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QUALIFYING MASTER'S THESIS

on the topic:

SOCIAL COMPONENT OF BANKING BUSINESS: CURRENT STATE

submitted by the applicant of higher education

Li Yue

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**ASSIGNMENT
FOR A QUALIFYING MASTER’S THESIS**

assigned to

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- The topic of the thesis: "SOCIAL COMPONENT OF BANKING BUSINESS: CURRENT STATE"

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3. List of questions to be researched:

CURRENT SITUATION OF SOCIAL RESPONSIBILITY FULFILLMENT OF BANK OF COMMUNICATIONS SHANGHAI BRANCH IN THE CONTEXT OF FINTECH.

ANALYSIS OF PROBLEMS AND CAUSES IN THE FULFILLMENT OF BANK OF COMMUNICATIONS' SOCIAL RESPONSIBILITY IN THE CONTEXT OF FINTECH

EXPERIENCE OF DOMESTIC AND FOREIGN COMMERCIAL BANKS IN FULFILLING THEIR SOCIAL RESPONSIBILITIES UNDER THE BACKGROUND OF FINTECH

4. Plan of qualifying master's thesis

№	Name of work stages
1	Selection of the topic
2	Approval of the plan and tasks of thesis
3	Implementation of thesis
4	Submission of thesis to the department to check for the presence of borrowings from other documents
5	Completion of the admission procedure for the protection of thesis
6	Defence of thesis

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ABSTRACT
ON QUALIFICATION MASTER'S WORK
«SOCIAL COMPONENT OF BANKING BUSINESS: CURRENT STATE» OF
Li Yue

Qualification Master's Work contains 54 pages, 1 figures, 61 references.

Object of research is banking sector.

Subject of research is social component of banking business.

Purpose of qualification master's work situational analysis and comparative methods - to study on banking business. In combination with banking supervision in Ukraine and the current management of banking institutions, social component of banking business can be clarified by expanding research on basic concepts, theoretical systems, work status, case analysis, and propose measures in the banking sector. The problems that exist in building a social component of banking business, as well as ways to manage financial innovations and improvement measures, as well as suggestions that are in the interests of the people to better protect legal rights. and interests of consumers.

Tasks of qualification master's work are

- to investigate the essence of social component of banking business;
- to characterize the institutional basis for the social component of banking business;
- to analyze the financial foundation of social component of banking business;
- to research the Current Situation and Problem Analysis of social component of banking business;
- to make improvements and recommendations for social component of banking business;

According to results of the research, theoretical and practical improvement measures and suggestions are proposed for the social component of banking business in Ukraine, which could help deal with financial innovation as well as in line with the interests of the public.

The obtained results can be used to promote the improvement of Ukraine's legislation, strengthen government supervision, the banking industry's response to financial innovation and deepen internal reform and management, the improvement of consumers' financial literacy and the protection of their rights and interests, and further promote the development and stability of the country's financial environment.

KEY WORDS: BANKING SECTOR, CONSUMER PROTECTION, FOUNDATION, BANKING BUSINESS, SOCIAL COMPONENT.

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INTRODUCTION

With the rapid development of the global economy and the constant evolution of information technology, financial and banking technology has become an important engine driving the modern economic system. Financial technology, also known as FinTech, deeply transforms and innovates traditional financial businesses through the application of advanced technological means such as big data, cloud computing, and artificial intelligence, bringing unprecedented changes to the financial market. As an essential component of the financial system, banking technology is also constantly innovating and developing to cope with the increasingly complex financial environment and customer needs. The basic concepts and methodologies of scientific knowledge in financial and banking technology are the foundation for understanding and applying these technologies. Grasping these fundamental concepts helps us deeply understand the connotation and extension of FinTech and grasp its development trends and patterns. Simultaneously, being familiar with and mastering the basic methods of banking technology is also an essential means to improve banking efficiency, optimize customer experience, and strengthen risk management. In the field of FinTech, we are facing numerous challenges and opportunities presented by cutting-edge technologies such as blockchain, big data, and artificial intelligence. These technologies have not only changed the traditional model of financial services but also driven the depth and breadth of financial innovation. For instance, blockchain technology, with its decentralized and secure characteristics, provides a more efficient clearing and settlement method for financial transactions. Big data technology supports financial decision-making through the analysis and mining of massive data. Artificial intelligence technology enhances the intelligence level of financial services through applications such as intelligent risk management and intelligent investment advisors. In the field of banking technology, automation and intelligent services have become the main trends of industry development. The popularity of electronic banking and online banking has provided customers with more convenient and efficient service experiences. Meanwhile, advancements in risk management and compliance

technology have also provided robust support for the stable development of banking businesses.

