, and W_{ji} for indicator *i*'s weight in attribute *j*.

Then the arithmetic mean of all customers' evaluation scores in the samples is figured out to get an average service score, as shown in Formula 5-4.

$$AVSQ = \frac{\sum_{i=1}^{N} SQ}{N} \tag{5-4}$$

Where $AVSQ$ stands for the average service quality, SQ for *i*th customer's overall quality, and N for the number of sample customers.

5.3 The empirical analysis and structure optimization of Agricultural Bank service quality evaluation

5.3.1 Research variables and the design of the questionnaire

1. The research variables

In this thesis, we study variables included the following five aspects: (1) The customer expectations of quality (E) of the ** branch of agricultural bank of China, The desired level of survey evaluation respondents about 33 agricultural bank ** branch service quality attributes;(2) the actual perception level of customers on the quality of the **branch of agricultural bank service (P), the actual perception level of evaluation respondents to 33 ** branch of agricultural bank service quality attributes; (3) The customers service quality evaluation of** branch of agricultural bank (5.1),according (1) and (2) we can get the evaluation of respondents about the 33 service quality properties of **branch of agricultural bank Q;(4) The customer overall impression about the services quality of ** branch of Agricultural Bank; (5)The demographic variables.

2. The design of questionnaire

The research questionnaire includes 3 parts: the evaluation variables about the service quality of **branch of agricultural bank, The overall impression evaluation variables about the service quality of **branch of agricultural bank, Demographic variables

(1) The evaluation variables about service quality of **branch of agricultural bank

This thesis is based on in-depth interviews and a large number of literatures were referenced to, combining with the characteristics of commercial banking services, improving and perfecting the property index of the SERVQUAL model. On the basis of the original five evaluation attributes, adding the sixth evaluation attributes - product and price, and adding the relevant evaluation indexes of customer focus in the tangibility and empathy of the SERVQUAL model. The complete questionnaires are shown in appendix3.

1) Tangibility

On the basis of PZB group putting forward four indicators:①owning modern equipment; ②the sensory of environment facilities are attractive;③service personnel well dressed, neat; ④materials (such as brochures, manuals, etc.)that match the service and attract the consumers, taking into account the number characteristics of bank tangible service and customers to bank transaction security in the tangibility of the embodiment, adding⑤the wide service outlets;⑥ Service facilities (such as ATM machine, trading desks, etc.) meet customer demand；⑦three indicators that facility layout can protect the privacy of clients.

2) Reliability

Reflected in indicators: ① fulfill commitments to customers; ② when customer experience difficulty, the service help customers to solve the difficulty passionately; ③at the first time servicing customer well; ④ provide services within the time promised; ⑤

recording accurately.

3) Responsiveness

Reflected in indicators: ① inform of the service content to customer accurately; ② provide services to customers with timely (e.g. waiting time is not long, etc.); ③ staff are always happy to help customers; ④employees neglects customers when employees are busy.

4) Assurance

Reflected in indicators: ①The behavior of employees enables the customers to generate a sense of trust; ② customers feel security during the transaction with the bank; ③ staff are always very polite; ④ employees have sufficient expertise to answer customer questions.

5) Empathy

The author adds two indicators including perfect service feedback channel and reasonable remedial measures in the empathy. the property is primarily reflected in the following seven indicators: ① give the necessary cares to different customers; ② convenient for all customers in business hours; ③ staff provides personalized services to customers; ④ staffs put the best interests of the customer in their minds; ⑤ staffs meet the specific needs of customers; ⑥ impeccable service feedback channels (such as customer service center tracks feedback efficient, a diverse customer base of recreational activities, etc.); ⑦ reasonable service remedies (such as transaction errors claims mechanisms, emergency measures when cannot provide service timely).

6) Product and Price

This study adds price of the product dimension in the SERVQUAL model, which is mainly reflected in the following six indicators: ① handling services at reasonable fees charged; ② service product diversification; ③ the simple procedure of services; ④ improve the financial services system of electronic banking(such as Internet banking, telephone banking, mobile banking); ⑤ service process is standard; ⑥ linked closely with relevant agencies and services supporting measures (such as tax services, etc.).

In this thesis, it is concluded that the index system of a total of six attributes, 33 specific indicators, as shown in Table 5-3.

Table5- 3 evaluation variable of quality of service project

Property name	Indicators questionnaire	Variable measurement scales
Tangibility	1.modern equipment	Likert scale
	2.attractive environment facilities	
	3. service personnel well neat and dresses	
	4.materials that match the service and attract the consumers	
	5.wide service outlets	
	6.service facilities meet to customers	
	7. facility layout can protect the privacy of clients	
Reliability	8.fulfill the commitment to customers	Likert scale
	9.help customers to solve the difficult passionately	
	10.provide customers with services for the first time on the job	
	11.provide services within the time promised	
	12.record accurately	
Responsiveness	13.tell service content to customers accurately	Likert scale
	14.provide customers with timely service	
	15.staff is always willing to help customers	
	16.staff will not fail to respond customers because of busy	
Assurance	17.the behavior of the staff can make customer trust	Likert scale
	18.customers feel secure in the process of transactions	
	19.employees are always very polite	
	20.staff's professional knowledge enough to answer customer's questions	
Empathy	21.give the required care for different customers	Likert scale
	22.convenient business hours all the customers	
	23. staffs provide customers with personalized services	
	24.employees to the customer's best interests at heart	
	25. employees meet the specific needs of customers	
	26.perfect service feedback channels	
	27.have a reasonable service remedy	
Product and price	28.the services fee is reasonable dealing with all kinds of business	Likert scale
	29.service product diversification	
	30. the procedure of handling business is simple	
	31. perfect electronic banking financial service system	
	32.standard service process	

	33.have linked with relevant institutions service supporting measures	

Source: Author finishing

(2) Overall evaluation of the quality of service customers

The overall rating variables of customer service quality in questionnaire include: overall evaluation of service quality, quality of service satisfaction, the willingness to recommend the bank to relatives and friends, and would like to accept the wishes of other banking services, as shown in Table 5-4.

Table5- 4 the overall impression evaluation variables of service quality in the ** branch of agricultural bank of china

The variable name	Variable measurement scale
The overall evaluation of service quality	Likert scale
The quality of service satisfaction	
The wish of Recommending the bank to friends and relatives	
The wish of accepting other bank services	

Source: Author finishing

In addition, the questionnaire of the demographic variables includes: gender, marital status, age, education level, occupation, income, region and so on.

In the course of the survey chapter, in order to capture the relationship between customer structure and the quality of service, in this thesis, according to the classification results of Chapter III about customer structure, the respondents include unattractive clients (A class), the current value is not high but there is a high value-added potential (class B), the current value is relatively high but growth potential is little (class C), high current value and have both great value-added potential (class D), etc. 469 pieces of survey questionnaires were distributed and 352 valid questionnaires were returned, the effective rate is 79%, the time interval of questionnaires distributed recovers July 1, 2014 to July 15, 2014.

5.3.2 The analysis of service quality survey in ** branch of Agricultural Bank of China

1. Factor Analysis

(1) KMO measure and Bartlett ball test

The value amount of KMO test of the questionnaire was 0.962, indicating that the data suitable for factor analysis. Significance probability outcomes Bartlett ball test is 0, which declare 33 variables are not independent, but they are correlated.

(2) Extraction and naming common factor

This study extracted six common factors, and six common factors cumulative variance

contribution rate reached 77.13%, including the majority information of the total 33 variables, so the author extracted these six factors, namely F1, F2, F3, F4, F5, F6, to evaluate the service quality of **branch of the Agricultural Bank of China.

According to the results of the factor analysis, the information reflected in the fact or sand the identification process remained the same, there is no essential change. According to the data extracted from the six common factors with respect to the previous six attributes, adjusting the distribution of individual indicators, and re-defining the structure property of the indices. The process of adjusting the distribution of the index was mainly determined by the appropriate factor to take home the maximum value of each index factor loads. The definitions of factor, factor loadings and reliability are shown in Table 5-5.

