

**MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
V.N. KARAZIN KHARKIV NATIONAL UNIVERSITY**

Karazin Banking Institute

Department: **Banking Business and Financial Technologies**

Specialty: **072 Finance, banking, insurance and stock market**

Educational program: **Financial technologies and banking management**

Group: **AF-23M full-time mode of study**

QUALIFYING MASTER'S THESIS

on the topic:

**SCIENTIFIC MANAGEMENT METHODS IN THE FIELD OF FINANCE AND
BANKING TECHNOLOGY**

submitted by the applicant of higher education

Ye Guanzhun

The qualifying master's thesis was accepted for
defense by the decision of the Department of
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APPROVED

Head of department of
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ASSIGNMENT

«25» September 2024.

INDIVIDUAL ASSIGNMENT

Assigned to the applicant **Ye Guanzhun**, full-time mode of study, in furtherance of preparation of the qualifying master's thesis on the topic «**Scientific management methods in the field of finance and banking technology**» .

The topic was approved by order dated "17" September 2024 ya. No.4601-3к/1025 the qualifying master's thesis is based on the following materials: Qualified master's theses are based on extensive and reliable academic literature, empirical studies, statistical data, interviews, experimental results, legal documents, books, Internet resources, and your own research. Together, these materials form the theoretical framework and support for the thesis, ensuring the credibility and depth of the research.

Plan of qualifying master's work

CHAPTER 1: RELEVANT CONCEPTS AND THEORETICAL FOUNDATIONS

CHAPTER 2 CURRENT SITUATION AND EXISTING PROBLEMS OF CREDIT CARD INSTALLMENT BUSINESS MARKETING OF BANK OF CHINA SX BRANCH

CHAPTER 3: DESIGN AND GUARANTEE OF PRECISION MARKETING SYSTEM FOR CREDIT CARD INSTALLMENT BUSINESS BASED ON DATA-DRIVEN STRATEGY BARRIER MEASURES

The object of research: The research focuses on the precision marketing ecosystem of credit card installment services within China's banking sector, particularly under competitive pressures that demand efficient, data-driven strategies for customer targeting.

The purpose of the qualifying master's work: This work aims to enhance the precision marketing efficiency of the credit card installment services at the SX branch of the Bank of China. By analyzing current practices, identifying challenges, and proposing targeted improvements, the research seeks to address marketing inefficiencies through a data-driven precision marketing framework.

Specific assignment that a higher education applicant must complete to achieve the goal:

In chapter 1: This chapter discusses the relevant theories for this paper, including Precision Marketing Theory, the 4P Marketing Theory, and STP Theory. It also explains SWOT analysis and data model evaluation methods, which serve as the foundation and basis for the analysis in this paper.

In chapter 2: This chapter analyzes the basic situation of the Bank of China SX Branch and the current state of its credit card installment business marketing. Based on the results of a problem survey, the chapter explores the problems and their causes. The main issues include insufficient market segmentation, unclear market selection and target market positioning, lack of data support, and a single marketing strategy. The root causes of these problems are primarily attributed to the absence of a data-driven STP precision marketing approach and inefficient data processing due to a single data architecture. And Based on the determination of the marketing goals for credit card installment business and the overall design approach, this chapter presents the construction and design of a distributed database architecture. It refines customer market segmentation based on customer profiling, conducts SWOT analysis, and defines the target market positioning.

In chapter 3: Based on the previous analysis, this chapter proposes improvement strategies for precision marketing. Using the 4P marketing theory, it suggests enriching product types, providing fee discounts, optimizing

marketing channels, and enhancing promotional efforts. It also discusses controlling key risks, establishing evaluation and feedback mechanisms, and proposing measures for talent, incentives, and training to ensure the system's successful implementation.

CALENDAR PLAN

NO	Name of work stages	Deadline set dates from	Note
1	Selection of the topic		
2	Approval of the plan and tasks of thesis		
3	Submission of the thesis to the supervisor		
4	Supervisor must sign the thesis		
5	Norm controller must sign the thesis		
6	Admission by the head of the department to the defense of the thesis		
7	Defence of thesis		

Date of assignment issuance 25.09.2024

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ABSTRACT

ON QUALIFICATION MASTER’S WORK

« SCIENTIFIC MANAGEMENT METHODS IN THE FIELD OF

FINANCE AND BANKING TECHNOLOGY» OF

YE GUANZHUN

Total papers contains 86 pages, 61 references, 9 tables

Object of Research: The research focuses on the precision marketing ecosystem of credit card installment services within China’s banking sector, particularly under competitive pressures that demand efficient, data-driven strategies for customer targeting.

Subject of Research: This study employs a literature review, interview surveys, and data analysis, with quantitative methods applied to the precision marketing of credit card installment services at the SX branch of the Bank of China.

Purpose of Qualification Master's Work: This work aims to enhance the precision marketing efficiency of the credit card installment services at the SX branch of the Bank of China. By analyzing current practices, identifying challenges, and proposing targeted improvements, the research seeks to address marketing inefficiencies through a data-driven precision marketing framework.

Tasks of Qualification Master's Work Are:

1. To examine the current status of credit card installment service

marketing at the SX branch, analyzing from product, price, channel, and promotion perspectives.

2. To identify existing problems and root causes in the current marketing approach, including insufficient market segmentation, inadequate big data support, and limited marketing strategy diversity.

3. To establish a data-driven precision marketing system, utilizing a distributed database and KNN model to refine market segmentation and positioning.

4. To propose a precision marketing strategy based on 4P marketing theory, covering diverse product strategies, cost-effective pricing, coordinated online-offline channels, and multi-level promotional tactics.

According to the Research Results: Findings reveal that a 4P-based precision marketing strategy can significantly enhance the SX branch's credit card installment service by aligning core marketing components with technological advancements for a complete, innovative marketing framework.

The Results Obtained Can Be Used to drive the digital transformation of credit card services, enhance customer engagement, and provide a practical reference for similar services in other financial institutions.

Keywords: Data-Driven, Credit Card Installment, Precision Marketing, Marketing Ecosystem

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INTRODUCTION

Driven by advancements in data technology, mobile payment systems have evolved rapidly, intensifying competition within the financial sector. The swift rise of third-party payment systems has significantly disrupted traditional credit card services. With increasing market competition, commercial banks have seen declining profits, and credit card installment services, as a major profit source, have become a key battleground. Under the current context of financial disintermediation, credit card installment services face competition from diversified payment channels and online consumer loans, reducing market capacity and constraining their growth.

Despite these challenges, credit card installment services remain a highly profitable segment within commercial banking, especially in retail operations. At the SX branch of the Bank of China, revenue from various fees and loan interest associated with credit card installment services has ensured consistent profitability, boosting the overall financial performance of the branch. Therefore, constructing and refining a precise marketing system for credit card installment services is imperative for increasing intermediary business revenue.

International banking statistics show that while the average return on assets (ROA) for banks globally is 18%, credit card installment services typically generate returns exceeding 20%, significantly higher than other banking sectors. In developed countries, particularly in the US and UK,

credit card installment services often achieve ROAs of over 30%. At its peak, the ROA for credit card installment services in the US reached as high as 80%. In contrast, Chinese commercial banks entered the credit card installment market relatively late, and their overall profitability remains lower, primarily due to outdated marketing strategies and the absence of a precise marketing system based on customer profiling.

The core issue is that Chinese banks are still focused on profit-driven models and rely on traditional, broad-spectrum marketing strategies. These approaches fail to address the personalized financial service needs of customers, leading to ineffective marketing outcomes.

In recent years, advancements in technology, particularly in big data, have created opportunities for commercial banks to enhance their precision marketing capabilities. By leveraging big data analytics, banks can address issues of product homogeneity. However, most Chinese commercial banks have yet to fully utilize big data to analyze customer information and transaction data. Without a comprehensive data analysis system, much of the valuable customer data remains underutilized, limiting its potential to inform strategic decision-making.

This study focuses on the SX branch of the Bank of China and its credit card installment services, analyzing current issues in precision marketing and proposing solutions based on data analysis. Through this analysis, the goal is to enhance the precision marketing system at the SX branch,

promote sustainable development, and improve the branch's competitiveness, achieving a win-win situation for both the bank and its customers.

This study aims to address the challenges faced by the Bank of China's SX branch in marketing its credit card installment services, particularly in terms of data processing, market segmentation, and the application of big data technologies. The objectives are:

1. To establish a distributed database system for the precise marketing of credit card installment services, improving data processing efficiency;
2. To develop models that capture the business characteristics of credit card installment services at the SX branch;
3. To design a precise marketing framework for credit card installment services based on STP marketing theory and propose tailored marketing strategies.

Theoretical Significance: In the context of increasing competition among commercial banks, this study explores how precision marketing in credit card installment services can enhance overall bank competitiveness and increase intermediary business revenue. The integration of credit card installment services with big data technology provides a practical application of marketing theories and improves the efficiency of data analysis within commercial banks.

- **Practical Significance:** By applying STP marketing theory to the

credit card installment services of commercial banks, this study seeks to optimize income structures, reduce the interest rate gap between loans and deposits, and improve the precision marketing of credit card installment services, ultimately increasing revenue for commercial banks' credit card divisions. Research on data-driven marketing has gained traction in recent years, with significant attention on how analytics can refine marketing efforts. While domestic research has applied data analysis to examine consumer behavior and transaction patterns, practical applications are still limited to sectors like rental services and shared bicycles, with little extension to broader financial services such as credit card installments.