However, the development of financial and banking technology also faces numerous challenges. Issues of technical security and privacy protection are becoming increasingly prominent, and ensuring the security of financial transactions and the confidentiality of customer information has become an important issue for industry development. Additionally, the adaptability of regulatory and policy environments is also a non-negligible issue in the development of financial and banking technology. With the continuous innovation and application of technology, relevant regulations and policies also need to be continuously improved and adjusted to adapt to the new technological environment and business needs. Therefore, deeply studying and mastering the basic concepts and methodologies of scientific knowledge in the field of financial and banking technology is crucial for promoting the healthy development of the financial industry and enhancing the efficiency and quality of financial services. This not only requires us to conduct theoretical exploration and research but also requires us to continuously explore and innovate in practice. In conclusion, the basic concepts and methodologies of scientific knowledge in financial and banking technology are important supports for the development of contemporary financial industries. By deeply studying and mastering these knowledge, we can better respond to the challenges and opportunities in the financial market and promote continuous innovation and development in the financial industry. At the same time, this also requires us to maintain an open mindset and innovative spirit, continuously absorb and learn from international advanced experience and technological achievements, and contribute to the prosperity and development of China's financial industry.

1. THEORETICAL BASICS OF DIAGNOSTIC FINANCIAL

1.1 Overview of the financial and banking technology fields

Financial and banking technology fields are indispensable and vital components in today's economic system. By applying advanced technological means, they have deeply transformed and innovated traditional financial and banking businesses, bringing unprecedented changes to financial markets and banking systems.

In the financial technology field, the rise of FinTech has become the main force driving industry development. FinTech utilizes a series of technological innovations such as big data, cloud computing, artificial intelligence, and blockchain, and applies them comprehensively to six major financial areas including payment and settlement, lending and financing, wealth management, retail banking, insurance, and transaction settlement. The application of these technologies has not only improved the efficiency and quality of financial services, but also reduced operating costs and broadened the coverage of financial services. For example, the popularization of mobile payments and digital wallets has enabled consumers to make payments and transfers anytime and anywhere; big data analysis helps financial institutions more accurately assess risks and formulate credit policies; and the application of artificial intelligence in areas such as intelligent investment advisors and customer service has improved user experience and satisfaction.

In the field of banking technology, with the rapid development of information technology, banking services have gradually achieved automation, intelligence, and personalization. The launch of online services such as electronic banking and online banking has enabled customers to handle banking transactions anytime and anywhere, greatly improving the efficiency and convenience of business processing. At the same time, banks also use artificial intelligence, big data, and other technological means to conduct precise customer profiling and risk assessment, providing customers with more personalized and targeted financial products and services. In addition, banks have also conducted extensive exploration and practice in risk management, compliance technology, and other aspects to ensure the steady development of banking business.

However, the development of financial and banking technology fields is also facing many challenges. Issues of technology security and privacy protection are becoming increasingly prominent, and how to ensure the security of financial transactions and the confidentiality of customer information has become an important issue for industry development. In addition, with the continuous innovation and application of technology, relevant regulations and policies also need to be continuously improved and adjusted to adapt to the new technological environment and business needs. In summary, financial and banking technology fields play an important role in promoting the development of the financial industry and improving the efficiency and quality of financial services. In the future, with the continuous progress of technology and the continuous expansion of application scenarios, the financial and banking technology fields will continue to maintain a rapid development trend, bringing more innovations and changes to the financial market and banking system.

1.2 The Importance of Studying Finance and Banking Technology

The importance of researching financial and banking technology cannot be ignored, mainly reflected in driving innovation in the financial industry, improving the efficiency of financial services, strengthening risk management, and promoting economic development.