Table5- 5factor definition, factor load and reliability

factor	attribute	Indicators Serial number	indicators	The coefficient of reliability	F1
F1	Assurance	12	Record accurately	0.9438	0.608
		15	Staff is always willing to help		0.614
		16	staff will not fail to respond customers because of busy		0.551
		17	The behavior of the staff can make customer trust		0.662
		18	customers feel secure in the process of transactions		0.599
		19	Employees are always very polite		0.733
		20	staff's professional knowledge enough to answer customer's questions		0.591
		21	Give the required care for different customers		0.644
F2	Empathy	22	Convenient business hours all the customers	0.9301	0.618
		23	Staff provides personalized service to customers		0.655
		24	employees to the customer's best interests at heart		0.673
		25	Employees meet the specific needs of customers		0.587
		26	Perfect service feedback channels		0.600

		27	reasonable service remedy		0.571
		33	Have linked with relevant institutions service supporting measures		0.728
F3	Product and Price	28	service fee is reasonable	0.9445	0.605
		29	Service product diversification		0.616
		30	handling the service procedure is simple		0.598
		31	perfect financial service system of electronic banking		0.733
		32	standard service process		0.649
F4	reliability	8	Fulfill the commitment to customers	0.9025	0.578
		9	help customers to solve the difficult passionately		0.625
		10	provide customers with services for the first time on the job		0.606
		11	Provide services within the time promised		0.532
		13	The content of the accurate inform customer service		0.488
		14	provide customers with timely service		0.576
F5	tangibility	1	With modern equipment	0.8847	0.690
		2	Attractive on the sensory environment facilities		0.721
		3	Well dressed, neat service personnel		0.635
		4	the material Match the service and attract the consumers		0.519
F6	Facilities security convenience	5	Wide service outlets	0.8661	0.534
		6	Service facilities (such as ATM) to meet customer demand		0.710
		7	Facility layout can protect the privacy of clients		0.652

Source: Author finishing

2. Reliability and Validity

(1) Reliability Analysis

The reliability test of index system calculated by Cronbach's a values method. Through SPSS to calculate the reliability coefficient of the index system is 0.9683, above 0.9. This shows the reliability of scale is very high. From the previous factor analysis has confirmed that the service quality of commercial banks is a multi-attribute,

The author also calculates the reliability coefficient of each attribute, the reliability test results

can be seen from Table 6, paragraph 5, the reliability coefficients for each attribute above 0.8. This shows that the reliability of sample data is very high, and the structure is very stable.

(2) Validity

1) Surface validity and content validity

The scale generation is built on the basis of previous studies on the SERVQUAL model, and the author conducted a number of in-depth exchanges with bank staffs, customer, referenced large number of documents, modified the scale. The scale was modified after the pre-test, determining the service quality evaluation scale finally, so the questionnaire of service quality evaluation has high face validity and content validity.

2) the structure validity

from the above factor analysis can see that the cumulated variance contribution ratio of the six common factor has reached 77.13%, including the majority information of 33 variables. Moreover, according to the load factor after the rotation matrix shows that the distribution of indicators showing obvious six factor structure, all 33 indicators are all in a higher load on one factor, which further illustrates the author extracted 6 factors have better explanatory factor.

So, after factor analysis and reliability test, the author got a questionnaire which is composed of six attributes, 33 indicators to evaluate the service quality of the ** branch of Agricultural Bank of China. By the scale information, the customer service quality evaluation of the ** branch of Agricultural Bank of China can be scientifically reflect.

3. The assessment and analysis of different attributes of service quality

Through calculation of the arithmetic mean of 33service quality evaluation indicators in the ** branch of Agricultural Bank of China, all average score is negative, which illustrates in the 33 indicators, each service quality indicators, customer perceived service quality levels did not reach customers expect of them. According to the index of dimension classification, each index score breakdown as shown in Table 5-6.

Table5- 6Breakdown of each index score

factor	attribute	Indicators Serial number	indicators	The average index difference ($P_i - E_i$)	Gap ranking
F1	Assurance	12	Record accurately	-0.42	29
		15	Staff is always willing to help	-0.93	16
		16	staff will not fail to respond customers because of busy	-1.35	4
		17	The behavior of the staff can make customer trust	-1.13	11
		18	customers feel secure in the process of transactions	-1.09	12
		19	Employees are always very polite	-0.58	24
		20	staff's professional knowledge enough to answer customer's questions	-0.88	17
		21	Give the required care for different customers	-1.29	6
F2	Empathy	22	Convenient business hours all the customers	-1.25	7
		23	Staff provides personalized service to customers	-0.77	19
		24	employees to the customer's best interests at heart	-1.51	1
		25	Employees meet the specific needs of customers	-1.22	8
		26	Perfect service feedback channels	-1.05	13
		27	reasonable service remedy	-1.18	10
		33	Have linked with relevant institutions service supporting measures	-0.84	18
F3	Product and Price	28	service fee is reasonable	-1.42	3
		29	Service product diversification	-0.75	20
		30	handling the service procedure is simple	-1.33	5
		31	perfect financial service system of electronic banking	-0.49	27
		32	standard service process	-0.70	21

		8	Fulfill the commitment to customers	-1.19	9
F4	reliability	9	help customers to solve the difficult passionately	-0.65	22
		10	provide customers with services for the first time on the job	-0.61	23
		11	Provide services within the time promised	-1.02	14
		13	The content of the accurate inform customer service	-0.98	15
		14	provide customers with timely service	-1.46	2
F5	tangibility	1	With modern equipment	0.35	32
		2	Attractive on the sensory environment facilities	0.41	30
		3	Well dressed, neat service personnel	0.37	31
		4	the material Match the service and attract the consumers	0.33	33
F6	Facilities security convenience	5	Wide service outlets	-0.54	25
		6	Service facilities (such as ATM) to meet customer demand	-0.44	28
		7	Facility layout can protect the privacy of clients	-0.50	26

Note: the smaller the average index error, customer perceived service quality and the bigger the expectation gap.
Source: Author finishing

(1) The evaluation and analysis of ensure

The assurance aspects property of the maximum degree of variance explained, each concrete index score is negative. But the records accurate rate is relatively higher, the difference between the level of customer expectations and the actual situation is small. But in "employees will not failing to respond to customer because of busy ", "employee behavior can make customers create credibility", " give the required care for different customers ","the customer feel a sense of security in the process of transactions with the bank" several aspects the evaluation is relatively low, suggesting that the staffs' attitude of the ** branch of Agricultural Bank of China is poor, the professional knowledge is not very proficient, the staffs can't fully meet the needs of answering customer questions. In addition, the "employee behavior can make customers create credibility", "the customer feel a sense of security in the process of transactions with the bank " get low score, it shows that the ** branch of

Agricultural Bank of China in establishing "Agricultural Bank of China, trustworthy bank " image aspect, need to pay more efforts.

(2) assessment and analysis of the empathic

All indicators score in empathizing is negative, which indicated that the customer in the service interaction had failed to meet expectations, customers hope to get some humanistic care. The employee of the ** branch of Agricultural Bank of China on the aspects "employee put the customer's best interests at heart", " accommodate all the customers in business hours ", "meet the specific needs of customers", "reasonable service recovery measures" have large gap. It is worth noting that the "staff takes the customer's best interests at heart" lowest score, indicating that customers want besides fixed 8-hour day, the ** branch of Agricultural Bank of China can provide more convenient business services.

(3) assessment and analysis of the price and product attributes

In the evaluation of price and product attributes, "the fee of deal with all kinds of business service is reasonable" score is lower, customers begin to pay close attention to the bank service fees and their interests in the bank, and is no longer just taking the bank as a simple savings office. "the service procedure is simple" score is significantly lower than other index, suggesting that customers go through the formalities of service is more complex, this may be related to the Agricultural Bank of China has introduced a series of names, functional diversity of different financial products, but as a result of technology, system and business process, the influence of such factors as some products on the market, there is a bid, the formalities of business services too numerous problems, such as these in a certain extent, reduce the customer's satisfaction, make the service discount.

(4) the evaluation and analysis of reliability

In the evaluation of reliability, "fulfill its promises to customers" and "provide timely service to customers " scores are low. Commitment and customer's expectation and perception gap between banks, shows that in recent years, Agricultural Bank of China determines the "customer-centric" business philosophy, putting forward some service standards and requirements, and after more than 20 years of reform and development, people's expectations of the service quality are much higher than the bank can provide service level, the bank's commitment to more heavy weights of the expectations. In addition, "service customers timely" the gap between actual and desired level is the second low score in the 33 indicators, indicating that banks ignore the customer benefit, low efficiency, delaying customers is very outstanding. Main contradictions concentrated in line at the cash counter, which reflects the inadequacy ability of service in the ** branch of Agricultural Bank of China.

(5) evaluation of tangibility

The scores of tangibility is highest. This shows that the customer of the ** branch of Agricultural Bank of China perceived tangible aspects is superior to other aspects, which is in good agreement with reality.

(6) evaluation and analysis of safety and convenience of the facilities

In facilities security and convenience attribute, "service network", "service facilities (such as ATM machine, trading desks, etc.) to meet customer demand" and "facility layout can protect the privacy of the client" relative score is higher, which shows that the Agricultural Bank of China outlets are more extensive, customers can enjoy convenient service. Though the** branch of Agricultural Bank of China are equipped with advanced ATM, but often appearing some faults, cannot use, these are causing the delay customers' time and affecting the customer get service conveniently

Facility layout also did not meet the demand of customer privacy protection, service outlets, the waiting area, business area, telephone banking service often put together, there is no obvious way of isolation.