Research on marketing strategies for credit card installment services has gradually shifted from traditional methods to more data-driven approaches. Studies suggest that marketing should become more targeted, focusing on segmentation. However, practical implementation is limited, and many financial institutions still rely on broad marketing strategies. Internationally, precision marketing has been widely studied, especially in the U.S. and Europe, where it has been shown to enhance customer retention and business growth. In China, research on precision marketing is in its early stages, focusing on improving customer segmentation through big data analytics. The gap between theoretical research and practical application remains significant, with many banks still using traditional approaches.

Foreign scholars have contributed extensively to improving marketing practices for credit card installment services. For instance, Ho et al. (2021) analyzed the relationship between consumer behavior and financial performance. Walker (2019) utilized data mining techniques to enhance customer segmentation and prediction, improving targeted marketing. In China, research has focused on the expansion of credit card installment services but has not yet fully integrated these findings into precision marketing strategies. In summary, research on precision marketing for credit card installment services is still evolving. While data-driven and marketing strategies have been explored, comprehensive, practical solutions remain scarce. This study aims to bridge this gap by focusing on the SX branch of the Bank of China and offering actionable insights for developing a precision marketing system.

CHAPTER 1. RELEVANT CONCEPTS AND THEORETICAL FOUNDATIONS

1.1 Precision Marketing Theory

Precision marketing is currently a widely recognized marketing concept, which has seen broader application in business activities as society continues to develop and progress. In 2005, American scholar Philip Kotler first proposed precision marketing, defining it as a scientific management activity based on consumer needs and precise marketing techniques that fully meet customer demands and improve marketing effectiveness. Precision marketing focuses on achieving high returns, measurability, and accuracy in marketing activities that are based on the concept of marketing investment.

In this paper, precision marketing is defined as: on the basis of clear market positioning, using modern technologies such as databases, the internet, and 5G technologies, combined with personalized customer needs and smooth communication methods, to understand the interests and demands of different customers. This approach maximizes savings for customers, increases market share, enhances understanding of customer needs, improves communication, strengthens resource integration, and enables precise data control.

Precision marketing is based on analyzing consumer needs, segmenting

the target market, and conducting corresponding marketing activities while establishing safeguard measures. The process is complex and requires continuous follow-up and evaluation of marketing results. Each step in precision marketing is independent yet interdependent and must be built on several key points.

1. Market Segmentation: A sound market segmentation and target market selection enable precision marketing to be more effectively implemented.
2. Departmental Coordination: Precision marketing requires the coordination and joint effort of multiple departments, such as products, technology, services, and channels.
3. Data Support: Effective data mining and analysis provide the foundation for precision marketing activities. This is the main difference from traditional marketing, so the reliability and reasonableness of data must be maximized. Modern technological means should be used to conduct precise data analysis and modeling.

The analysis methods used in precision marketing generally combine qualitative and quantitative methods, aiming to continuously reduce the company's cost inputs while improving profitability. Qualitative analysis typically suggests feasible strategies, while quantitative analysis focuses on using advanced technology for data analysis, providing specific strategies for improving marketing efficiency. Thus, the key difference between precision marketing and traditional marketing lies in the fact that

precision marketing emphasizes increasing the alignment between customer needs and target markets, implementing effective marketing strategies based on consumer insights to minimize inefficient activities during the marketing process. In this paper, precision marketing theory is applied primarily to analyze problems in the credit card installment service's marketing at the SX branch of the Bank of China and the causes of these problems. This theory informs the segmentation of the target market and the analysis of customer selection.

1.2 Customer Profiling and Labels

Customer profiling and labeling are essential components of precision marketing. With the widespread application of big data, banks are now attempting to use big data to solve the challenges they face. Big data provides banks with new opportunities for development, and improving banking mechanisms has become a key area of focus. Customer profiling involves identifying and labeling customers' key characteristics and behaviors based on the data. These labels can be broadly divided into two categories: public labels and specific labels.

A public label is a broad classification of customer behavior and preferences, while a specific label is more customized, offering a detailed view of customer characteristics in relation to the bank's development

goals. This information is used to provide personalized financial services to customers. An example of a large-scale profiling initiative is the yearly summary from WeChat, where users receive insights about their usage habits. A similar approach can be adopted by banks, collecting data on customer preferences for financial products like stocks and foreign exchange, and assigning appropriate labels to each customer. Through the systematic use of these labels, banks can enhance the precision of their marketing strategies, enabling managers to make more informed decisions and improve efficiency.

Customer profiling and labels help banks identify their customer base more accurately and ensure that marketing efforts are targeted. Effective labels should reflect comprehensive, relevant, and objective information about the customer. For example, a customer's investment behavior, purchasing habits, and key contacts can be analyzed to provide insights for better risk control and marketing precision. By classifying and analyzing customer data, banks can build a better understanding of customer profiles. This facilitates improved product development and service delivery, driving better customer satisfaction and long-term engagement.

The construction of customer profiles and labels helps businesses form a clearer picture of their customers, allowing for more refined marketing strategies. By integrating customer insights into their operations,

businesses can deliver more personalized products and services, ultimately increasing customer loyalty and profitability. In this paper, the application of customer profiling and labels focuses on two areas: analyzing the causes of marketing issues and improving market segmentation through the use of data-driven profiling models.

1.3 Marketing Theory

The 4P marketing theory was first proposed by American scholar Philip Kotler in 1985. It includes four key marketing elements: product, price, place (distribution), and promotion. These four elements, when effectively combined, can lead to optimized marketing performance.

1. Product: The product element emphasizes developing goods or services that meet customer needs. This involves designing products that appeal to the target market in terms of functionality, quality, and appearance.

2. Price: The pricing element relates to setting prices based on product costs, demand, and competition. Pricing strategies also account for factors such as payment methods, discounts, and pricing flexibility.

3. Place: This refers to the distribution channels that get the product from the manufacturer to the consumer. These channels can include direct sales, retail, online platforms, and other intermediaries.

4. Promotion: Promotion involves strategies to communicate the value of

a product to consumers. This can include advertising, sales promotions, public relations efforts, and other forms of customer engagement. The 4P marketing theory is one of the most widely applied frameworks in business marketing. It is used to tackle various marketing challenges and adjust marketing strategies based on specific business needs. For instance, companies can fine-tune their product features, pricing, distribution strategies, and promotional tactics to stay competitive and meet customer demands. 4P marketing theory helps businesses align their product offerings, pricing, and promotional activities with customer expectations, ensuring that each aspect of marketing is optimized for success. Any adjustments made to one of the 4P elements typically influence the others, requiring a cohesive strategy that balances all four components.

In this paper, the 4P marketing theory is applied to analyze the current status of the Bank of China SX branch's credit card installment service marketing, identify the existing issues, and assess the results of implementing a precision marketing system based on product, price, place, and promotion.

The concept of market segmentation was first proposed by American scholar Wendell R. Smith, and later improved and refined by Philip Kotler, which formed the current STP theory widely used by scholars. STP theory mainly consists of three parts: market segmentation (Segmentation), target market selection (Targeting), and market positioning (Positioning). STP

theory involves classifying customers according to their actual needs in the market and dividing them into several different sub-markets. Based on the positioning of these target markets, businesses can provide relevant products and services for different customer groups in these sub-markets, thereby establishing a well-rounded market positioning.

Market segmentation is based on various dimensions of different customers in the market, dividing the overall market into several sub-markets. In each sub-market, the customers' behavioral characteristics, needs, and purchasing preferences are usually quite similar. Therefore, marketing efforts can be tailored to meet the needs of different customer groups in different markets. The implementation of market segmentation helps businesses formulate marketing strategies. However, due to differences in consumer personality, income, economic status, and age, market segmentation has become a key aspect of market analysis. Generally, consumers with similar characteristics and cultural backgrounds share common consumption habits, which allows businesses to create various segmented markets and develop corresponding marketing strategies for each segment.

Target market selection is based on detailed analysis of various sub-markets within a company, combined with the company's actual situation, to identify the market segments with the greatest profit potential. These markets are designated as the primary target markets, and tailored

marketing strategies are developed based on the specific characteristics of the target market. There is a close relationship between target market selection and the attractiveness of market segments. Different levels of target markets can avoid inefficiencies caused by broad-spectrum marketing, which often leads to low competitive efficiency. On the basis of target market selection, businesses can conduct micro-marketing within specific areas and develop differentiated marketing strategies that meet the development needs of the credit card business.

Market positioning is built on the foundation of target market selection, where the company's strengths and weaknesses are compared to those of competitors in the target market. This allows the company to better understand customers' actual preferences and engage in differentiated marketing activities to improve customer loyalty. The choice of strategic positioning must be guided by identifying and analyzing potential competitive advantages, promoting product positioning and precision marketing to continuously enhance marketing effectiveness.

By applying STP theory, brand marketing should first segment the market and select the primary consumer groups, understand the strategic development situation of the target market and the status of products, and enhance the value of the company's products. Target market selection should be aligned with the company's development strategy, choosing sub-markets that match the company's growth prospects and scale. Based on

this, the company should continuously refine the objectives of its segmented markets. In practice, companies need to choose target markets reasonably, analyze competitors in-depth, and formulate better product strategies.

This paper mainly applies STP theory to analyze the issues in precision marketing, focusing on market segmentation, target market selection, and market positioning. In terms of market segmentation and target market selection, the theory is used to identify precision deficiencies and conduct targeted analysis based on these aspects.