Financial and banking technology is a critical driver of innovation in the financial industry. With the rapid development of cutting-edge technologies such as big data, cloud computing, and artificial intelligence, the business models of finance and banking are undergoing profound changes. By introducing these advanced technologies, traditional financial businesses have optimized and innovated their business processes, giving birth to new financial services such as mobile payments, intelligent investment advisors, and blockchain financing. These innovations have not only enhanced the competitiveness of the financial industry but also brought consumers a more convenient and efficient financial experience.

Financial and banking technology also plays a significant role in improving the efficiency of financial services. Traditional financial service processes are often cumbersome

and time-consuming, while modern financial technology greatly improves the speed and accuracy of business processing through automation and intelligence. For instance, the popularity of electronic and online banking channels has enabled customers to conduct business anytime, anywhere, without being restricted by time and location. At the same time, the application of intelligent customer service and intelligent risk management technology has significantly reduced the burden of manual processing, improving service efficiency and quality.

Financial and banking technology also plays an important role in risk management. As the financial market becomes increasingly complex and volatile, risk management has become a crucial aspect of banking operations. Modern financial technology utilizes big data analysis and artificial intelligence predictions to monitor and alert risks in real-time, helping banks promptly identify and address potential risks. Additionally, the application of blockchain technology enhances transaction transparency and traceability, reducing the risk of fraud and money laundering.

Finally, researching financial and banking technology is crucial for promoting economic development. As the core of the modern economic system, the development level of the financial industry directly impacts the overall efficiency of the economy. Studying and applying advanced financial technology can drive the rapid development of the financial industry, providing more efficient and convenient financial services to the real economy. This not only helps improve corporate financing efficiency and reduce financing costs but also contributes to optimizing and upgrading industrial structures, further promoting sustainable and healthy economic development.

Of course, we must also be aware of the challenges and risks associated with the development of financial and banking technology. For example, rapid technological updates may lead to business interruptions or data loss; cybersecurity issues may threaten the safety of financial transactions and the confidentiality of customer information; and the application of new technologies may bring regulatory gaps and compliance risks. Therefore, while promoting the development of financial and banking technology, we also need to strengthen the formulation and improvement of relevant regulations and policies to ensure the healthy development of technology and bring sustainable competitive advantages to the financial

industry.

1.3 The definition and scope of banking technology

Banking technology refers to a series of technical means and tools applied to banking business and operations, covering various aspects from traditional counter services to modern electronic banking and online banking. These technologies aim to improve the efficiency of banking business processing, optimize customer experience, strengthen risk management capabilities, and promote the innovation and development of banking business.

Within the scope of banking technology, we can roughly divide it into the following main aspects:

Payment and settlement technology: including electronic payment systems, cross-bank clearing networks, etc., to ensure that funds can be transferred quickly and safely between different accounts.

Core business systems: such as account management systems, loan management systems, etc. These systems support the basic business operations of banks, including customer information management, transaction processing, risk control, etc.

Electronic banking and mobile finance: including online banking, mobile banking, telephone banking, etc., providing customers with convenient non-face-to-face financial services, realizing account inquiry, transfer and remittance, investment and financing functions anytime and anywhere.

Data management and analysis technology: banks have accumulated a large amount of customer and business data. Through data warehousing, data mining, and big data analysis technologies, they can deeply understand customer needs, optimize product design, and improve risk management.

Risk management and compliance technology: including credit risk assessment, anti-money laundering monitoring, compliance inspection systems, etc., to help banks effectively identify, assess, and manage various risks and ensure the compliance of business operations.

Information security and protection technology: with the increasing frequency and

complexity of cyber attacks, banks need to continuously strengthen information security protection, including firewalls, intrusion detection systems, data encryption, and other technical means to protect customer information and funds security.

Intelligent technology: with the development of artificial intelligence, machine learning, and other technologies, banks have begun to explore the application of these technologies in customer service, credit approval, risk prediction, and other fields, improving the automation and intelligence level of business processing.

Banking technology is a broad and complex field that covers multiple levels from basic business support to advanced analytical applications. With the continuous progress and innovation of technology, banking technology is also constantly developing, providing powerful support for the expansion and optimization of banking business.

(1) Manual Era (1960s-1970s):

(2) During this period, banks had not yet introduced electronic computers, and their operations were mainly reliant on manual labor. Savings office staff used ledgers, pens, and abacuses to perform tasks such as bookkeeping, interest calculation, settlement, and internal reconciliation. This method of operation was inefficient and unable to meet the rapid development needs of China's banking industry at that time.