4. Evaluation of the overall customer perception of service quality and satisfaction

(1) Evaluation of the overall customer perception of service quality and satisfaction

First, we use factor analysis to calculate the overall quality of customer service. Let S for the overall service quality score. After each rotation of the weights from the variance contribution rate, the composition according to the expression common factor of six new variables and factor analysis of the number of their rights, as shown in equation 5-5.

$$
\begin{aligned}
S = {} & 0.171 \times fac1\_1 + 0.155 \times fac2\_1 + 0.140 \times fac3\_1 \\
& + 0.129 \times fac4\_1 + 0.107 \times fac5\_1 + 0.092 \times fac6\_1
\end{aligned}
\tag{5-5}
$$

The average level of the overall quality service evaluation of the** branch of Agricultural Bank of China is AVS, as shown in equation 5-6.

$$
AVS = \sum_{i=1}^{352} S/352
\tag{5-6}
$$

AVS is calculated -0.00043, it is negative, which indicating that the quality of customer service in the** branch of Agricultural Bank of China did not achieve their desired level, but this value is small, indicating not significant, namely the overall service quality of the ** branch of Agricultural Bank of China located in the medium level.

Secondly, the calculation of the average customer survey data on the overall service quality of the ** branch of the Agricultural Bank of China. The Calculation results show that

the average value of the evaluation questionnaire of overall customer service quality perception in the ** branch of the Agricultural Bank of China is 5.28 (7 magnitude scale), the service quality of the ** branch of the Agricultural Bank of China in the general is general level, which is consistent with the use of the above factor analysis to calculate the overall customer perception of service quality levels, namely

The service quality of the ** branch of the Agricultural Bank of China is general level.

(2) Correlation analysis on the overall perception of service quality and customer satisfaction and other variables

The statistical results between the overall perception of the sample and customer satisfaction, other related variables are shown in Table 5-7.

Table5- 7the correlation coefficient table of sample overall perceived service quality and customer satisfaction, and other related variables

Statistical indicators	The overall quality of service	Customer satisfaction	Recommendation intention	Accept other bank's service quality
The overall quality of service($Pearson'\rho$)	1.000	0.857	0.712	-0.208

Source: Author finishing

As can be seen from Table 5-7 data, the correlation coefficient between the overall perception of service quality and customer satisfaction is 0.857, which indicating that the correlation between overall perception of service quality and customer satisfaction is a strong positive; the correlation between overall perceived service quality and customer willingness to recommend also showed a positive correlation, the correlation coefficient was 0.712, but the degree of correlation is less than the related strength between the overall perception of service quality and customer satisfaction; the correlation between the overall total sample perceived quality service and willingness to accept the services of other banks was not significant. Overall perception of service quality and customers accepting other banks' service have a negative correlation, indicating the overall perceived of service quality to the ** branch of the Agricultural Bank of China is lower, and the willing to accept other bank service is stronger.

5.3.3 Classification optimization based on the quality of customer service metric structure

this thesis further analyzes overall service quality evaluation of different customer groups to the **branch of Agricultural Bank of China, statistical results of the overall perception of service quality, customer satisfaction and other related variables are shown in Table 5-7:

Table5- 8correlation coefficient table of overall service quality perception of different customer, customer satisfaction, and other related variables

Statistical indicators	The overall quality of service	Customer satisfaction	Recommendation intention	Accept other bank's service quality
Class A customer：				
The overall quality of service($Pearson'\rho$)	1.000	0.841	0.694	-0.239
Class B customers:：				
The overall quality of service($Pearson'\rho$)	1.000	0.845	0.705	-0.220
Class C: customer：				
The overall quality of service($Pearson'\rho$)	1.000	0.867	0.722	-0.201
Class D customer：				
The overall quality of service($Pearson'\rho$)	1.000	0.870	0.706	-0.182

Source: Author finishing

The empirical results from Table 5-8:

(1) There is a significantly positive correlation among overall service, customer

satisfaction and recommended satisfaction to four type customer groups, only when bank provides a higher quality of services, customers will be satisfied with services and want to recommend. There is a significantly negative correlation between the overall perceived service quality of customer and customer whether to accept other bank's service, namely only bank guarantee continuous high quality of service, to maintain the good relationship with customer, to avoid the loss of customers.

(2) Through analyzing the correlation coefficient of four different customer groups among overall perception service quality, customer satisfaction, recommendation intention and whether to accept other banking services of comparative analysis. We found that the difference of correlation coefficient between different customers perceived service quality and other variables is not obvious in the **branch of Agricultural Bank of China, which indicates that the marketing strategy and services to different customer groups is not enough deep, there is still much room for improvement in customer-oriented product design and service.

Companies often formulate different marketing strategy for various market segments. Understanding the different requirements of different types of customers to the service quality, which is the basis of correct marketing strategy and the implementation of the marketing plan. Also, the bank also need to do that, because the same type customer often has some common consumption characteristics and preferences, these characteristics and preferences are being reflected in the evaluation of customer service quality is consistent with banking services. Assume that bank service quality is relatively stable, we can determine the different customer requirements of service quality through analyzing some indicators that are closely related to customer perception of service quality.

Through the above analysis, we can grasp the most influential terms when different type of customer evaluates the quality of commercial bank service, but which does not mean other indicators of service terms is unimportant. We grasp the service quality requirements of different categories of customer, thereby guiding the Bank in the development of marketing strategies for different customers, the bank can do better.

Domestic banks recently completed transformation from planned economy to market economy, but still largely in the level of passive service. with the rise of online banking, the intense outlets of Chinese bank are not advantages. The scale effect is no longer outstanding, the bank's asset quality has become the lifeline. This makes the business strategy of commercial banks gradually incline towards the direction of high-quality customers. Customer status determines the balance sheets of banks, Good development future customers is the source of high quality bank assets, bank' customers are the most important resource, the

bank's ability to meet customer needs is whether banks can maintain close contact with customers, that is the development key.

Supply and demand pattern of Chinese financial market has undergone a fundamental change, the buyer's market begin to establish, the domestic banking market has been preliminarily divided completely by state-owned commercial banks and small and medium-sized banks, in this case, more and more banks began to spend more time and take effort to understand the customer. On the one hand the banks introduce appropriate products to meet customers' demand, on the other continuing to nurture and mining the potential demand of customers, developing new products to guide customers' demand.

5.4 Summary

Based on the customer structure segmentation in the third chapter, this chapter understands different service quality requirements of different types customer in the **branch of Agricultural Bank of China. this can help develop the right marketing strategy and product design, improving competitiveness. Based on this, firstly this chapter summarizes the special between the quality of service and service quality of commercial banks; combining service quality evaluation theory and the background of Chinese commercial banks, establishing the SERVQUAL model for the**branch of Agricultural Bank of China; get customer perceived of service quality of the**branch of Agricultural Bank of China through questionnaires, finally through empirical analysis, mastering the different evaluation results of service quality and product demand from different customers in the**branch of Agricultural Bank of China.

Studies have shown that the correlation coefficient between overall perception of service quality and customer satisfaction is positive, indicating that the overall perception of service quality and customer satisfaction is a strong positive correlation; the overall perception of service quality and customer willingness to recommend is also positively correlated, but the degree of correlation is less than the correlation between the overall perception of service quality and customer satisfaction; the overall perceived quality of service for all sample and willingness to accept the services of other banks correlation was not significant. The correlation between overall perception of service quality and accepting other bank service intention no significant correlation was not significant. The correlation between Overall perception of service quality and accepting other bank services' willingness was negative. At the same time, there is still a gap between the customer perceived service quality and customer expectation in the**branch of Agricultural Bank of China.

Therefore, the bank should change from pursuing scale effect to digging the customer benefit, which is more conform to the law of commercial bank development.

Modern bank development strategy that takes the customer as the center, which is different from the past main line that mainly pays attention to the outlet and interpersonal relationship, the bank did not choose the customers, but the use of information technology tools to segment customers value, and quantify the different levels of customer requirements for service quality, positioning market for different customer groups, providing financial products and services which can meet the need of customers. Focusing on the stabilizing and developing high profitable customers, in order to obtain the depth benefits. The ** branch of Agricultural Bank of China excavates the benefits of customer' source deeply, providing gradation service that is mainly comprised of high quality service, realizing the goal that bank and customer acquire the value at the same time.

Chapter 6: The service structure optimization strategy of agricultural bank of customer oriented

6.1 service structure optimization of agricultural bank's ** branch of Customer oriented

6.1.1 Establish customer-focused business philosophy

1. Understanding the importance of the customer in the sight of strategic

Bank is a service industry in which every penny harvest is from servicing customers. No customers, banks' profit is, like water without source. Winning the customers' satisfaction and trust is to win the market. it is occupied the most advantageous terrain of business, so the importance of the customer matters. Business model, operation process, system arrangement, product innovation of the bank is to be designed around the customer. Customer relationship management (CRM) of ** branch of Agricultural Bank of China an bel push powerfully, only when they grasp and understanding customer in the eyes of strategy. This strategy should be rooted in the enterprise culture. Everyone in the ** branch of Agricultural Bank of China should fully realize the importance of the customer, stratify customers by value, feed customers' needs timely, meet customer demand and fully tap the potential customers.

2. Popularize the philosophy of customer relationship management roundly

To fully implement the customer relationship management in the bank, we have to make every employee in every department understand of the concept of customer relationship management and use it in the business process. In the usual work, the staff members should vigorously promote and popularize the concept of customer relationship management, to make every one of the bank recognizes the importance of successful implementation of customer relationship management (CRM). Only when we have a unity of purpose, each department can perform their duties, cooperate and support other department work in the Angle of the whole business, especially the front desk business department. The concept of customer relationship management (CRM) should carry out to every department and every employee.