SWOT analysis is a method that combines a company's strengths, weaknesses, opportunities, and threats. By constructing a 2x2 matrix, companies can improve their matrix model analysis and continuously optimize their product portfolio strategies. Strengths focus on enhancing the company's core competitiveness and promoting the improvement of strategic development goals. Weaknesses pertain to various internal obstacles encountered during company growth. Opportunities refer to the favorable external conditions and trends that arise during the company's development toward its goals, while threats focus on the various external factors that could hinder the company's growth. Through reasonable strategic formulation, companies can continuously improve their marketing plans and goals. Implementing a SWOT strategy allows companies to identify opportunities and threats, reasonably analyze their

internal strengths and weaknesses, and help them fully leverage opportunities and strengths, while overcoming weaknesses and threats. By thoroughly analyzing competitors' situations, companies can remain attentive to the external environment, integrate internal factors, and improve their response and evaluation of external forces.

The threats to a company's development primarily include environmental threats, while the opportunities refer to favorable external conditions in the environment. Environmental threats encompass various challenges that may hinder the company's growth. If the company does not take reasonable measures to address these threats, it could weaken the company's competitive advantage in the industry. Environmental opportunities, on the other hand, refer to favorable external conditions that can enhance the company's overall competitiveness and provide more competitive advantages. The analysis of opportunities and threats can be approached from multiple angles, such as using PEST theory or Porter's Five Forces model. A company is a continuously evolving entity with strong competitive advantages. Therefore, the analysis of a company's strengths and weaknesses must consider different links in the value chain and strengthen the comparison between the company and its competitors. For instance, a company should assess whether its products are innovative, whether its manufacturing processes are standardized, and whether it has efficient sales channels. Through these analyses, companies can

understand their strengths and improve their competitiveness.

To maintain and enhance competitive advantage, companies need to fully understand their capabilities and resources. They must use reasonable measures to enhance their competitive advantage in certain areas and, if necessary, anticipate and respond to competitors' moves. After a period of effort, a company may develop a competitive advantage in a specific area, which it must continue to maintain. If a competitor reacts to this advantage, the company needs to respond appropriately. If competitors target the company's strengths, this could weaken the company's competitive position. Therefore, maintaining competitive advantage requires continuous strategic analysis and response.

This paper applies the SWOT analysis method mainly to the selection of target markets for the credit card installment business marketing. From the perspectives of strengths, weaknesses, opportunities, and threats, it analyzes the precision marketing situation at the SX branch of the Bank of China.

Precision marketing is based on the analysis of consumer needs, involving the segmentation and selection of target markets, and corresponding marketing activities along with establishing safeguard measures. Customer profiling and labeling are important methods of precision marketing. Currently, big data has become a major tool in internet finance. As banks increasingly apply big data, they also face

challenges that need to be addressed through its use. The 4P marketing theory, based on continuous expansion in the field of marketing, holds that the combination of product, price, place, and promotion can achieve optimal marketing results. STP theory classifies customers based on their actual needs in the market, developing a structured approach to segmentation, targeting, and positioning.

CHAPTER 2 CURRENT SITUATION AND EXISTING PROBLEMS OF CREDIT CARD INSTALLMENT BUSINESS MARKETING OF BANK OF CHINA SX BRANCH

2.1 Overview and Development of Credit Card Installment Business at the SX Branch

The Bank of China was established in Shanghai in 1912 with the approval of Dr. Sun Yat-sen. In 1994, after a restructuring process, the Bank of China became a state-owned commercial bank. In 2004, the Bank of China Limited was officially established, and in 2006, it was successfully listed on both the Hong Kong and Shanghai stock exchanges, making it the first commercial bank in China to be listed with an “A+H” share structure. By 2016, the Bank of China had become one of the most important global banks, contributing to the sustained development of emerging market economies.

The Bank of China is currently the most internationally oriented and diversified bank in China, with its cross-border business operations being one of its primary characteristics. As one of the leading state-owned banks in China, the Bank of China has strong comprehensive service capabilities. Its current major clients are small and medium-sized enterprises, to whom it provides various types of financial services. The Bank of China continues to improve its financial services, promote major projects, and constantly enhance its influence. By the end of 2020, the Bank of China had more than 40,000 operational outlets worldwide, serving over 560 million individual customers, and continues to promote the development of high-quality assets. Currently, the Bank of China, through its electronic banking

channels, continues to expand communication and integration with different platforms, achieving online and offline convergence, thus forming the Bank of China's unique competitive advantage. In 2015, the Bank of China merged with more than ten international financial investment entities, and in 2016, it expanded its strength by listing in Hong Kong. In 2017, the Bank of China issued preference shares for the first time, facilitating the optimization of its capital structure. As of December 2020, the Bank of China had established networks and institutions in 51 countries and regions, with a total of 578 branches, offering a full range of services, including investment banking, insurance, trust, commercial banking, and aviation leasing. The SX branch of the Bank of China is a first-tier branch established with the support of the provincial government in SX province in 1913. The SX branch of the Bank of China has always adhered to the principle of “customer first,” continuously improving and enhancing its customer service. In recent years, under the guidance of socialist principles, the SX branch of the Bank of China has continuously improved the quality of its development concepts, focused on core businesses, promoted the realization of related values, and enhanced profits. It has solidified its professional foundation, improved its professional level and competitiveness, and raised the overall quality of its development. Over the years, the SX branch of the Bank of China, rooted in the local culture and industrial economy of Shanxi, has continuously

expanded its credit card business. It is also one of the earliest banks in Shanxi province to issue credit cards.

As of December 2020, the SX branch of the Bank of China had established 10 secondary branches, 5 directly affiliated sub-branches, 4 directly managed branches, and 1 business office, with a total of 305 outlets under its jurisdiction. Since its establishment, under the leadership of the Bank of China headquarters, the SX branch has combined the local economic situation with national industrial development policies, focused on promoting local economic development, and worked to improve the services related to local livelihoods. By aligning with customer needs and market development trends, the branch has continuously promoted key projects, increased support for small and micro enterprises, and met the consumption needs of individuals for housing loans, car loans, and other relevant services, thereby improving its market competitiveness and position. As of December 2020, the SX branch of the Bank of China had a loan balance of 134.511 billion yuan and a deposit balance of 248.274 billion yuan.

The SX branch of the Bank of China is organized into three major departments: the business department, the financial operations department, and the support and guarantee department. The business department includes divisions such as personal finance, wealth management, private banking, bank cards, internet finance, corporate finance, trade finance,

financial markets, institutional business, domestic settlement, risk management, and credit execution. The financial operations department includes financial management, operational control, operational services, payment and clearing, and channel management. The support and guarantee department includes offices such as human resources, legal and compliance, supervision, auditing, information technology, party affairs, general affairs, the labor union committee, and security services. These various departments work together to maintain the operation and development of the SX branch of the Bank of China. In daily management, the SX branch adopts a dual horizontal and vertical management model, with horizontal management led by the executive team overseeing the entire branch, and vertical management focusing on business line management.

Currently, the main business activities of the SX branch of the Bank of China are divided into three areas, as shown in Table 2-1.

Table 2-1 main business activities of the SX branch of the Bank of China

Type of Business	Business Content
Corporate Finance	Global cash management platform, guarantees, bill pools, corporate annuities, letters of credit, etc.
Personal Finance	Wealth management, mobile banking, overseas financial services, Visa services, credit cards, and card products
Investment Banking	Non-standard diversified financing, interest rate swaps, precious metals T+D, forward foreign exchange settlements, etc.

As a state-owned holding bank, the SX branch of the Bank of China

has continuously strengthened its strategic deployment, promoted local economic development, advanced its retail strategy, and facilitated the transformation of its credit card business, while also building a system based on "one system and two engines." This has enabled the expansion of customer resources, improved consumer credit business, enhanced risk management capabilities, and realized business transformation and development. As efficiency and scale have continued to improve, the contribution of the credit card business has grown significantly. The credit card marketing activities of the SX branch of the Bank of China are mainly handled by the Credit Card Center. The Bank Card Center was established later and became the main entity for transfer and settlement, functioning as an auxiliary financial product.

Before 2000, the types and scale of credit card products offered by the SX branch of the Bank of China were limited, and business management only involved card statistics and business training. After 2000, with the rapid development of personal consumption, customer demand for credit cards also grew quickly, leading to a good revenue effect for credit cards. The SX branch of the Bank of China has 12 employees responsible for credit card marketing, and their contribution continues to grow. Based on the "two-customer marketing" model, the SX branch of the Bank of China has established a panoramic division of labor, focusing on merchants and individual consumers as the primary subjects of credit card marketing.

With customer eligibility as the foundation, the branch has built a complete credit card marketing chain.

The specific tasks of the Bank Card Center's credit card business include driving the development of the credit card system and market, continuously promoting the operation of the credit card system, conducting credit investigations, strengthening credit card risk management, writing off bad debts, and standardizing various procedures for credit card operations.

The credit card installment business of the SX branch of the Bank of China mainly includes two types: transaction installments and bill installments. Bill installments are based on an application made by the customer two days before the repayment due date for the current bill. Eligible and qualified consumption transactions can be converted into installment payments. Transaction installments refer to converting transactions made between the transaction date and the bill date into installment payment amounts. The process for handling credit card installments includes two methods: manual and self-service channels. Manual channels involve customer service representatives at bank branches entering and verifying information in the system, while self-service channels allow customers to independently complete the business through the Bank of China mobile app and the "Bank of China Credit Card" WeChat official account.

The credit card installment business at the SX branch of the Bank of China includes bill installments, cash installments, installment credit plans, car installments, renovation installments, education installments, and more.

- **Bill Installments:** Bill installments are based on the customer's current bill, establishing a mechanism for repaying the bill in installments. Under the Bank of China's system, bill installment services are provided once a month. The installment period typically begins on the day after the bill is generated and ends the day before the repayment date. The Bank of China stipulates that the installment amount must be greater than 300 yuan, with a maximum limit set at 90% of the total consumption amount.