(3) PC Stand-alone Stage (1980s-1990s):

(4) With the popularization of electronic computers, banks began to enter the early stage of electronification. Computer equipment installed at each branch was not yet networked and mainly functioned to replace paper-based bookkeeping, creating a separate "electronic ledger" for each business outlet. However, due to the independence of the systems, data exchange and cross-account deposit and withdrawal between branches were not possible.

(5) Network Connectivity Stage (1990s to early 2000s):

(6) With the development of network technology, bank branches began to establish network connections, enabling real-time data transmission and exchange. At this stage, data between branches could be processed centrally within a certain regional scope, making cross-account deposit and withdrawal possible. Additionally, business processes were optimized,

including the automation of transactions, leading to the birth of trading systems.

(7) Data Centralization Stage (early 2000s to around 2008):

(8) With the explosive growth of data volume and increasing demands for data processing, banks began to enter the stage of large-scale data centralization. By storing and processing data centrally, banks could better manage risks and optimize their operations.

(9) After entering the 21st century, with the rapid development of the internet and mobile technology, bank technology further evolved towards networking, mobilization, and intelligence. New service models such as online banking and mobile banking emerged, providing customers with more convenient and personalized financial services. Simultaneously, advanced technologies such as big data and artificial intelligence began to be widely applied in areas such as risk management, customer analysis, and product innovation, driving the intelligent and refined development of banking business.

The evolution of bank technology is a continuous process of adapting to technological advancements, meeting customer needs, and improving operational efficiency. With the continued progress and innovation of future technology, bank technology will continue to develop to a higher level, providing stronger support for the expansion and optimization of banking business.

Electronic banking is a broad concept that utilizes computer technology and network communication technology to provide convenient and fast financial services to customers through voice or other automated equipment, either manually assisted or self-service. It encompasses various forms of financial services, including but not limited to call centers, automatic teller machines (ATMs), POS, CDM, and unmanned banks. These service forms enable customers to conduct various banking operations anytime, anywhere, greatly enhancing the convenience and efficiency of financial services.

Online banking, also known as electronic banking or virtual banking, is an important component of electronic banking. It specifically refers to the various financial services provided by financial institutions based on the Internet. Utilizing Internet digital communication technology, online banking takes the Internet as the underlying trading platform and service channel, providing customers with online services for settlement, credit,

and other operations. The emergence of online banking has significantly transformed the traditional way of handling banking business, enabling customers to conduct various banking operations through the Internet without having to visit physical bank branches.

In terms of functionality and usage, both electronic banking and online banking offer a rich range of financial services, such as account inquiries, fund transfers, and investment management. However, their main differences lie in the service channels and coverage. The service channels of electronic banking are more diversified, including telephones, ATMs, etc., while online banking primarily relies on the Internet. Additionally, the service scope of electronic banking may be broader, encompassing a wider range of financial service forms, while online banking focuses mainly on online financial services.

From a security perspective, online banking typically features higher-level security measures. Since online banking relies solely on the Internet for transactions, banks adopt various technological means to ensure transaction security, such as encryption technology and identity verification. Regular security vulnerability detections and risk assessments are also conducted to counter potential cyberattacks and threats. In contrast, while other channels of electronic banking (such as ATMs and POS machines) also employ certain security measures, they may not provide the same comprehensive security guarantees as online banking.

In terms of convenience, online banking has significant advantages. Customers can conduct banking operations anytime, anywhere with an Internet connection, without being restricted by time and location. This convenience makes online banking the preferred financial service choice for an increasing number of people. While other channels of electronic banking also offer a certain degree of convenience, they may not achieve the same level of truly round-the-clock, location-independent service as online banking.

In terms of business innovation, online banking also holds greater potential. With the continuous development of technology, online banking can more flexibly integrate new technologies and new businesses to provide customers with more personalized financial services. For example, by leveraging big data and artificial intelligence technology, online banking can conduct in-depth analysis of customers' consumption habits, risk preferences, and other factors, thereby recommending more suitable financial products and services to

customers. This innovative capability enables online banking to maintain a leading position in the fiercely competitive market.