3. Take customers' satisfaction as the ultimate test standard.

Whether taking the customer as the center, the inspection standard is customer satisfaction. Bank of America who are the strategic investors in the **Branch of agricultural bank of China regularly measure the "customer satisfaction", in a variety of indicators to evaluate the customer satisfaction of Banks, listen to the voice of the customer, with six sigma

method to optimize customer service process.

Customer satisfaction also determines the loyalty of the customer, only when the customer pleased with the bank service, the customer will bring more value and customers to the ABC.

4. Promote the change of marketing idea

The customer marketing idea has promoted the software development and utilization of the CRM system.   The use of CRM system in bank customer's management can not only provides a highly efficient operation platform, and for ** branch of Agricultural Bank of China, it promoted the idea of further update and management. The concept of CRM system is that: "not all of customer is god. Statistics show that a significant percentage of the customer is a bank loss. CBA implement the CRM system, so it could obtain useful data analysis, target customer, narrow the net looking for customers, increasing the work efficiency. We should classify customers according to the customer's contribution, so that can bring more customers who take revenue to banks, and provide them personalized service, meet the needs of this customers, and establish long-term and stable customer relationship. Reduce the high cost customer when it is necessary. The traditional service has been unable to adapt to the demand of the society, and the bank must pay attention to the cost and benefit under the circumstances of profit not good, so ** branch of Agricultural Bank of China must change the traditional ideas in order to adapt to the demand of the CRM system.

5. Differentiation design Customer oriented product

(1) Improve the product research process of company's business

Optimize product research and development process of company, and improve the development efficiency and quality. Through creative evaluation, task, requirement analysis, design, build, test and product launch six stages, such as "standard" innovation process. we could improve the sensitivity of demand changes, understanding customer needs, proactively discover and cultivate the market demand, and design and market products By strengthening the market and customer demand information collection, analysis, market and customer demand information in time, Company product research and development planning, optimization design, make overall product arrangement in development, improve the scientific nature and effectiveness of product research and development. In product research and development, we should not only meet the market and customers need, but also conduct advanced research and development, to guide the market and customers' need actively.

(2) Study and establish the product evaluation and evaluation methods

For the bank, we should analysis product contribution, categorize management and set

up flexible and efficient product marketing strategy. For growth product, it need to be functional and upgrade; For maturity product we need to function optimization, perfect function, prolong the lifecycle of the product as far as possible; For company who has traditional business advantage and comparative advantage we need to implement brand strategy, nurturing the core brand, form the core business of the company products and improve market share; For product with recessionary market dynamics it will be out in time, to minimize the losses. For the product of innovation and development, we need to improve the appraisal incentive mechanism, strengthen the innovation work of steam.

6.1.2 Improve the utilization of information technology

1. Establish modern information platform and data warehouse

(1) Integrate the various channels of information, through the information platform, to realize information sharing. All of all banking business information is stored in each system based on digital carrier. The ** branch of Agricultural Bank of China should integrate existed customer information of each channel timely, then integrate them into a unified database of customers according to certain rules, and let this concept throughout the daily operation and management of the entire process. We need to let all the departments and employees share the information they have mastered; at the same time, they can share information in the bank.

Figure6- 1Logical structures of independent data mart
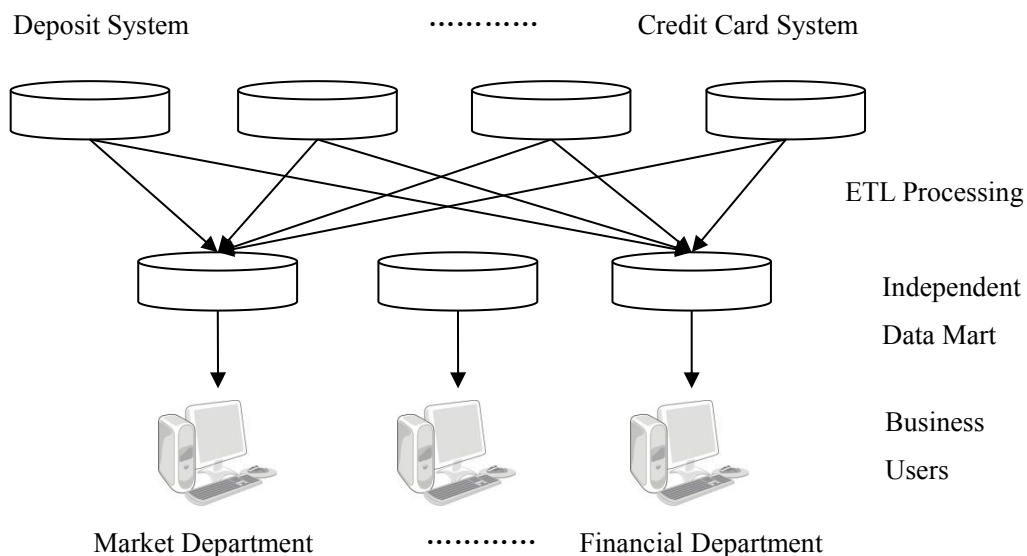
Source: Author finishing

(2) Establish complete data warehouse. Data warehouse technology's biggest advantage is the integration and the ability of data mining facing topic. For example, successful implementation of the data warehouse is the CRM system in the Bank of America. At present, the data storage system of the Agricultural Bank of China ** branch is the original

department MIS system and business-oriented independent data mart. They are often designed for the specific department business requirements, with different model, data storage, and system is divided to leave, unable to share information resources between different departments. The biggest difference between data warehouse and data mart is the difference between architecture. The collection of data in the ** branch of ABC often refers to the transactions of data centralization of focus and concentration of physical storage, still according to the different needs of the business and the data stored on the logic in the relatively independent data mart, through the ETL (Extraction, Transformation and Loading) process, cleaning and sorting the data in the business system, we loaded them into the data mart. User can directly access the information in the data mart to generate a multi-dimensional analysis reports or other information by OLAP tools (figure 6-1).

In this kind of structure, employee A must be independent for each data mart design ETL processing program for each data mart independently.   Transform every operating data of production system into each independent data mart, accordance with the need. Obviously, this strategy will become very complex and difficult to maintain, and also in investing.

** branch of Agricultural Bank of China should set up a data storage model which could share and uniform the information, providing the consistent view of information for business personnel at various levels, and establishing an enterprise data warehouse on the basis. The advantage is ETL process is firstly loaded all the data into the central data warehouse according to the unified storage model. Business users can directly access the central data warehouse. For some departments who have the specific needs of the data mart can copy the relevant data to the department to improve efficiency; and using OLAP server to provide multi-dimensional information analysis according to the CRM needs (see figure 6-2).

In order to make the CRM of ** branch of Agricultural Bank of China can play its real value, and effectively convert customer information to positive customer relationship, then convert them into commercial profits. In order to improve the efficiency and return on investment, we need to fully integrated bank branches and business departments of customers' information, billing information and transaction history data and connecting to the integrated service system and call center. Establish CRM data warehouse in the center of the ** branch of Agricultural Bank of China, providing whole bank oriented CRM analysis and decision function, and then provide data query support for online banking.

2. Use the data mining technology to integrate data system platform

To do a good job in integration of   bank data system platform must be prepared to the following several aspects work: complete the system development plan, clear all kinds of

system functions; System development must reflect the thought   the customer, take full advantage of existing and mining   customer information in data warehouse, integrate the deposit, lending, intermediary business, and other products and other information   of customer in the bank into customer relationship management (CRM); accelerate the system integration and information integration. Give important role to the system of reengineering business process.
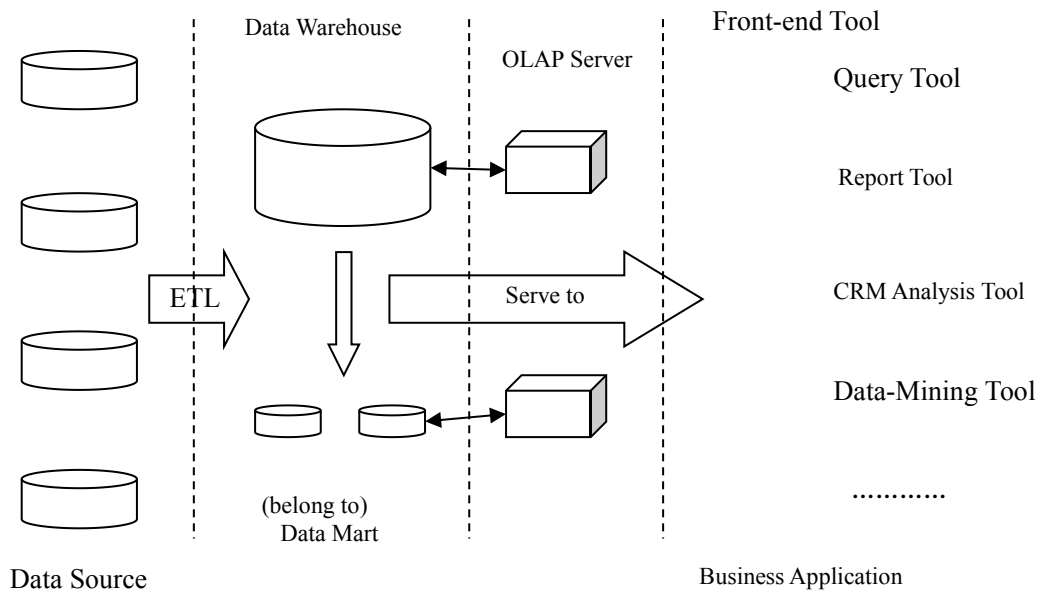
Figure6- 2 Multidimensional Information Analysis

Source: Author finishing

Customer relationship management (CRM) is a kind of advanced bank operation and management mode, perfect customer relationship management (CRM) system is the basic guarantee of the implementation of customer relationship management (CRM). The basic function of customer relationship management (CRM) is a customer found, customer analysis, customer interaction and customer value realization. The four stages of customer relationship management (CRM) is a customer information collection stage, design stage, business contacts and tracking phase. According to basic function and management process of the customer relations management, combined with the characteristics of the total domestic bank, branch organization system, the bank's customer relationship management system should be composed of four functional systems.