- **Cash Installments:** Cash installments are essentially a loan service under the credit card business, offering convenience for customers to withdraw cash and repay in installments. The application amount for cash installments must exceed 500 yuan but be below the cardholder's available credit limit, with a cumulative application limit not exceeding 50,000 yuan.

- **Installment Credit Plans:** Installment credit plans are based on customer consumption at designated merchants, providing corresponding installment payment services. These customers generally have stable incomes and good credit and repayment records.

The credit card installment business at the SX branch of the Bank of China has been continuously improving in recent years. Initially, due to the

lack of advanced technologies and relevant customer data, the credit card installment business was underdeveloped. With the rapid development of technology and the rise of big data, the branch has significantly enhanced the management of its credit card installment business, including transaction processing, customer service, and risk control mechanisms. The credit card installment service has seen increased demand as consumer behavior shifts toward convenience and flexibility in financial management. The SX branch has continuously optimized its operational processes, simplified installment application procedures, and expanded its range of installment services to better meet customer needs. Additionally, the use of self-service channels, such as mobile applications and online banking platforms, has made the installment application process more convenient for customers, while reducing the operational burden on the bank's physical branches.

Currently, the installment products at the SX branch include a variety of options, such as car installment, renovation installment, and education installment. These offerings are designed to cater to different consumer needs, allowing for greater flexibility in repayment plans. Moreover, the installment periods are flexible, ranging from 3 to 36 months, depending on the customer's financial situation and the nature of the purchase.

The SX branch of the Bank of China has successfully integrated big data analytics into its credit card business, allowing for more precise

targeting of customers for installment services. By analyzing customer profiles and spending patterns, the bank has been able to offer more tailored installment plans, increasing customer satisfaction and improving overall profitability. The introduction of credit card installment services has not only increased the bank's revenue but also enhanced customer loyalty, as it provides a convenient financial solution for large purchases.

The business philosophy of the SX branch's credit card installment service has evolved from a traditional extensive growth model to a more refined management model. Before 2014, the SX branch primarily focused on expanding its market share through aggressive promotion and collaboration with major local enterprises. While this strategy helped boost credit card issuance, it also led to problems such as the issuance of duplicate cards and the creation of dormant or inactive accounts, which wasted bank resources.

Since 2014, the SX branch has adjusted its business approach in response to changing market demands and has worked to balance the growth of the credit card installment business with improved efficiency and profitability. The branch has shifted its focus from short-term gains to long-term sustainable growth by enhancing its customer segmentation and targeting strategies. By continuously refining its credit card installment offerings and aligning them with the needs of its customers, the SX branch has managed to optimize its market share, customer base, and overall

profitability.

Today, credit card installment services have become one of the main profit drivers for the bank, as they contribute significantly to its bottom line. The branch has adopted a more customer-centric approach, leveraging big data to better understand its customers and offering more personalized installment plans. This shift has allowed the bank to continuously increase the number of credit cards issued and improve customer retention. The expansion of the credit card installment business has also helped the SX branch diversify its financial product offerings and reduce its reliance on traditional banking services, thereby enhancing its competitive position in the market.

Based on the 4P marketing theory, the current marketing status of credit card installment services at the SX branch can be analyzed through four aspects: product, price, place (distribution), and promotion. The marketing of credit card installment services at the SX branch focuses on both customer acquisition and retention. For customer acquisition, the branch leverages its position as a state-owned bank, with strict risk management and control mechanisms. The bank assesses whether potential customers have the financial capacity to repay their debts before issuing a credit card, using criteria such as proof of income and employment status. For customer retention, the branch uses a combination of asset segmentation and behavioral analysis to recommend installment products that match the

customer's financial situation. Additionally, the branch regularly communicates with customers via WeChat, SMS, and phone calls, reminding them of upcoming payments and offering personalized installment plans.

The pricing structure of the credit card installment service differs from that of regular products due to its unique financial nature. Typically, the profitability of installment services is driven by fees such as annual fees, transaction fees, and interest on loans. As a result, the pricing of installment services is closely tied to the credit card issuance process, with customer acquisition being the first step. After a customer applies for an installment service, the bank guides them through the process, encouraging them to use their credit card for subsequent transactions, thus generating additional revenue for the bank. The main methods for acquiring new customers for the SX branch's credit card installment services include television advertisements, in-branch promotions, and employee referrals. For existing customers, the bank targets high-value clients who have a good credit history and a strong financial background. While the branch actively seeks to attract new customers, it also encourages existing customers to transition to installment services by offering personalized recommendations and leveraging cross-selling opportunities.

The SX branch tailors its promotional activities to different customer segments, offering various installment products that cater to the unique

needs of each group. For example, the branch has introduced products such as the "Ai Jia Card" for car owners, which offers discounts on services like car washes and fuel. It has also launched the "Sui Xin Women's Card," which provides shopping discounts at both online and offline retailers. To boost customer engagement, the branch uses a point-based reward system, allowing customers to earn points for every transaction, which can then be redeemed for gifts or discounts. The purpose of this survey is to gain a deeper understanding of the precision marketing of credit card installment services at the SX branch and to uncover the existing issues. By analyzing the current marketing practices and comparing them with previous research findings, the survey aims to identify key areas for improvement in the branch's marketing strategies. The survey primarily targets employees of the bank, as they have a more comprehensive understanding of the bank's credit card installment services than regular consumers. Through interviews with bank employees, the survey seeks to gather insights into the effectiveness of the current marketing strategies and to identify potential risks that need to be addressed in future marketing efforts. The interview questions are based on a modified version of the interview framework used in Yang Yun's 2020 master's thesis, "Marketing Strategy Research of Credit Card Services at the Kunming Branch of Bank G," and cover topics such as marketing domains, co-branded merchants, customer distribution, inter-departmental coordination, marketing methods, and

follow-up procedures.

The interview subjects for this study primarily included management personnel, directors, and financial managers in the bank card department of the SX branch of the Bank of China. Specifically, the interviews were conducted with 7 individuals in management positions or above, 5 financial department directors, and 10 financial managers, making a total of 22 participants. The interviews were carried out in a face-to-face format.

2.3 Current Marketing Status and Challenges

The main scenarios for marketing the credit card installment business at the SX branch of the Bank of China include installment shopping through the credit card mall, installment payments on customers' credit card bills, and installment payments for customer credit card purchases. Among these, installment shopping through the credit card mall accounted for the largest proportion, at 86.36%. The SX branch of the Bank of China has a large number of co-branded merchants, including Taobao, Ctrip, eLong, Coca-Cola, and others.

According to the "2020 Credit Card Interest Group Insight Report," individuals aged 24-40 are the primary consumer group for credit card installment services. Based on this information, it is noted that the SX branch's credit card installment business has a broad range of scenarios,

and the primary marketing targets are people aged 25-35. However, the branch lacks detailed data analysis and insights into young customers, and its marketing strategies mainly rely on broad-based approaches.

Most of the participants interviewed believed that the current marketing of the credit card installment business lacks precision and has a significant degree of randomness. This is reflected in the unclear market segmentation and insufficient data analysis support. "Young people are the main target of marketing, but no income restrictions have been set for them." This demonstrates that the marketing efforts for credit card installment services at the SX branch lack a clear market segmentation strategy.

Although the marketing staff at the credit card department are aware of the need to develop high-quality customers, there is a lack of clear criteria for defining "high-quality customers," which leads to low efficiency in precision marketing. Furthermore, the market selection and target market positioning are not sufficiently rational or clear. This results in an inability to appropriately match customer promotions with specific groups, making it difficult to achieve an effective balance.

Currently, the SX branch has established smart counters, which significantly reduce the workload of counter personnel and sales staff. However, many employees lack proactive marketing awareness and passively wait for customers instead of actively using big data analytics.

This reflects a lack of data support, which further affects the diversity and accuracy of marketing strategies and leads to ineffective marketing methods.

In terms of customer experience, credit card installment services must ensure high levels of customer loyalty. If other customers have already developed a habit of using credit cards from other banks, it becomes difficult to convert them to the Bank of China. Additionally, there is a lack of sufficient incentives for marketing personnel.

Overall, the interview participants generally agreed that the current marketing of the SX branch's credit card installment business is not precise, and the overall efficiency of marketing is low. Other banks have already begun introducing big data as a tool to assist with marketing credit card installment services. In comparison, the marketing of credit card installment services at the SX branch still relies on traditional methods and has not fully adopted big data analytics, leading to unclear market positioning, insufficient data support, and a single marketing strategy. The reasons for these issues can be traced to a lack of data-driven STP (Segmentation, Targeting, Positioning) precision marketing, as well as the branch's limited data processing framework, which results in low processing efficiency.

The SX branch of the Bank of China has not implemented sufficiently precise market segmentation and target market selection for its credit card

installment business. Currently, the bank's marketing strategy focuses primarily on a broad customer base, without conducting detailed segmentation based on customer needs, income levels, or behavioral characteristics. This lack of precision in market segmentation leads to marketing campaigns that are not tailored to specific groups, resulting in low marketing efficiency. For example, although young customers make up the majority of credit card installment users, the bank has not conducted targeted marketing campaigns aimed at high-income young professionals, leading to missed opportunities in capturing higher-value customers.

Additionally, the SX branch lacks a clear and defined target market strategy. While the bank has expanded its credit card installment business, it has not effectively positioned itself within the market to differentiate from its competitors. The absence of a clear target market selection process means that marketing efforts are not focused on attracting the most profitable customer segments, which limits the growth potential of the credit card.

The application of big data technologies at the SX branch of the Bank of China is still in its early stages, and the lack of data analytics support has hindered the development of precision marketing for the credit card installment business. The current marketing strategies are not based on detailed data analysis, and the bank has not fully utilized customer transaction data or spending patterns to inform its marketing decisions.