It is worth noting that while online banking offers many advantages, other channels of electronic banking still play an irreplaceable role in certain specific scenarios. For instance, in remote areas or places with poor network coverage, electronic banking channels such as ATMs or POS machines may be more suitable. Additionally, for customers who are not accustomed to using the Internet or have concerns about network security, traditional electronic banking channels may better meet their needs.

Electronic banking and online banking each have their unique characteristics and advantages. They play indispensable roles in modern banking business, providing customers with diversified, convenient, and secure financial services. With the continuous advancement of technology and changes in customer demand, electronic banking and online banking will continue to develop and innovate, providing stronger support for the expansion and optimization of banking business.

Electronic banking and online banking are both essential components of modern banking business, leveraging advanced technological means to provide convenient and efficient financial services to customers. Here are some key information and differences between electronic banking and online banking:

Automation and intelligent services play a crucial role in modern banking business, greatly improving the efficiency and quality of banking services through the application of advanced technological means.

Automated services are mainly reflected in the process of banking business processing. Through automated systems, banks are able to perform many traditional manual operations, such as account inquiries, transfer and remittance, loan approval, etc. These automated processes not only improve processing speed, reduce human errors, but also lower operational costs. Meanwhile, automated services can also provide customers with a more convenient service experience, such as 24-hour self-service and cross regional business processing.

And intelligent services go further by applying advanced technologies such as

artificial intelligence and big data to achieve intelligent decision-making and personalized services for banking business. Intelligent services can deeply analyze customer needs and behaviors, and provide customized financial products and service recommendations for customers. For example, an intelligent investment advisory system can develop personalized investment plans for clients based on their investment preferences and risk tolerance. In addition, intelligent services can also achieve risk prediction and prevention, helping banks better manage risks.

In banking business, automation and intelligent services often complement and promote each other. Automation services provide data foundation and business support for intelligent services, while intelligent services improve the efficiency and accuracy of automation services by deeply analyzing data, optimizing business processes.

However, it is worth noting that automation and intelligent services also face some challenges. For example, how to ensure the security and privacy of data, how to prevent technological risks, and how to balance technological innovation with customer needs. Therefore, while promoting automation and intelligent services, banks also need to strengthen risk management and customer education to ensure the stable operation of services and customer satisfaction.

In summary, automation and intelligent services are important directions for the development of modern banking business. They will provide banks with more efficient, convenient, and personalized service experiences, while also promoting innovation and development of banking business.

Risk management and compliance technology play a crucial role in banking business, together forming an important cornerstone for the stable operation of banks.

Risk management involves identifying, evaluating, controlling, and monitoring various types of risks that may arise in bank operations. These risks may include market risk, credit risk, liquidity risk, etc. In order to effectively manage these risks, banks need to adopt a series of technical means, such as establishing risk assessment models, using big data and artificial intelligence technology for risk prediction and monitoring, etc. Through these technological means, banks can timely identify potential risks, take corresponding control

measures, and ensure the safety and stability of business operations.

Compliance technology mainly focuses on the compliance of banks with relevant laws, regulations, and regulatory requirements in their business activities. With the increasing strictness and complexity of financial regulation, banks need to leverage advanced technological means to ensure compliance. This includes establishing a compliance management system, real-time monitoring and early warning of business activities, and timely detection and correction of violations. At the same time, banks also need to use data analysis techniques to quantitatively evaluate compliance risks and provide decision-making support for management.

In terms of integrating risk management and compliance technologies, banks can establish a unified risk management and compliance platform by integrating internal resources. This platform can achieve centralized management, sharing, and analysis of risk and compliance information, improving the efficiency of risk identification and control. In addition, banks can also leverage the power of external professional institutions to introduce advanced risk management and compliance technology solutions, and improve the overall level of risk management.

However, the application of risk management and compliance technologies also faces some challenges. For example, with rapid technological updates, banks need to constantly follow up on the development and application of new technologies; Meanwhile, there are differences in regulatory requirements among different countries and regions, and banks need to adapt to different regulatory environments. Therefore, when banks apply risk management and compliance technologies, they need to comprehensively consider the actual situation and business needs, and develop reasonable technology application strategies.

Cross border payment and settlement systems are an indispensable part of modern financial systems, which involve the transfer and settlement of funds between different countries and regions, and are highly complex and challenging.

The main function of cross-border payment and settlement systems is to achieve currency conversion and fund settlement between different countries. It usually includes multiple participants, such as banks, payment institutions, clearing organizations, etc., who

jointly maintain the stable operation of the system through a series of agreements and rules.