(1) Customer information collection system. Establish a unified customer information database, "take the customer as the center" rather than "with products as the center" to integrate information. Attach great importance to the department which is the market-oriented and could obtain customer information. We need to make full use of the information channels

to search for customer and make the collecting customer information can enter the customer information database.

(2) Customer information analysis system. Using business intelligence system, the function of data extract, could analyze customer information data and process them, including the sorting of the customer demand information, the analysis of customer transactions and customer comprehensive evaluation of contribution to a bank to fully understand customers and found customers.

(3) Develop products and services system. According to the system to provide the results of the analysis of customer information analysis, provide for we need to provide and develop for customer the banking products and services which adapt to the demand of them. Especially for high comprehensive contribution or potential value of the customer, must grasp the customer's needs and preferences, comprehensive targeted selection, combination and development of financial products and services, and then improve customer satisfaction.

(4) Marketing system of products and services. Marketing personnel and customer manager should recommend customer targeted financial products and services for their selection based on the analysis of customer information, through strengthening the communication with customers, to provide customers with satisfactory products and services and improve customer dependence and loyalty.

6.1.3 Strengthen the management of customer structured

1. Segmenting customers, implement differentiation.

Using existing data, customer's information, setting explore potential customer data model, let mining customer value in marketing strategy and put high value customer to customers set up long-term, stable, and meticulous marketing strategy. Banks should focus on the personalized, differentiated services, to improve the marketing effect.80% of the profits come from 20% of customers, through the CRM system, marketers can manage the high-value customers and market precisely and through customer to handle the business data and situation, a comprehensive understanding of the customer provides the Omni-directional service for the customer the first time, improve customer trust the Banks and increase the number of value clients.

To truly take the customer as the center in the customer relationship management, ABC Lianyungang branch should adhere to the "on-demand and change, continuous innovation", and segment customer, implement targeted personalized, humane, differentiated respectively for premium customers, general customers, potential customers, poor customer service, in

order to consolidate old customers, develop new customers, ABC should use effective customer differentiation service process, provide active service to our customers.

In general, ** branch of Agricultural Bank of China should position the customer value from the customer's real value and potential value of two yi degrees and then take differentiated measures: for customer whose real value and potential value is high, to take mother strategy, establish a long-term stable relationship with these customers. To potential customers, implement development strategy; to customers whose real value is high and the potential value is low, take the protection strategy; for customers whose reality and potential customer value is low, then take stable strategy.

(1) Unify construction bank customer profiles. The CBA should unify collects all data, let all the departments and employees pick up customer's data   the first time   when they need to use these materials, so that could improve work efficiency and enhance the competitiveness of Banks.

(2) Establish a multi-channel to excavate quality customers. Find potential customers through different channels; through the existing customer information, establish analysis model, mining potential customers. Grow up together with customers and establish long-term and stable cooperation with them.

(3) Develop high quality customer service mechanism.20% of high-quality customers can bring 80% of the profits for Banks, aimed at these intimate customers, establishing long-term, comprehensive, high quality and professional service mechanism for them. Provides the omni-directional service to customers, help customers solve problems and meet the reasonable requirements of customers, for striving for the trust of them, improving quality and customer loyalty and satisfaction.

2. Carry out the customer interaction management.

** branch of Agricultural Bank of China should fully understand customer information, grasp the customer demand, establish a good relationship with customers and cultivate customer loyalty, by providing personalized service and grow up together with customers at the same time establish a mutual customer relationship with them. The specific practices are as follows:

First, a comprehensive understanding of the real needs of customers matters. ** branch of Agricultural Bank of China could understand the history of trading behavior of customers through customer relationship management (CRM), analyze customer's behavior, present situation and future development in the past, establish a long-term stable relationship with customers, so that ABC can better face the competition. So, the bank should keep for a long

time relationship with customers, communicate with customers and solicit opinions of the customer.

Secondly, establish a variety of channels to collect customer suggestions and comments. When customers receive services of CBA at ordinary times, buy CBA's products and use the construction bank card, etc., they will have some suggestions and comments to make the bank to do more good. **branch of CBA through the service hotline, the voice of the customer and governor of Open Day, can be more comprehensive and timely understanding of the real needs of customers and the problems existing in the bank's service, product, etc., so that can improve the problems with the customer in time.

Then, encourage customers to participate in the bank's customer relationship management (CRM). When business people use customer relationship management system for customer maintenance, consulting clients more, listening more customer's feelings, truly, please customers to participate in the use of customer relationship management (CRM) system.

3. Improve the customer manager system

Customer manager is the important strength of the banking business, how to develop and implement good customer manager system is very important. Agricultural bank of CBA** branch should do a good job in the customer manager system from four aspects: Establish and perfect management mechanism; Specific customer manager's job management; Strengthen and improve the business account manager vocational training; Meet the reasonable requirements of customer manager through multiple channels.

Establish perfect customer manager mechanism, through the performance management, target control, and establish reasonable customer's responsibility to manage them, then maximum play the role of the customer manager, expanding the bank's business, and enhance the competitiveness of the bank.

At the same time, strengthen the training of customer manager team, improve the comprehensive quality of customer manager and let the customer manager team can adapt to the development of the new environment. In work, understand the demand of the customer manager, reasonable to meet the demand of the customer manager and ensure that the customer manager team can create the biggest value.

6.2   Service quality and performance evaluation under the customer's structure optimization strategy

Under basic of strategy research which is the classification of customer's structure and

structure of customer oriented service marketing, in early 2015 the ** branch of Agricultural Bank of China, began to implement differentiation marketing strategy for different customers, according to the needs of different customer group characteristics, set up different CRM system. On this basis, the ** branch of Agricultural Bank of China will make different customers satisfaction as the fundamental operation inspection standards, and constantly improve the agricultural bank's product research processes according to the research results that providing differentiated product marketing and service quality.

On this basis, according to the fifth chapter's design method of the questionnaire survey in view of the classification results of the customer structure in the third chapter, on January 1, 2016 to January 15, 2016 questionnaire distributed and recycling time interval, a questionnaire 492, recycling effective questionnaire 420, effective rate 85%, the questionnaire survey covered the preliminary questionnaire customers mostly object).

As shown in the fifth chapter, here also calculate 33 ** branch of agricultural bank of China's service quality evaluation refers to the arithmetic average of the results, as shown in Table 6-1.

Table6- 1 Scores of Each Index Item

Factor	Property	Index Identifier	Index	Average Index Difference(P_i-E_i)	Gap Ranking
F1	Surety	12	Record is accurate	-0.10	27
		15	Employees are always willing to help customers	-0.30	21
		16	Employees will not be careless to customers when they're busy	-0.39	17
		17	The behavior of employees leads to customers feel sense of trust	-0.65	10
		18	Customers feel sense of safety in transaction	-0.77	8
		19	Employees are polite	-0.25	23
		20	Employees are professional enough to answer questions of customers	-0.33	20
		21	Afford good care for different customers	-1.04	2
F2	Empathy	22	Be convenient for all customers during business hour	-0.76	9
		23	Employees offer individualized service	-0.38	18
		24	Employees keep the maximization of interest of customers in mind	-0.90	6
		25	Employees satisfy specific requirement of customers	-1.09	1
		26	Channel of service feedback is perfect	-0.46	15
		27	Reasonable recovery measures for service	-0.52	14
		33	Service supporting measures closely connect to related institution	-0.37	19
F3	Production and Price	28	The fee that charge for varieties of business is reasonable	-1.04	3
		29	Productions for service is multiplex	-0.61	11

		30	The procedure is simple and easy to handle	-0.95	5
		31	The system of financial service for E-bank is complete	-0.98	4
		32	The service process is smooth	-0.21	24
F4	Reliability	8	Fulfill commitment for customers	-0.60	12
		9	Help customer in need warmly	-0.27	22
		10	Perform well for customers for the first time	-0.15	25
		11	Afford service in committed time	-0.59	13
		13	Inform concise service context for customers	-0.42	16
		14	Afford timely service for customers	-0.83	7
F5	Tangibility	1	Modernized facilities	0.22	30
		2	Environmental facilities is attractive in sensory aspect	0.15	31
		3	Servers wear decently	0.28	29
		4	Materials are matched to service and attracted to customers	0.11	33
F6	Facilities Security Convenience	5	Service network is widespread	0.14	32
		6	Service facilities(i.e ATM and so on)meet the need of customers	-0.05	28
		7	Arrangement of facilities guarantees the privacy of customers	-0.13	26

Note: the smaller the average index error, the bigger the gap with customer perceived service quality expectation.