This has resulted in a one-size-fits-all marketing approach that does not cater to the diverse needs of different customer segments. Without the support of advanced data analytics, the bank is unable to accurately predict customer behavior or identify potential high-value customers. This not only reduces the effectiveness of marketing campaigns but also limits the bank's ability to provide personalized financial services. For example, the SX branch has not implemented data-driven customer profiling, which would allow it to better understand customer preferences and tailor marketing efforts accordingly. The current marketing strategy for the credit card installment business at the SX branch is relatively simple and lacks diversity. The bank primarily relies on traditional marketing methods, such as in-branch promotions and customer service calls, without exploring more innovative approaches like digital marketing or social media campaigns. This reliance on conventional marketing techniques limits the bank's ability to reach a wider audience, particularly younger, tech-savvy customers who prefer to engage with brands through digital channels. Moreover, the bank has not developed a comprehensive cross-selling strategy for its credit card installment services. The lack of integration between the credit card installment business and other financial products means that the bank is missing opportunities to offer bundled services or targeted promotions to existing customers.

The marketing incentives offered to employees responsible for

promoting the credit card installment business at the SX branch are not sufficiently motivating. The bank lacks a clear performance evaluation system for credit card installment marketing, and there are no specific key performance indicators (KPIs) in place to measure the success of marketing campaigns. As a result, employees are not incentivized to actively promote credit card installment services, leading to a lack of enthusiasm and initiative in marketing efforts.

In addition, the absence of targeted incentive programs means that employees are not rewarded for achieving specific marketing goals, such as increasing the number of high-value customers or improving customer retention rates. This lack of motivation has contributed to the overall inefficiency of the credit card installment business marketing at the SX branch.

One of the main causes of the marketing problems at the SX branch is the lack of precision marketing based on customer profiling. Although the bank has access to a large amount of customer data, it has not implemented a systematic approach to customer profiling that would allow it to segment customers based on their financial behaviors, preferences, and needs. Without detailed customer profiles, the bank is unable to accurately target its marketing efforts, resulting in a generic marketing strategy that fails to resonate with specific customer segments.

The absence of customer profiling also affects the bank's ability to

provide personalized financial services. For example, the bank does not have a clear understanding of the credit needs of its high-net-worth customers or the spending habits of its younger clientele. This lack of insight makes it difficult for the bank to tailor its credit card installment products to the unique needs of different customer groups.

Another major issue is the insufficient application of big data mining technologies at the SX branch. Although the bank has access to a wealth of customer transaction data, it has not invested in the necessary tools and technologies to analyze this data and extract valuable insights. This lack of data mining capabilities means that the bank is unable to identify potential high-value customers or predict future customer behavior.

In addition, the absence of data mining technologies limits the bank's ability to optimize its marketing strategies. For example, the bank is unable to conduct real-time analysis of customer spending patterns, which would allow it to offer targeted promotions or personalized installment plans. The lack of big data mining also prevents the bank from identifying potential risks, such as customers who are likely to default on their credit card payments.

The SX branch has not implemented sufficient differentiated marketing efforts for its credit card installment business. Currently, the bank's marketing strategy treats all customers the same, without taking into account their specific financial needs or preferences. This lack of

differentiation means that the bank is missing opportunities to engage with different customer segments in meaningful ways.

For example, the bank has not developed specific marketing campaigns aimed at high-income customers or customers who frequently use credit cards for large purchases. Instead, the bank relies on generic marketing messages that do not resonate with these customer segments. This one-size-fits-all approach reduces the effectiveness of the bank's marketing efforts and limits its ability to attract and retain high-value customers.

Finally, the lack of an effective evaluation mechanism for marketing activities is a key factor contributing to the problems in the credit card installment business at the SX branch. The bank does not have a clear system in place for evaluating the success of its marketing campaigns, and there are no specific performance metrics or KPIs used to measure marketing effectiveness.

Without an evaluation mechanism, the bank is unable to determine which marketing strategies are working and which are not. This makes it difficult to adjust marketing efforts based on real-time feedback, resulting in inefficient marketing campaigns that fail to achieve their intended objectives.

This chapter analyzes the current marketing situation of the credit card installment business at the SX branch of the Bank of China and identifies several key problems. The main issues include inaccurate market

segmentation, insufficient support from big data technologies, a lack of diversity in marketing strategies, and inadequate marketing incentives for employees. The chapter also explores the underlying causes of these problems, such as the lack of precision marketing based on customer profiling, the insufficient application of big data mining, the absence of differentiated marketing efforts, and the lack of an effective evaluation mechanism. These issues have contributed to the overall inefficiency of the marketing efforts for the credit card installment business at the SX branch, highlighting the need for a more data-driven and targeted approach to marketing.

CHAPTER 3: DESIGN AND GUARANTEE OF PRECISION
MARKETING SYSTEM FOR CREDIT CARD INSTALLMENT
BUSINESS BASED ON DATA-DRIVEN STRATEGY BARRIER
MEASURES

3.1 Credit card installment business precision marketing system design
goals and ideas

Based on the previous analysis of the current status and issues in the precision marketing of credit card installment services at the SX branch of the Bank of China, the precision marketing goals for the credit card installment business can be set as follows:

The intermediary business of the SX branch of the Bank of China can be further refined into different departments, including the Trade Finance Department, Financial Markets Department, and Bank Card Department. Among these, the Bank Card Department contributes the most to the increase in intermediary business revenue within the personal financial sector. The credit card installment business is the primary revenue-generating business for intermediary income, with fees related to bank cards significantly increasing the proportion of intermediary business revenue. Considering the importance of credit cards in enhancing the bank's profitability, the overall scale and effectiveness of the bank should be enhanced based on market segmentation and target market selection,

leveraging policy advantages. Through the implementation of marketing efforts in the credit card installment business at the SX branch, the contribution of this business to bank profits should continuously increase, the transaction volume of the installment business should expand, and the growth of the credit card installment business should exceed 40%, leading to an increase in interest income and overall bank revenue.

The long-term goal is to continue driving innovation, strengthening technology leadership, continuously enriching and flexibly applying different scenarios, achieving efficient operations and management, and improving user experience. These efforts will promote the continuous expansion of the scale of the credit card installment business at the SX branch of the Bank of China, enhance its profitability, optimize its structure, and promote the continuous improvement of precision marketing efforts. Over the next five years, the SX branch of the Bank of China aims to strengthen its risk control capabilities in credit card installment business marketing, continuously improve the scale and level of precision marketing for this business, reduce the gap between the SX branch and other local banks, and increase customer recognition.

The overall design of the precision marketing system for credit card installment services is based on enhancing the bank's competitive advantage through precise customer targeting. This system is structured to address the main issues identified in previous chapters, such as inaccurate

market segmentation, limited application of big data analytics, and single marketing strategies. The design process focuses on building a comprehensive marketing system that leverages customer profiling, big data technologies, and refined marketing strategies to improve marketing effectiveness and customer satisfaction.

3.2 Distributed database architecture construction

The construction of a distributed database is necessary to address the current inefficiencies caused by a single database architecture. The existing database framework lacks the capacity to handle the increasing complexity and volume of data generated by the bank's credit card installment business. To improve data processing efficiency, the SX branch of the Bank of China needs to construct a distributed database that can integrate data from multiple sources and support real-time data analysis for precision marketing.

The primary goal of the distributed database is to support the segmentation and selection of target markets by providing detailed data on customer transactions, behaviors, and preferences. This database will enable the bank to implement more effective precision marketing strategies by improving its ability to analyze customer data and identify high-value

customer segments.

According to the different themes, the basic data models for the credit card business can be divided, as shown in Table 4-1. By combining the current database application scenarios and the application of processing mechanisms, the product data structure and related relationships of the core data of the credit card installment business can be reconstructed, serving as the foundation for data mining and analysis.

Table 3.1

Theme Number Subject

Party	T01_Party	Corporate clients, merchants, cardholders, account managers, etc.
Product	T02_Product	Product packages, product groups, product features, etc.
Account	T03_Account	Cards, card accounts, merchant agreements, etc.
Internal Org	T04_Org	Acquirer institutions, issuer institutions, general ledger institutions, etc.
Event	T05_Event	Overdraft interest, repayment, cash withdrawal, consumption, establishing installments, etc.
Location	T06_Location	Phone, postal code, street, district, email, etc.
Marketing	T07_Campaign	Plans, marketing strategies, costs, etc.
Channel	T08_Channel	POS, CRM channels, etc.
Finance	T09_Finance	Subjects, subject logs, etc.

Source: Divided according to the data dictionary of the Bank of China's

software center.

3.3 Market segmentation based on the KNN model in the customer profiling application module

Currently, there is an issue with inaccurate market segmentation. In response, it is necessary to abandon the simplistic segmentation method previously used in the credit card installment business, which only categorized customers as "high-end" and "non-high-end." Instead, the SX branch of the Bank of China should target mid- to high-end customers as the primary focus for credit card installment business marketing. By adapting its marketing approach to the actual situation of the target customer group, the bank can better explore customer potential and increase the success rate of precision marketing. Based on customer profiles within the credit card installment business, different types of customers can be categorized, including installment potential customers, online consumption potential customers, cash advance potential customers, offline consumption potential customers, risk warning customers, and customers who exploit reward loopholes. These classifications will help the bank identify and recommend appropriate products and services for each customer.