In the process of cross-border payment and settlement, the system needs to handle multiple currencies and payment tools, while also considering factors such as laws and regulations, regulatory requirements, and time differences in different countries and regions. Therefore, cross-border payment and settlement systems need to have high flexibility and adaptability, and can provide customized services according to different business scenarios and needs.

However, traditional cross-border payment and settlement systems often have some problems, such as cumbersome processes, low efficiency, and high costs. These issues not only increase the operating costs of enterprises, but may also lead to delays in capital flow and increased risks.

To address these issues, modern cross-border payment and settlement systems are constantly introducing new technologies and innovative models. For example, blockchain technology is widely used in the field of cross-border payments, and its decentralized, secure, and reliable characteristics make fund transfer faster, more transparent, and more cost-effective. At the same time, some emerging payment institutions also provide more intelligent and personalized cross-border payment solutions by utilizing technologies such as big data and artificial intelligence.

In addition, cross-border payment and settlement systems also need to strengthen interconnectivity with other financial infrastructure, such as international settlement banks, payment systems, etc., to achieve more efficient and convenient cross-border financial services.

In summary, cross-border payment and settlement systems are an important component of the financial system, and they are of great significance in promoting international trade, investment, and global economic integration. With the continuous development and innovation of technology, cross-border payment and settlement systems will continue to be optimized and improved, providing more efficient, secure, and convenient financial services for the global economy.

2. ANALYSIS OF BASIC CONCEPTS OF FINANCIAL TECHNOLOGY

2.1. The definition and connotation of financial technology

Financial technology, often referred to as fintech, refers to the utilization of technological innovations to transform and enhance financial sector products and services, aiming to reduce transaction costs and improve customer service efficiency. This innovation not only involves the optimization of existing financial processes but also the creation of entirely new financial business models and service paradigms.

The connotation of financial technology is rich and diverse, encompassing multiple technological fields such as cloud computing, big data, blockchain, and artificial intelligence. The application of these technologies in the financial sector provides financial institutions with more efficient and precise business processing capabilities, while also delivering more convenient and personalized financial service experiences to customers.

For instance, the application of big data technology in the financial sector enables financial institutions to collect and analyze customer information more comprehensively, thereby assessing risks and formulating credit policies more accurately. Blockchain technology, with its decentralized and secure characteristics, provides a more efficient and transparent means of clearing and settling financial transactions. The application of artificial intelligence technology in areas such as customer service and intelligent investment advisory has significantly elevated the level of intelligence in financial services.

Overall, financial technology is an emerging field that highly integrates finance and technology, profoundly transforming the ecology and landscape of the financial industry and injecting powerful momentum into its future development.

The essence of financial technology lies not only in technological innovation and application but also in its profound impact on socio-economic life. By optimizing the allocation of financial resources and enhancing the accessibility and inclusiveness of financial services, financial technology is driving the process of financial inclusiveness and socialization.

Financial technology lowers the threshold for accessing financial services, enabling more people to enjoy convenient and efficient financial services. Under traditional financial models, many small and micro enterprises and individuals often lack access to financial services due to insufficient credit records or limited asset sizes. However, financial technology, leveraging techniques such as big data and artificial intelligence, can more comprehensively assess the credit status and repayment abilities of these groups, providing them with more precise financial services and thus promoting the popularization of financial services.

Financial technology also optimizes the allocation of financial resources, enhancing the efficiency of financial markets. Traditional financial markets often suffer from issues such as information asymmetry and high transaction costs, leading to insufficient capital flows and inefficient utilization. By breaking down information barriers and reducing transaction costs, financial technology enables funds to flow more quickly and accurately to where they are needed, improving the efficiency of resource allocation in financial markets.

Furthermore, financial technology plays a crucial role in driving innovation and development in the financial industry. With the continuous advancement of technology and the expansion of application scenarios, financial technology is bringing more and more innovative points and growth opportunities to the financial industry. For instance, the emergence of new financial business models such as digital currencies and smart contracts is transforming traditional financial models and injecting new vitality into the development of the financial industry.