Source: Author finishing

According to calculation results of Table 6-1,the respective averages are negative, illustrates that in the 33 indicators, for each indicators reflecting service quality, customer perceived service quality level after the implementation of customer oriented optimization strategy, still has certain gap distance to the service quality customer satisfaction; But we will compared the results of the analysis in Table 6-1 with the results of Table 5-5, after ** branch of agricultural bank of China implement the customer oriented marketing optimization strategy, customer perceived service quality has obvious improvement. Using the calculation result of type 4-5 and 4-6,AVS is obtained for 0.00024, compared with the original 0.00043 calculation results, improved obviously, once again shows that this thesis combined with the classification results of the structure of customer's implement customer oriented strategy can significantly improve the overall service quality of customer, can bring more for ** branch of agricultural bank of China customer resources, can improve the customers' willingness to recommend, and improve the effect of the ** branch of agricultural bank of China, enhance its market competitiveness; The results also show that ** branch of agricultural bank of China customer oriented product design as well as the service has much room to improve.

6.3 Case Analysis

Based on the above research, we make different marketing product strategy for the 4 kinds of customers of ** branch of the Agricultural Bank of China. Here, this thesis mainly according to B, C, D class three types of customers.

First, the ** branch regular surveys customer satisfaction of three kinds of customer, and summarize customer dissatisfaction with the views, understand the reasons, find ways to seek a breakthrough. Second, the targeted customers (B, D) class customers establish specialized marketing team, a clear marketing objectives and the responsibility, to provide premium financial services, needs to establish high-level coordination mechanism, incline resources, equipped with a strong sense of responsibility, professional and high quality customer manager, pay for the request to the finance department in marketing support, guarantee. To focus on customer, high-value customers (i.e., C, D class customer) business is dealt with in, Taiwan before and after the relevant departments together, opened the green channel, special process window, guarantee the priority to deal with, to ensure the efficient complete the relevant work. For example, we have a mass client Chengdu real estate development and residential projects in line at the same time to apply for financing, and clients demand strongly, and said who first reply will use the bank granted, with a letter. Our bank according to the situation actively communicate with total, branch letter, the credit department, discusses its scheme, opened the green channel, eventually takes 15 days to realize from the client meeting to the end of the loan approval process, 20 days to realize the lending. In regard to price charge, pricing, cost benefits. And before the implementation of customer classification refinement, such a business would take three months.

Since 2015, we have also to key customers (especially class D customer) strengthen product innovation, in the face of the old and new market economy transformation of kinetic energy, excess production capacity, resources and environment pressure, the reform innovation transformation. Industry fund and deepen the development of Sichuan for example our strategic cooperation, by sending debt financing tools improves the Sichuan high speed deposit in our bank account for more than, to raise their market share.

We combed through to customer classification, the implementation of diversified resources configuration, customer satisfaction, the bank performance is obviously improved in 2014.

As of the end of 2015, the business department of public customers has more than 500, an increase of 35%, of which 9 pillar customers, high value customers 27, 72 potential

customers, respectively, increased by 4, 11, 36. The growth rate was 80%, 68% and 100% respectively. The average daily deposits amounted to 19 billion 700 million yuan, a net increase of 7 billion 700 million; 5 billion 800 million yuan loans, a net increase of 3 billion 500 million; realize the intermediate business income of over 9 million yuan. Profit of 3.2 billion, a net increase of 1.8 billion, profits doubled; annual business marketing costs charged to 14.3 million, an increase of 12%; the cost increase of small and medium-sized customers fell by 35%, the high value customer costs charged to an increase of 41%. Comprehensive benefits of the overall ranking of a substantial increase in the area ranked first, to enhance the 2 place, in the province ranked 4, to enhance the 12. The ** branch of ABC has access to the national "Thousand beautiful branch", "Hundred beautiful branch" and national finance pioneer award

In addition to the number of customers and the overall performance of the upgrade, the contribution of large customers to the entire line of performance is also gradually increased. Such as provincial tobacco company will be the province's 21 income households in which 18 agreed to in the Agricultural Bank of China to open throughout the year to achieve capital accumulation over 70 billion yuan, average daily deposits of 46 billion yuan, intermediate business income 200 million yuan. At the same time, the bank also for two consecutive years the sole bid Province tobacco interbank payment platform for cooperation, provincial tobacco senior to me said the high degree of recognition and praise. Companies in the deposit market share compared with 14 years increased by 25%, single family achieve profit contribution, a net increase of nearly 20 million yuan, the market share of the industry ranked by 4 promotes to the second.

6.4 Summary

Combined with the local economic development, the market and identifying the superior customer groups. Regarding the characteristic advantage industry as the center of the industry, and make it as the focus of industry segments. Give key support to the core enterprise as well as its upstream and downstream customers supply chain. Actively involved in the industry with high quality, good growth, products having the market, the medium and small customers with high credibility, expand the share of the small and medium-sized customer's market.

To reflect the difference of the business process, establishing the quick access to high-quality customer marketing; To reflect the difference of the allocation of resources, implementing the allocation of resources to tilt in the high-quality customers and service; To

reflect the difference of serving products, and satisfying the demand for the high quality customers in time as soon as possible; To reflect the difference of the price service, according to the contribution degree of implementation to implement comprehensive pricing to the quality customers; To reflect the difference of the means of service, providing tailor-made, personalized, comprehensive financial services for high-quality customers. According to the needs of customers, equipped with professional customer manager and establishing customer manager team for the main group clients. According to different levels and different sizes of customers, setting up chief client manager in the head office or the branch level, establishing regular visits to senior leadership system for our bank with the key account senior leader. Establishing the key marketing and customer service contact meeting system, strengthening the information communication between the upper and lower line and the various branches, analyzed the management and the business trends of the key clients, proposing countermeasures, studying and solving the problems arising from the key client service and marketing.

For "The marketing team", the fundamental advantage lies in its ability to integrate marketing resources effectively, pushing a member of a single job or a separate department aggregated into a centripetal force, cohesion, combat effectiveness of the marketing team, so that they can complete its mission objectives. "Marketing Team" mechanism, is essentially to early "Account Manager Group" and "negotiating team" management pattern further deepening, which is on the "up and down the linkage, horizontal interaction" further refined mechanism, the fundamental purpose is to promote marketing efforts to work better. Marketing team should be set up in marketing activities, using "team marketing" replace "personal marketing", playing the overall advantages of the Agricultural Bank of China branch **, raising the level of client service and client negotiations. According to different clients, projects and operations, the formation of different levels of "marketing team" to strengthen the linkage and interactive of various functional departments, playing the planning and finance department, accounting department, IT, Operations Management Department, Legal Department and other support departments service role, inviting relevant departments experts to join in the task-oriented team, improving the level of the team. Between corporate business and personal services, we should interact with the linkage between the front office and the back office up to the strength of the team to promote the rapid development of the business.

Chapter 7: Conclusion and Prospection

7.1 Conclusion

With the intensified openness to China's commercial Banks, and the rise of the Internet financial, China commercial bank market competition is increasingly fierce, which led it to seeking new competitive advantage strategy. On the one hand, commercial Banks actively introduce diversification of products or services to meet customer demand; On the other hand, the enterprises also realize that, as Banks service convergence of products, cannot simply rely on product competitive advantage, providing high quality service has become an important means to build commercial bank competitive advantage.