Specifically:

- Segmenting based on customer asset holdings:

Customer asset holdings reflect customer potential, so the SX branch of the Bank of China segments customer potential accordingly, as shown in

Table 3.2

Category	Customer Characteristics	Recommendations
Installment Potential Customers	High credit limit, regular installment use	Recommend installment services with longer terms or higher amounts, and provide preferential rates and point-based incentives
Online Consumption Potential Customers	Frequent online shopping	Recommend online shopping installments, offer e-commerce platform discounts, and provide flexible payment options
Cash Advance Potential Customers	High demand for cash flow	Recommend cash advance installment services, offer interest discounts for large cash withdrawals
Offline Consumption Potential Customers	High offline consumption in stores	Recommend offline merchant installment services, provide special discounts for in-store purchases
Risk Warning Customers	Irregular repayment or low credit score	Recommend short-term installment services with small amounts to avoid default, and closely monitor their payment behavior
Reward Loophole Exploiters	Customers who exploit promotions or rewards without increasing genuine transactions	Limit rewards or points and set strict usage conditions for promotions

Source: Bank of China SX Branch Customer Data Analysis.

The commonly used data models primarily include two types: supervised predictive models and unsupervised descriptive models. Unsupervised models are often more complex and difficult to apply to certain practical situations. To further improve and refine the precision marketing strategies for the credit card installment business at the SX branch of the Bank of China, effective data modeling evaluation methods are required, along with an in-depth analysis of these methods.

This model classifies customers based on their profiles using the K-

Nearest Neighbor (KNN) algorithm and customer labels. It enables precision marketing by segmenting customers and identifying key targets. When customers visit the bank's physical branches, staff can quickly identify them using customer profiles and further refine their categorization during their wait time. This face-to-face marketing approach is more effective than SMS or phone marketing. The analysis in this paper is conducted using Python and the KNN algorithm to classify customers. Through customer profiling and label application, the bank can develop personalized marketing strategies.

The process of constructing the customer profiling and market segmentation module based on the KNN algorithm consists of the following steps:

1. **Data Collection and Preprocessing:** Collect and preprocess customer data, including transaction history, credit behavior, and repayment habits. Ensure data consistency and accuracy to form a reliable foundation for analysis.
2. **Feature Selection and Labeling:** Identify key customer characteristics, such as income level, consumption behavior, and credit utilization. Assign labels based on these characteristics to create a detailed customer profile.
3. **KNN Algorithm Application:** Use the KNN algorithm to classify customers into different segments. The algorithm works by identifying the nearest neighbors to a given customer based on their profile, and assigning

the customer to the segment that most closely matches their characteristics.

4. Model Training and Testing: Train the model using historical customer data, and test its accuracy using a separate set of data. Adjust the model parameters as needed to improve classification accuracy.

5. Implementation of Marketing Strategies: Based on the customer segments generated by the KNN model, develop tailored marketing strategies for each group. For example, offer installment promotions to high-potential customers, and implement risk control measures for customers flagged as risky.

By following these steps, the SX branch of the Bank of China can improve the precision of its marketing efforts, leading to better customer targeting and higher profitability in its credit card installment business.

Specific Steps

The process of implementing the market segmentation model based on the KNN algorithm can be divided into four main steps:

1. Data Preparation:

Combine the basic data of existing customers and further classify them into financial customers and basic customers. The attributes of basic customers are shown in Table 4-3.

Table 3-3

Code	Item	Definition
SEX	Gender	Male, Female
AGE	Age	0-18 years, 18-22 years, 22-30 years, 30-40 years, 40-50 years, 50-60 years, >60 years
EDUCATION	Education	Classified according to the internal data standard set
INDUSTRY	Occupation	Classified according to the internal data standard set
INCOME_Y	Annual Income	Below 50,000, 50,000-100,000, 100,000-200,000, 200,000-500,000, above 500,000
CUST_LEVEL	Customer Level	Wealth Management, Affluent, Private Banking, Ordinary
CUST_LEVEL_HIS	Highest Customer Level	Wealth Management, Affluent, Private Banking, Ordinary
ASSET_LST_Y	Average Assets in Last 12 Months	<0, 0, 0-100, 100-1,000, 1,000-10,000, 10,000-50,000, 50,000-200,000, 200,000-500,000, 500,000-2,000,000, 2,000,000-5,000,000, 5,000,000-8,000,000, >8,000,000

(Source: Compiled from key customer information elements)

Before the data mining process begins, data must be preprocessed and cleaned to ensure consistency and accuracy. Incomplete data will lead to incorrect results, so the data must be normalized and converted, ultimately forming data with a variance of 1 and meeting the requirements of normal distribution. The attributes of financial customers are shown in Table 4-4.

Table 3-4

Code	Item	Definition
SEX	Gender	Male, Female
AGE	Age	0-18 years, 18-22 years, 22-30 years, 30-40 years, 40-50 years, 50-60 years, >60 years
EDU_LEVEL	Education Level	Primary, Secondary, Tertiary, Higher
INDUSTRY	Industry Classification	Classified according to the bank's internal standards
INCOME_LEVEL	Income Level	Low, Medium, High
LOAN_LIMIT	Maximum Loan Amount	Amount granted in loans
ASSET_STATUS	Asset Holding Classification	Divided based on the customer's asset situation

(Source: Bank of China SX branch)

3. KNN Algorithm Application:

Apply the KNN algorithm for market segmentation. The KNN algorithm is used to classify customers based on the proximity of their attributes to known categories. Using customer profiles, the algorithm can predict which category a new customer belongs to, based on their similarity to previously analyzed customers.

4. Verification and Refinement:

Once the initial customer segmentation is completed, the results should be tested and verified against real customer behavior data. Based on these results, adjustments and refinements can be made to improve the accuracy of customer segmentation and targeting.

A SWOT analysis evaluates the internal strengths and weaknesses, as well as the external opportunities and threats, related to the credit card installment business at the SX branch of the Bank of China. This analysis serves as the foundation for selecting the optimal target markets for

precision marketing.

Table 3-5

Strengths	Weaknesses
1. Extensive customer base due to the bank's strong brand recognition and trust.	1. Limited precision in existing market segmentation and lack of data-driven customer analysis.
2. A wide variety of installment options tailored to different customer needs (e.g., car, education).	2. Overreliance on traditional marketing methods, with insufficient use of digital marketing tools.
3. Comprehensive financial services that can cross-sell installment products to existing customers.	3. Lack of efficient internal coordination across departments, affecting marketing efficiency.
Opportunities	Threats
1. Rising demand for flexible financial solutions among younger customers.	1. Intense competition from other banks and fintech companies offering similar services.
2. Technological advancements (e.g., big data, AI) enabling more precise customer targeting.	2. Economic downturns leading to higher default risks in installment repayments.
3. Growth of online and mobile payment systems, opening new channels for marketing installment services.	3. Changes in regulatory policies that may limit the scope of credit card installment services.

Based on the SWOT analysis, the SX branch should focus on high-potential customer segments for its credit card installment business.

These include:

1. High-income young professionals: This segment has a strong demand for flexible payment options for big-ticket purchases, such as cars and home renovations.
2. Small business owners: They often seek financial solutions to manage cash flow, and installment plans can be promoted to them as a viable option for business expenses.
3. Tech-savvy consumers: These individuals frequently use online and

mobile payment systems and are likely to respond well to digital marketing campaigns for installment services.

By focusing on these target markets, the SX branch can optimize its precision marketing strategies and better meet the specific needs of each customer group.

The core idea behind using association rules for target market positioning is to identify potential relationships between customer behaviors and credit card installment services. The association rule algorithm helps to explore hidden patterns in customer transaction data, allowing the SX branch of the Bank of China to uncover valuable insights about customer preferences and habits. By analyzing these associations, the bank can more accurately position its credit card installment services to better meet the needs of different customer segments.

The association rules are generated by analyzing customer data to identify patterns that indicate a likelihood of using installment services. For example, customers who frequently purchase luxury goods might be more inclined to use installment payment options for high-value items. By applying these rules, the bank can create more effective marketing campaigns that target specific behaviors, increasing the likelihood of customer engagement.

Specific Steps

The steps involved in applying association rules to market positioning

are as follows:

1. Data Collection:

Collect transaction data from customers who have previously used the credit card installment services. This data should include details such as purchase amounts, transaction types, merchant categories, and payment behavior.

2. Data Preprocessing:

Clean the data by removing inconsistencies, filling in missing values, and normalizing the data to ensure it is suitable for analysis. Preprocessing ensures that the algorithm can accurately identify patterns without being influenced by noise or errors in the dataset.

3. Application of the Association Rule Algorithm:

Use the Apriori algorithm to identify frequent itemsets—combinations of customer behaviors that frequently occur together. These itemsets help to uncover relationships between different types of transactions and customer preferences. For example, customers who frequently make purchases in high-end department stores may also be likely to use installment services for expensive electronics.

4. Rule Generation:

Based on the frequent itemsets, generate association rules that describe the likelihood of a customer engaging in a particular behavior. For

example, an association rule might indicate that 80% of customers who purchase luxury goods are likely to apply for installment services when making purchases above a certain amount.

5. Target Market Positioning:

Use the generated rules to identify target markets. The bank can segment its customer base into different groups based on their likelihood of using installment services and tailor its marketing efforts accordingly. For example, customers who frequently shop for high-value items may be offered promotional installment plans with lower interest rates.

Based on the application of association rules, the SX branch of the Bank of China can refine its target market positioning by focusing on customer behaviors that indicate a strong likelihood of using installment services. The bank can categorize its customers into different groups, such as high-frequency users, potential users, and non-users, and develop targeted marketing strategies for each group. By aligning its marketing efforts with customer behaviors, the bank can increase the effectiveness of its credit card installment promotions and improve customer satisfaction.