The essence of financial technology is a multidimensional and multifaceted concept. It encompasses not only technological innovation and application itself but also its profound impact on the financial industry and socio-economic life. With the continuous development of financial technology, we have reason to believe that it will bring more innovation and transformation to the financial industry and socio-economic sphere, ushering us into a new era of finance that is more efficient, convenient, and inclusive.

2.2 The Development History and Current Situation of Financial Technology

The development journey of financial technology can be described as magnificent. Accompanied by technological progress and innovation in the financial industry, it continuously drives the transformation and development of the financial sector. From initial electronization and automation to today's digitization and intelligence, financial technology is leading the financial industry towards a more efficient and convenient future with its unique charm.

In the early stages, the development of financial technology mainly focused on electronization. With the rise of computer technology, financial institutions began to convert traditional paper-based business into electronic forms, such as electronic bills and electronic payments. This phase of financial technology primarily addressed issues related to the speed and efficiency of business processing, enabling financial transactions to be completed more quickly and accurately.

Subsequently, with the popularization of internet technology, financial technology entered the networked phase. The emergence of online banking and mobile payments allowed customers to conduct financial transactions anytime and anywhere, without being constrained by time and location. This phase of financial technology not only improved service efficiency but also broadened the coverage of financial services, enabling more people to enjoy convenient financial services.

Entering the 21st century, with the rapid development of cutting-edge technologies such as big data, cloud computing, and artificial intelligence, financial technology ushered in a new era of digitization and intelligence. The application of big data technology enables financial institutions to collect and analyze customer information more comprehensively, thereby assessing risks and formulating credit policies more accurately. Cloud computing technology provides financial institutions with powerful data storage and computing capabilities, enabling financial business to operate more efficiently. Meanwhile, the application of artificial intelligence technology has made financial services more intelligent, such as intelligent customer service and intelligent investment advisors, significantly enhancing customer experience and service quality.

Currently, the development of financial technology has exhibited several prominent characteristics:

Firstly, technological innovations are constantly emerging. With technological advancements, the pace of innovation in financial technology is accelerating, with new technologies and applications emerging in endless streams. For instance, blockchain technology, with its decentralized and secure features, has been widely applied in the financial sector, providing more transparent and efficient solutions for financial transactions. The rise of digital currencies is also transforming the traditional model of the financial industry, injecting new vitality into its development.

Secondly, financial services are becoming more inclusive. The development of financial technology has made financial services more accessible and inclusive, enabling many people to cross the threshold of traditional financial services and enjoy convenient and efficient financial services. Especially for micro and small enterprises, rural areas, and impoverished populations, the development of financial technology has provided them with more opportunities to obtain financial support, promoting balanced socio-economic development.

Thirdly, risk management is becoming more precise. Through big data analysis and artificial intelligence prediction techniques, financial institutions can more accurately identify, assess, and manage risks, thereby reducing business risks and improving operational efficiency. This not only contributes to the steady development of financial institutions but also provides customers with safer and more reliable financial services.

However, the development of financial technology also faces some challenges and issues. For instance, there are urgent issues to address regarding technological security risks and privacy protection. The rapid pace of technological updates requires financial institutions to continuously invest resources in technological upgrades and maintenance. Additionally, the application of new technologies may give rise to regulatory gaps and compliance risks. Therefore, while promoting the development of financial technology, it is also necessary to strengthen the formulation and improvement of relevant regulations and policies to ensure the healthy development of financial technology and bring sustainable competitive advantages to the financial industry.

In conclusion, the development journey of financial technology is filled with transformation and innovation, continuously driving the financial industry forward. Currently, financial technology has achieved remarkable accomplishments and exhibits a robust development trend. In the future, with continuous technological advancements and the expansion of application scenarios, financial technology will bring more innovations and transformations to the financial industry, propelling us into a more efficient, convenient, and inclusive new era of finance.

2.3 The main branches of financial technology

The main branches of financial technology are quite extensive and diversified, covering multiple key areas that play an important role in promoting innovation and transformation in the financial industry. Here are some major branches of financial technology:

FinTech: This is the core branch of financial technology, focusing on applying technological innovations to financial services. This includes leveraging big data, cloud computing, artificial intelligence, blockchain, and other technological means to improve the efficiency of financial services, reduce operating costs, and broaden the coverage of financial services. FinTech has a wide range of application scenarios, including payment clearing, lending and financing, wealth management, retail banking, insurance, trading and settlement, and more.