Regardless of the Internet financial or commercial Banks, the survival and development are all based on the customer, and commercial Banks depend on customers. Developing new customers and maintaining good customer resources are the foundation of the survival and development of commercial Banks, also the essential guarantee to get enough market share, the source of the achieve good economic benefits. Therefore, the focus of the modern commercial bank competition is essentially the customer competition. Whether the business activities of commercial Banks or service product innovation are all take the customer as the center, to meet customer demand as the prerequisite, aim at the customer resources. The strength and weakness of customer resource determine the business structure, profitability and competitiveness of commercial Banks. Therefore, commercial bank management goal is to use new technology, method and idea to create new service products for getting customers, product innovation also gradually from the products of commercial Banks as the center to take the customer as the center. Agricultural Bank, a state-owned commercial bank, has branches in all the county administrative regions, whose original and biggest advantage of agricultural bank service is linking to urban and rural areas, but it's actually not the case, the county branches instead become the most vulnerable part, based on the worst agricultural competitiveness. At the same time, due to the economic globalization and the implementation of e-commerce, making agriculture Banks face fiercer competition, especially because of the competition to customer resources globalization, and the drastic competition for high value customer, and make customers' disturbance intensify, make customers lose seriously, customer acquisition costs increase, increased risk of bank management. As the stability of the customer and market maintenance from bad to worse, if we want to change this situations

of county branch, we urgently need to know customer demand characteristics and establish the virtuous cycle mechanism of market-customers-benefit. This is the most urgent problems to be solved, which is how to integrate 、 classify and fully analyses existing customer information, mining potential customers, and cultivate the bank loyal customers, improve the competitiveness of the bank that existing business application system of agriculture banks failed to do. This thesis, by the Agricultural Bank of China as the background, used the market marketing, management decision theory and method, technology of data mining, statistics and econometrics methods to analyses customer structure of agricultural bank ** branch. First of all, from the perspective of qualitative and quantitative, through questionnaire survey and SERVQUAL model, this thesis discusses the customer to the results of the agricultural bank of product and service quality. On this basis, the use of data mining and cluster analysis, this thesis hierarchically studies customer demand structure and service to the agricultural bank customer groups; classifies customer demand information, obtains the agriculture bank customer demand trends and the product competition. Secondly, this thesis uses panel data model to analyses the relationship between customer demand structure and agriculture bank performance; On the basis of previous studies, this thesis also discusses optimal marketing strategy of agriculture banks ** branch, realizing the maximization of banks' earnings.

First of all, this thesis focuses on ** branch of Agricultural Bank of China customer segmentation problem. Under the background of big data, how to go from vast amounts of customer data by data mining technology to find out useful information, thus to bank customer segmentation is a key way to solve this problem. In order to improve the segmentation accuracy in agricultural bank branch ** customer, this thesis puts forward a kind of bank customer segmentation method based on improved k-means. Using the improvement of the traditional k-means algorithm and k-means algorithm to empirically study ** branch of agricultural bank customer classification data, the results show that improved algorithm effectively overcomes the traditional k-means algorithm easily falling into local optimal value, customer classification accuracy is increased and the clustering results are more reasonable. Therefore, this thesis will use the improved k-means algorithm to divide ** branch of agricultural bank customers into four categories: unattractive customers (class A), the current value is not high but has high value-added potential customers (class B), the current value is relative taller but not value-added potential clients (class C), and there are both very high current value and the huge value potential customers (class D).

By subdividing bank customers and providing different customers with differentiation of

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financial products and services, giving limited resources into the high-value customers, will help to sustain and develop the relationship better, avoid the loss of high value customers.

Banks also can screen out customers who can't bring profit, and adopt corresponding measures to change them into valuable customers, or eliminate altogether. All these measures will play a direct role in promoting the profit for banks.

Secondly, on the basis of customer segmentation of ** branch of agricultural bank, this thesis empirically researches on the perception of service quality as well as the different requirements of the quality of service for different customer groups. This thesis combines the theory of service quality evaluation with the background of China's commercial banks, establishes SERVQUAL model on ** branch of agricultural bank; Through the questionnaire survey to obtain ** branch of agricultural bank customers perceived service quality, at last, through the empirical analysis, master ** branch of agricultural bank different customers with different service quality evaluation results as well as product requirements.

Overall perception of service quality and customer satisfaction research has shown that the correlation coefficient is positive, which means overall perception of service quality and customer satisfaction are strong positive correlation; Overall perception of service quality and customer recommended intention also are positively correlated relationship, but the degree is less than the overall perception of service quality and customer satisfaction related strength; All samples of overall service quality perception and acceptation of other bank service intention correlation is not significant. Overall customers' perception of service quality and acceptation of other bank's service will have a negative correlation. At the same time, there is a gap between ** branch of agriculture banks' customers perceived service quality and expectation. Therefore, from the pursuit of economies of scale to excavate the customer benefit is more conform to the law of development of commercial banks. Strive to stable development of high benefit customers, in order to obtain depth of benefit. ** branch of China's agricultural banks deeply excavate the benefit of customer resources, provide for high quality service, make banks and their customers in terms of value interests "win-win".

Again, the change of market structure is the customer structure adjustment, which necessarily has a profound influence on performance of banks. Empirical research on customer oriented structure of the correlation between service quality and bank performance. The results show that the deposit and lending market share, market concentration and performance are significantly related to the net income and fees or commission revenue proportion and performance is significantly positive correlation in the deposit and lending market. Intermediary business market share, market concentration and performance are

significantly negative correlation, the higher the degree of competition in the market intermediary business market, the greater the impact on performance. Intermediary business market share, market concentration and performance are significantly negative correlation, the higher the degree of competition in the market intermediary business market, the greater the impact on performance. Cost income ratio and performance have a significantly positive correlation, which indicates that our country commercial banks are low in management level with high concentration. GDP growth and performance have a negative relationship, which is mainly due to the different types of commercial bank's response to different environmental changes, large commercial banks have strong risk resistance ability, on the sensitivity of the macro environment change is less than other banks. Different customers' service quality and bank performance have significantly positive correlation.

** branch of agricultural banks in-depth reform, to improve its governance structure, make them more sensitive to the change of the market, should pay close attention to the customer market structure change on the influence of the banks' net interest margin and profitability, also pay close attention to other banks, level of high quality customers of Internet financial rob, improve service quality ** branch of agricultural banks, narrowed the gap between customer perceived service quality and expected quality, increase the bank anti-risk ability, and improve performance.

Finally, on the basis of the research, this thesis puts forward to customer oriented service structure optimization strategy of agricultural banks, focused on customers, according to different customers establishing on product design strategies thus to improve ** branch of agriculture banks' product platform's ability to response to the customer demand information.

Therefore, this article's research has certain theoretical perspective, but also has strong pertinence, which meets customers' individual needs and economical allocation of resources under the mechanism of customer relationship management (CRM) has certain academic value; For other commercial bank customer relationship management in the real management also has strong referred guide.

(1) Improve the level of ** branch of agricultural banks' information, comprehensive management of customer data. Through the application of customer relationship management (CRM), will be scattered, not centralized customer information for centralized management, ongoing, data mining, which can be timely and accurate understanding of the old customers and new customer information, not only can improve the information level of the bank, also can realize comprehensive dynamic management of customer data.

(2) To further improve customer satisfaction. Optimization between customers and

banks have a wide variety of forms of communication channels, at the same time, also make in the communication to keep data consistency and continuity, through the study of the data analysis, banks may, according to the personalized needs of customers, make quick and accurate response. Making the customer satisfied when buying bank products at the same time can also keep effective communication to the bank. In addition, understanding more comprehensive customer information can be more timely for accurate handling of customer complaints and suggestions, so as to improve customer satisfaction.

(3) Improve the bank's competitive advantage. This thesis realizes ** branch of agricultural bank customer classification processing, improves customer satisfaction and loyalty, which can not only maintain existing customers, these customers through business reputation also extend the influence of the bank, and then improve their image, and constantly increase the accumulation of new customers, greatly reduce operating costs, improve profitability. At the same time, Customer relationship management (CRM) focused on long-term relationships with customers and bank has the sustainable advantage in the competition.

7.2 Research Prospect

In this thesis, with the deepening reform of the financial system in China, and under the impact of foreign banks to enter the domestic market strategy, the banking industry faces increasingly fierce competition in the big background, ** branch of the agricultural bank as the research object, using the improved k-means algorithm, SERVQUAL service quality and panel data model econometric methods, such as ** branch of agricultural bank of in-depth analysis of customer structure, combined with the questionnaire survey, marketing, management, decision theory and method of statistical techniques, discussing the optimal customer ** branch of agricultural bank marketing strategy, realizing the maximization of banks' earnings. However, due to the haste of time and my energy is limited, this thesis research there are still some shortcomings, remaining to be further research in the future.

(1) This thesis proposes the improved k-means algorithm for ** branch of agricultural bank customer after finishing 6079 about 600000 trading data, to optimize the parameters of the algorithm, speed up the silver door of customer segmentation, improve the accuracy of customer segmentation. Then with the development of the Internet financial business of commercial bank and the era of big data, the bank customer data will increase further, the improved k-means algorithm needs further inspection, the algorithm model is worth further

research.

(2) This thesis studied the classification of the customer demand structure and different customer structure assessment of the quality of service, and combined with the banks to participate in the product collaborative design. Follow-up studies can build customer participation in the agricultural bank of product design platform, the network analysis method and analytic hierarchy process (AHP) to get the actual weight of customer demand, customer demand mapping relationship.