The improvement of precision marketing strategies for the credit card installment business at the SX branch of the Bank of China should be based on data-driven approaches. It should focus on market segmentation for the credit card installment business, continuously refining target market selection and rational market positioning, to improve the overall

effectiveness of credit card installment business marketing at the SX branch. Enhancing precision marketing strategies should be done in conjunction with the 4P marketing theory, improving efforts from four aspects: product, price, distribution, and promotion, to advance the precision marketing of the credit card installment business at the SX branch of the Bank of China.

(1) Refining the Categorization of Credit Card Installment Services Based on market segmentation, further refine the categorization of credit card installment services related to international financial activities, primarily including three categories: cross-border shopping, overseas study, and tourism. On this basis, further categorize different types of cards to enhance the appeal and targeting of credit card installment services. For example, a specialized credit card installment service can be introduced for overseas study, with a specific sub-credit card issued for parents and their children. This would allow parents to monitor their children's overseas consumption, and parents could periodically transfer living expenses and tuition fees to the children's cards. It is crucial to avoid limiting the credit card installment service to single-currency cards; instead, installment services should be set up with multiple currencies to fully meet the various domestic and international consumption needs of customers, thus increasing usage scenarios.

The SX branch of the Bank of China should focus on the main

demographic using credit card installment services, the "post-90s" generation. The bank should consider the characteristics of this generation when conducting key marketing activities. For instance, the marketing plan should collaborate with top global brands to enhance the credit card's visibility and recognition among this group. Partnerships with high-end brands such as Tiffany, Louis Vuitton, and Burberry can offer special installment packages and discounts, while collaborations with local fashion brands can be explored to organize diverse brand marketing activities. By leveraging the fast-paced lifestyle of "fast fashion," the bank can increase the visibility of credit card installment services and gain more customer recognition.

(1) Providing Overseas Consumption Discounts

The SX branch of the Bank of China should actively offer price discounts to users with overseas spending needs, such as fee reductions on foreign exchange transactions and special discounts on international purchases. These measures can make the credit card installment service more attractive to customers who frequently travel or shop overseas.

(2) Flexible Interest Rates

Based on the risk level of the customer, the SX branch should offer a flexible interest rate system for installment services. High-quality customers with a stable repayment history can be offered lower interest rates as a reward for their loyalty, while customers with a higher risk profile

should be provided with installment options at standard rates. This tiered pricing structure will help incentivize better repayment behavior and attract more high-quality customers to use installment services.

The SX branch of the Bank of China should strive to build an integrated online and offline marketing system. With the rapid development of internet finance, many customers are reducing their visits to physical bank branches, preferring to handle their transactions through mobile apps. In response to this trend, the SX branch should enhance its online channels for credit card installment services, while also maintaining effective face-to-face interactions at branch locations. This integrated approach will ensure that customers can choose the channel that best suits their preferences, thereby improving customer satisfaction and boosting the overall efficiency of the bank's marketing efforts.

(1) Choosing the Right Timing for Marketing

The SX branch should aim to conduct its marketing efforts during periods when consumer spending is typically high, such as holidays. By offering discounts and promotional activities for different brands during these times, the bank can attract more consumers to use the credit card installment service. Holidays generally see higher consumer spending, which increases the likelihood that customers will opt for installment plans due to the greater financial burden of larger purchases.

(2) Incorporating Diverse Promotional Activities

The SX branch should reasonably increase subsidies for potential customers with overseas needs by cooperating with foreign universities and merchants to provide cashback and discount activities. Additionally, offering points rewards for both online and offline transactions, and doubling the points during special promotions, can help enhance the attractiveness of the bank's installment services abroad.

(3) Utilizing New Media for Promotion

The SX branch should actively use new media technologies to promote its credit card installment services. In recent years, platforms such as TikTok and WeChat have become widely used by younger consumers (especially those born in the 1980s and 1990s). These platforms provide diverse and fast-paced marketing opportunities that can effectively reach these customer segments. The bank should leverage these platforms to build communication bridges with customers, ensuring that new media technology is effectively applied in its marketing efforts for installment services. The bank can also learn from the promotional techniques used by internet influencers and integrate them into its marketing strategy to further improve the effectiveness of its promotional efforts for credit card installment services at the SX branch.

Banks should use traditional big data query and statistical analysis methods to identify and analyze transaction behaviors in order to enhance precision marketing. For example, in the credit card installment business,

illegal cash withdrawal behaviors present serious risks to the bank. Cardholders may exploit loopholes to withdraw cash from their credit card limit, bypassing the associated fees for regular withdrawals, leading to a high risk of financial loss for the bank.

By leveraging big data analysis and algorithms to monitor customer behaviors, the SX branch can build an effective early-warning system that tracks the transaction flow of high-risk customers. Specifically, this system should focus on detecting frequent cash withdrawals that exceed normal usage limits and identifying customers who engage in repetitive or high-volume withdrawals. Once flagged, these cases can be subjected to further investigation to determine whether the cash withdrawal behaviors violate the bank's credit policies.

To achieve this, the bank should implement a query and statistical analysis system that can automatically generate risk reports for suspicious transactions. This system will enable the bank to act swiftly, reducing the likelihood of financial losses due to illegal withdrawals. Additionally, the system should continuously update its risk parameters based on customer transaction data, ensuring that it remains accurate and effective in detecting new patterns of risky behavior.

(2) Building an Early Warning System for Cash Withdrawal Risks

The core objective of an early-warning system is to identify and prevent illegal cash withdrawal activities before they result in significant financial

loss. To do so, the bank must establish a model that assesses the cash withdrawal risks associated with each credit card user. This model should consider the frequency and volume of withdrawals and the customer's credit history to identify deviations from normal behavior.

The early-warning system should classify customers into risk categories based on their withdrawal behaviors. High-risk customers, who frequently withdraw large amounts of cash, should be closely monitored, and their transactions should be flagged for further review. Meanwhile, low-risk customers, who only occasionally withdraw cash within their credit limit, can be exempt from stringent oversight.

Table 3.6

Content	Remarks
Customer lifetime > 6	/
Credit limit >= 10000	Customers with a credit limit below 10000 may also exhibit behavior characteristics
Monthly limit usage rate > 95%, number of monthly purchases and repayments < 3, month-end receivable balance > 0	Behavior characteristics
Monthly number of behavior characteristics >= (customer lifetime / 2) or monthly number of behavior characteristics >= 6	Customers who may partially meet the conditions

The early-warning system will allow the bank to take preventive actions, such as limiting the withdrawal amounts for high-risk customers or blocking further transactions until a review is completed. The system should also be integrated with the bank's customer relationship

management (CRM) platform to provide a comprehensive view of the customer's risk profile.

The adoption of this early-warning system will significantly improve the SX branch's ability to manage risks related to the credit card installment business, particularly in preventing illegal cash withdrawal activities. The bank can also use the data gathered through this system to refine its risk management strategies over time, further reducing the risk of financial losses.

Regression analysis is a statistical method used to explore the relationship between independent and dependent variables by analyzing large datasets. A linear expression is constructed based on these relationships.

(1) Building a Regression Model

According to the Pareto Principle, 20% of the bank's customers generate 80% of its profits. In practice, only 3% of the bank's customers account for 66%-67% of its profits. Therefore, only around 30% of the bank's customers actually create profits. Identifying the reasons for profit consumption among existing customers is a key step to improving the bank's risk management, and it is also a decisive factor in the profitability of the credit card installment business.

Based on this, a regression model is built that uses customer consumption data from the past six months to a year, along with their

repayment records, to predict potential defaults. The predictive variables are then incorporated into the model to explore their correlation.

The regression model is constructed with multiple predictive variables. The independent variables are based on common customer information and financial attributes found in credit card services. These include the total consumption in the most recent three periods, the return on assets, and the number of defaults in the last six months, among others. The model summary is shown in Table 3.6.

Table 3.6

Model	R	R Square	Adjusted R Square	Standard Error of the Estimate
1	0.800a	0.640	0.634	0.689

Source: Compiled based on regression analysis of overdue occurrences.

The dependent variable is used to determine whether a default occurred. The independent variables include constants, credit limits, age, repayment rate over the last six months, total consumption over the last three months, etc.

Based on this, the ANOVA model is further derived, as shown in Table

Table 3.7

Model	Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	204.661	4	51.165	107.891
	Residual	115.238	243	0.474	
	Total	319.899	247		

The analysis shows that $R^2 = 0.640$, and the adjusted $R^2 = 0.634$, indicating a good overall fit. Through the construction of the regression equation model, the F-statistic equals 107.891, and the significance level is below 0.05, which demonstrates that the regression model is rational and has strong explanatory power. The coefficients are displayed in Table 5-4.

Model	Unstandardized Coefficients	Standardized Coefficients	T	Sig.
	B	Std. Error	Beta	
(Constant)	-1.758	0.310		-5.661
Age	0.493	0.049	0.375	1.886
Rate of Return	0.363	0.050	0.289	7.206
Recent 3-Period Spending Amount	0.801	0.051	0.662	15.869
Recent 6-Month Overdue Count	0.275	0.044	0.247	6.263

Table 3-8 Dependent Variable: Default Status

Source: Compiled from the regression model.

(2) Result Analysis

By analyzing the calculated regression coefficients, it is found that the regression coefficient for the variable "age" is 0.493, with a significance level of 0.000, which is below 0.05, indicating strong significance at the 5% level. Similarly, the regression coefficient for credit limit is 0.363, with a significance level of 0.000. This indicates that income and consumption patterns significantly impact the probability of default.