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Annexes

Appendix 1: Stationary Test

Table1: Levin-Lin-Chu test

Variable	Statistic	Prob
CS	-12.7385	0.0001
MS	-27.7073	0.0000
MS'	-5.452047	0.0002
HHI	-5.84429	0.0000
CR	-2.92161	0.0017
DF	-7.08474	0.0000
CI	-3.79339	0.0001
GDP	-6.90104	0.0000

Table2: Augmented Dickey-Fuller (ADF) Test

Variable	Statistic	Prob
CS	25.6482	0.0000
MS	55.5612	0.0001
MS'	54.5205	0.0003
HHI	67.8030	0.0000
CR	50.3019	0.0029
DF	58.7395	0.0002
CI	36.2803	0.0266
GDP	24.3631	0.0000

Appendix2: Correlation Test

Table3: Pearson Correlation

	CS	MS	MS'	HHI	CR	DF	CI	GDP
CS	1	0.012**	0.028***	0.007	-0.02***	-0.022	-0.048***	-0.004
MS	0.012**	1	0.312***	0.499***	0.283***	0.328***	-0.419	-0.021
MS'	0.028***	0.312***	1	0.409***	0.366**	0.265***	-0.294	-0.068
HHI	0.007	0.499***	0.409***	1	0.385***	0.234***	-0.418***	-0.011
CR	-0.02***	0.283***	0.366**	0.385***	1	0.224***	-0.411***	0.032
DF	-0.022	0.328***	0.265***	0.234***	0.224***	1	-0.365***	-0.38**
CI	-0.048**	-0.419	-0.294	-0.418***	-0.411***	-0.365***	1	0.278
GDP	-0.004	-0.021	-0.068	-0.011	0.032	-0.38**	0.278	1

Note:***,**means it has passed 1% significance level

Appendix 3: Questionnaire for Service Quality

Part I: Background

Dear Madam or Sir:

Thank you for spending time participating in this survey!

The survey is designed to collect the information about the bank service quality. Such information will be used as statistical support for research on improving the bank service quality and levels.

This is anonymous survey. And the data collected and results obtained will be used for academic research only. All the information furnished will be kept confidential. Please complete the questionnaire and return it to us.

Should you have any questions or inquiries regarding the questionnaire, please contact Mr. Tian at tianshic010@163.com. Furthermore, we do hope that we could continue to communicate with your regarding the research. If you have any good advice, you may also contact us.

Thank you for your cooperation and support! Such support will be critical to our success of the thesis.

Part II: Question:

Dear Madam or Sir:

In order to better provide you with a good service environment, I sincerely invite you to participate in this investigation. For each of your recommendations, we will pay great attention to the serious study, and promote our continuous improvement of network quality of service. (Please check appropriate description in the answer line where the options are given in a 7-point scale: 7 is the highest rating and 1 the lowest).

1. Gender

   □male   □female

2. Age

   □20 or less   □20-30   □30-40   □40-50   □above 50

3. Marital Status

   □ unmarried   □married   □divorced   □widowed

4. Educational Level

   □junior high school below   □high school   □college   □bachelor degree   □

   graduate and above

5. Overall evaluation of the quality of service

   □ very dissatisfied □ not satisfied □ not satisfied □ general □ satisfied □

   satisfied □ very satisfied

6. Satisfaction of service quality

   □ very dissatisfied □ not satisfied □ not satisfied □ general □ satisfied □

   satisfied □ very satisfied

7. Would like to recommend this bank with friends and relatives

   □ very dissatisfied □ not satisfied □ not satisfied □ general □ satisfied □

   satisfied □ very satisfied

8. Want to accept other banking services

   □ very dissatisfied □ not satisfied □ not satisfied □ general □ satisfied □

   satisfied □ very satisfied

9. Modern equipment

   □ very dissatisfied □ not satisfied □ not satisfied □ general □ satisfied □

   satisfied □ very satisfied

10. Attractive environment facilities

   □ very dissatisfied □ not satisfied □ not satisfied □ general □ satisfied □

   satisfied □ very satisfied

11. Service personnel well neat and dresses

   □ very dissatisfied □ not satisfied □ not satisfied □ general □ satisfied □

satisfied □ very satisfied

12. Materials that match the service and attract the consumers

   □ very dissatisfied □ not satisfied □ not satisfied □ general □ satisfied □

satisfied ☐ very satisfied

13. Wide service outlets

☐ very dissatisfied ☐ not satisfied ☐ not satisfied ☐ general ☐ satisfied ☐

satisfied ☐ very satisfied

14. Service facilities meet to customers

☐ very dissatisfied ☐ not satisfied ☐ not satisfied ☐ general ☐ satisfied ☐

satisfied ☐ very satisfied

15. Facility layout can protect the privacy of clients

☐ very dissatisfied ☐ not satisfied ☐ not satisfied ☐ general ☐ satisfied ☐

satisfied ☐ very satisfied

16. Fulfill the commitment to customers

☐ very dissatisfied ☐ not satisfied ☐ not satisfied ☐ general ☐ satisfied ☐

satisfied ☐ very satisfied

17. Help customers to solve the difficult passionately

☐ very dissatisfied ☐ not satisfied ☐ not satisfied ☐ general ☐ satisfied ☐

satisfied ☐ very satisfied

18. Provide customers with services for the first time on the job

☐ very dissatisfied ☐ not satisfied ☐ not satisfied ☐ general ☐ satisfied ☐

satisfied ☐ very satisfied

19. Provide services within the time promised

☐ very dissatisfied ☐ not satisfied ☐ not satisfied ☐ general ☐ satisfied ☐

satisfied ☐ very satisfied

20. Record accurately

☐ very dissatisfied ☐ not satisfied ☐ not satisfied ☐ general ☐ satisfied ☐

satisfied ☐ very satisfied

21. Tell service content to customers accurately

☐ very dissatisfied ☐ not satisfied ☐ not satisfied ☐ general ☐ satisfied ☐

satisfied ☐ very satisfied

22. Provide customers with timely service

☐ very dissatisfied ☐ not satisfied ☐ not satisfied ☐ general ☐ satisfied ☐

satisfied ☐ very satisfied

23. Staff is always willing to help customers

☐ very dissatisfied ☐ not satisfied ☐ not satisfied ☐ general ☐ satisfied ☐ satisfied ☐ very satisfied

24. Staff will not fail to respond customers because of busy

☐ very dissatisfied ☐ not satisfied ☐ not satisfied ☐ general ☐ satisfied ☐ satisfied ☐ very satisfied

25. The behavior of the staff can make customer trust

☐ very dissatisfied ☐ not satisfied ☐ not satisfied ☐ general ☐ satisfied ☐ satisfied ☐ very satisfied

26. Customers feel secure in the process of transactions

☐ very dissatisfied ☐ not satisfied ☐ not satisfied ☐ general ☐ satisfied ☐ satisfied ☐ very satisfied

27. Employees are always very polite

☐ very dissatisfied ☐ not satisfied ☐ not satisfied ☐ general ☐ satisfied ☐ satisfied ☐ very satisfied

28. Staff's professional knowledge enough to answer customer's questions

☐ very dissatisfied ☐ not satisfied ☐ not satisfied ☐ general ☐ satisfied ☐ satisfied ☐ very satisfied

29. Give the required care for different customers

☐ very dissatisfied ☐ not satisfied ☐ not satisfied ☐ general ☐ satisfied ☐ satisfied ☐ very satisfied

30. Convenient business hours all the customers

☐ very dissatisfied ☐ not satisfied ☐ not satisfied ☐ general ☐ satisfied ☐ satisfied ☐ very satisfied

31. Staffs provide customers with personalized services

☐ very dissatisfied ☐ not satisfied ☐ not satisfied ☐ general ☐ satisfied ☐ satisfied ☐ very satisfied

32. Employees to the customer's best interests at heart

☐ very dissatisfied ☐ not satisfied ☐ not satisfied ☐ general ☐ satisfied ☐ satisfied ☐ very satisfied

33. Employees meet the specific needs of customers

☐ very dissatisfied ☐ not satisfied ☐ not satisfied ☐ general ☐ satisfied ☐ satisfied ☐ very satisfied

34. Perfect service feedback channels

☐ very dissatisfied ☐ not satisfied ☐ not satisfied ☐ general ☐ satisfied ☐ satisfied ☐ very satisfied

35. Have a reasonable service remedy

☐ very dissatisfied ☐ not satisfied ☐ not satisfied ☐ general ☐ satisfied ☐ satisfied ☐ very satisfied

36. The service fee is reasonable dealing with all kinds of business

☐ very dissatisfied ☐ not satisfied ☐ not satisfied ☐ general ☐ satisfied ☐ satisfied ☐ very satisfied

37. Service product diversification

☐ very dissatisfied ☐ not satisfied ☐ not satisfied ☐ general ☐ satisfied ☐ satisfied ☐ very satisfied

38. The procedure of handling business is simple

☐ very dissatisfied ☐ not satisfied ☐ not satisfied ☐ general ☐ satisfied ☐ satisfied ☐ very satisfied

39. Perfect electronic banking financial service system

☐ very dissatisfied ☐ not satisfied ☐ not satisfied ☐ general ☐ satisfied ☐ satisfied ☐ very satisfied

40. Standard service process

☐ very dissatisfied ☐ not satisfied ☐ not satisfied ☐ general ☐ satisfied ☐ satisfied ☐ very satisfied

41. Have linked with relevant institutions service supporting measures

☐ very dissatisfied ☐ not satisfied ☐ not satisfied ☐ general ☐ satisfied ☐ satisfied ☐ very satisfied