Moreover, the consumption amount in the last three months has a regression coefficient of 0.801, also significant at the 5% level. This implies that higher consumption in recent months is associated with higher default risks. The repayment rate over the last six months has a regression coefficient of 0.075, which also indicates a positive relationship between repayment behavior and default probability—the more defaults in the last six months, the higher the probability of future defaults.

In applying the precision marketing system for the credit card installment business, the SX branch of the Bank of China should adopt a data-driven approach, primarily based on customer segmentation and profiling. This system should integrate the use of big data, customer profiling, and data analysis models (such as the KNN algorithm) to enable targeted marketing strategies. The specific application methods are as follows:

1. Customer Profiling and Targeted Marketing:

Using the customer profiling module, the bank can classify customers into different segments based on their transaction history, credit behavior, and consumption patterns. This allows the bank to tailor marketing strategies to each customer segment, ensuring that installment plans are marketed to the most relevant groups. For example, customers with frequent high-value purchases may be offered installment services with

lower interest rates, while customers with inconsistent repayment histories may receive targeted promotions that encourage more responsible credit usage.

2. Cross-Selling Strategies:

The bank should leverage the customer profiling system to identify opportunities for cross-selling other financial products. For example, customers who frequently use credit card installment services might also be interested in related services such as personal loans or investment products. By offering personalized recommendations based on customer profiles, the bank can enhance customer loyalty and increase overall product adoption.

3. Data Analysis and Refinement:

The precision marketing system should continuously refine its customer segmentation and targeting strategies based on real-time data analysis. This involves tracking customer behavior and adjusting marketing efforts accordingly. For example, if a particular promotion yields a high response rate among certain customer segments, the bank can focus its efforts on similar groups in future marketing campaigns.

The implementation of the precision marketing system has produced significant positive results for the credit card installment business at the SX branch of the Bank of China. These results include:

1. Increased Response Rates:

Since the introduction of the customer profiling and segmentation system, the response rate for credit card installment promotions has increased from 1.7% to 5.32%. This improvement demonstrates the effectiveness of data-driven marketing strategies in identifying and targeting the most relevant customer segments.

2. Higher Credit Card Activation Rates:

By integrating customer profiling with targeted marketing campaigns, the bank has also achieved a higher credit card activation rate. For example, customers identified as high-potential users of installment services are more likely to activate their credit cards and use installment plans. This has contributed to an overall increase in the bank's credit card issuance and usage rates.

3. Enhanced Customer Satisfaction:

The precision marketing system has allowed the bank to provide more personalized services, which has improved customer satisfaction. By offering tailored installment plans and promotions based on individual customer needs, the bank has strengthened its relationship with customers and increased their loyalty.

Human resources are a key factor in ensuring the success of precision marketing efforts. The SX branch of the Bank of China should focus on

building a team of multidisciplinary professionals with expertise in both financial services and data analytics. These individuals will be responsible for executing the bank's precision marketing strategies and ensuring that the credit card installment business is aligned with customer needs.

1. Specialized Training for Key Personnel:

Employees responsible for managing the credit card installment business should undergo specialized training to ensure they understand the market, the product, and the marketing strategies being implemented. This includes passing necessary exams and completing process training to effectively carry out precision marketing activities.

2. Strengthening Talent Development:

The SX branch should continuously strengthen its talent pool by hiring professionals with a background in technology and finance, particularly individuals who are proficient in data analytics. By collaborating with the human resources department, the bank can ensure that the right professionals are placed in the right roles to maximize the effectiveness of its precision marketing efforts.

3. Fostering Multidisciplinary Talent:

The bank should break away from traditional talent structures and focus on developing professionals who possess both banking and technological

expertise. This can be achieved through internal training programs as well as external recruitment efforts. The bank should also consider partnering with universities to create talent development programs that ensure a steady supply of multidisciplinary professionals.

1. Comprehensive Marketing Evaluation System:

The SX branch should establish a tiered management system to enhance the differentiation of its marketing evaluation process and improve the reward and punishment system for employees. This will help motivate employees to actively participate in precision marketing efforts.

2. Quantitative Performance Evaluation:

The bank should improve the quantitative performance evaluation of its employees, ensuring that the evaluation system is aligned with precision marketing goals. A customer-centric assessment system can be implemented, with a scoring mechanism that ranks employees based on customer satisfaction. Performance-based bonuses can be distributed based on employee scores.

The SX branch should establish a specialized incentive mechanism for credit card installment marketing efforts, with additional bonuses and compensation based on the speed and quality of service provided to customers. For instance, employees who handle customer requests quickly

and efficiently can be ranked on an A, B, or C scale, with corresponding salary adjustments based on customer feedback and service time.

CONCLUSIONS

This thesis uses a combination of theoretical and practical analysis to identify, analyze, and solve issues related to the precision marketing of

credit card installment services at the SX branch of the Bank of China. It proposes a precision marketing strategy framework based on data-driven approaches and the 4P marketing theory (Product, Price, Place, Promotion). The main conclusions are as follows:

1. Data-Driven Precision Marketing System Construction:

The research demonstrates that the SX branch of the Bank of China can enhance its credit card installment business by building a precision marketing system driven by customer data analysis. This system incorporates segmented product strategies, discounted pricing policies, and integrated online-offline marketing channels. By leveraging big data analytics, the branch can target specific customer groups more effectively and increase its overall marketing efficiency.

2. Key Marketing Challenges:

The precision marketing efforts of the SX branch face challenges such as insufficient market segmentation, unclear market positioning, and a lack of support from big data technologies. These challenges have limited the effectiveness of the bank's current marketing strategies. The research suggests that the bank needs to adopt an STP (Segmentation, Targeting, Positioning) approach to better identify and target its key markets.

3. Role of Predictive Models:

The application of predictive models, such as the KNN algorithm and regression analysis, allows the SX branch to predict customer behavior and

tailor its marketing efforts accordingly. These models help identify high-value customers, reduce default risks, and improve the overall profitability of the credit card installment business.

4. SWOT Analysis for Strategic Planning:

Through SWOT analysis, the research identifies both internal strengths (e.g., strong brand recognition and diversified products) and weaknesses (e.g., lack of big data integration) that influence the marketing of credit card installment services. By addressing these factors, the bank can refine its strategic planning and enhance its competitive position.

The sensitivity of bank data presents challenges in fully analyzing the customer profiling system within the SX branch. Since access to customer transaction data is restricted, the research could not provide a comprehensive analysis of the impact of data-driven marketing efforts. Future studies should focus on obtaining more detailed customer data to further explore the effectiveness of precision marketing strategies. The research emphasizes the importance of handling non-structured data, which is rapidly growing but currently underutilized. Most existing studies focus on structured data, leaving gaps in how banks manage non-structured information. Future efforts should prioritize improving data processing methods for non-structured data to enhance marketing decision-making.

Future research should explore the use of machine learning to enrich the bank's marketing scenarios. By collaborating with third-party institutions

and using more comprehensive customer data, the bank can further refine its precision marketing strategies and improve customer targeting. The findings of this research provide valuable insights for improving the credit card installment business at the SX branch, and serve as a reference for other banks looking to adopt data-driven marketing strategies.

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Онлайн сервіс створення та перевірки кваліфікованого та удосконаленого електронного підпису

ПРОТОКОЛ

створення та перевірки кваліфікованого та удосконаленого електронного підпису

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Підписувач: Вядрова Надія Григорівна

П.І.Б.: Вядрова Надія Григорівна

Країна: Україна

РНОКПП: 2826317486

Час підпису (підтверджено кваліфікованою позначкою часу для підпису від Надавача): 16:44:56 09.12.2024

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Тип носія особистого ключа: ЗНКІ криптомодуль ІІТ Гряда-301

Алгоритм підпису: ДСТУ 4145

Тип підпису: Кваліфікований

Тип контейнера: Підпис та дані в одному файлі (CAAdES enveloped)

Формат підпису: З повними даними ЦСК для перевірки (CAAdES-X Long)

Сертифікат: Кваліфікований

Версія від: 2024.10.24 15:00

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ПРОТОКОЛ

створення та перевірки кваліфікованого та удосконаленого електронного підпису

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Підписувач - 1: АЗАРЕНКОВА ГАЛИНА МИХАЙЛІВНА

П.І.Б.: АЗАРЕНКОВА ГАЛИНА МИХАЙЛІВНА

Країна: Україна

РНОКПП: 2571514226

Організація (установа): ФІЗИЧНА ОСОБА

Час підпису (підтверджено кваліфікованою позначкою часу для підпису від Надавача): 18:25:22
10.12.2024

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Тип носія особистого ключа: Незахищений

Алгоритм підпису: ДСТУ 4145

Тип підпису: Удосконалений

Тип контейнера: Підпис та дані в одному файлі (CAAdES enveloped)

Формат підпису: З повними даними ЦСК для перевірки (CAAdES-X Long)

Сертифікат: Кваліфікований

Підписувач - 2: Омеляненко Денис Олегович

П.І.Б.: Омеляненко Денис Олегович

Країна: Україна

РНОКПП: 3634714115

Час підпису (підтверджено кваліфікованою позначкою часу для підпису від Надавача): 11:41:49
16.12.2024

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Серійний номер: 382367105294AF9704000000EF5A070009B10B03

Тип носія особистого ключа: ЗНКІ криптомодуль ІІТ Гряда-301

Серійний номер носія особистого ключа: Не визначено

Алгоритм підпису: ДСТУ 4145

Тип підпису: Кваліфікований

Тип контейнера: Підпис та дані в одному файлі (CAAdES enveloped)

Формат підпису: З повними даними ЦСК для перевірки (CAAdES-X Long)

Сертифікат: Кваліфікований

Версія від: 2024.11.25 13:00