Blockchain technology: As a decentralized distributed ledger technology, blockchain has broad application prospects in the financial field. It can improve the transparency and security of financial transactions, reduce intermediate links and unnecessary transaction costs. Blockchain has important applications in areas such as digital currencies, smart contracts, and identity verification, helping to promote innovation and development in the financial industry.

Artificial intelligence finance: The application of artificial intelligence technology in the financial field is gradually deepening. From stock price prediction, assessing consumer

behavior and willingness to pay, to credit scoring, intelligent investment advisors and chatbots, to insurance underwriting and claims, risk management and stress testing, artificial intelligence technology is providing financial institutions with more efficient and accurate solutions.

Big data finance: The application of big data technology enables financial institutions to better process and analyze massive amounts of data, thereby discovering trends and patterns hidden in the numbers. This helps financial institutions improve the accuracy of investment decisions, optimize risk management strategies, and provide customers with more personalized financial products and services.

Mobile payment and digital wallets: With the popularity of mobile internet, mobile payment and digital wallets have become important innovations in the financial industry. They provide consumers with convenient and secure payment and transfer methods, while also providing financial institutions with new ways to expand their business and increase customer stickiness.

Cybersecurity and privacy protection: With the rapid development of financial technology, issues of cybersecurity and privacy protection have become increasingly prominent. Ensuring the security of financial transactions and the confidentiality of customer information has become an important issue for industry development. Therefore, cybersecurity technology and privacy protection technology have also become important branches of financial technology.

In addition, there are also branches such as quantitative finance, intelligent investment advisors, online lending, and regulatory technology that are constantly developing and improving. The innovation and application of these areas have not only driven the digital transformation of the financial industry, but also provided financial institutions with more opportunities to expand their business and enhance their competitiveness.

Blockchain technology

Blockchain technology is an internet database technology with decentralization and transparency, allowing everyone to participate in recording the database. Its core includes the concepts of transactions, blocks, and chains. A transaction is an operation that leads to a

change in ledger state, such as adding a record. A block records transactions and state results that occurred during a certain period of time, representing a consensus on the current ledger state. The chain is a sequence of blocks linked together in the order of occurrence, serving as a log of the entire state changes.

Blockchain technology utilizes a block-chain data structure to verify and store data, generates and updates data through distributed node consensus algorithms, and ensures the security of data transmission and access using cryptography. In addition, smart contracts consist of automated script codes used for programming and manipulating data. Blockchain technology can ensure the authenticity of data on the chain, enhancing its credibility and trustworthiness.

One of the main applications of blockchain technology is as the underlying technology for Bitcoin, but it is also suitable for other scenarios. From the perspective of participants, blockchain can be classified into public chains, alliance chains, and private chains. Public chains, such as Bitcoin and Ethereum, are fully decentralized and can be participated in by anyone. Alliance chains, on the other hand, are limited to alliance members, and their read and write permissions and accounting permissions are determined according to alliance rules.

Blockchain technology constructs a collectively maintained reliable data model through encryption algorithms, consensus mechanisms, and specific data storage methods, enabling the transfer of digital assets between network nodes. Asymmetric encryption algorithms are a key component, ensuring the trustworthiness of data. The public key is used to encrypt information, while the private key is used for decryption. Only the recipient with the private key can decrypt the information, thus ensuring the security of blockchain information.

Big Data Analysis

Big data analytics, as the core force of today's information era, is gradually changing our way of life, business models, and even social structures. With its powerful data processing capabilities and profound insights, it provides us with unprecedented opportunities to better understand and respond to this complex and changing world.

First, we need to understand the basic concept of big data analytics. Big data, as the

name suggests, refers to those datasets that are enormous in scale, diverse in type, and require high-speed processing. Big data analytics, on the other hand, is the process of collecting, organizing, processing, and analyzing these data to reveal hidden patterns, associations, and trends behind the data. This analytical approach allows us to extract valuable knowledge from vast amounts of information, guiding our decision-making and actions.

In the business realm, the application of big data analytics is particularly extensive. Through deep analysis of consumer behavior, companies can accurately grasp market demand, optimize product design, and enhance user experience. At the same time, big data analytics can also help businesses predict market trends, formulate effective marketing strategies, and improve competitiveness. Additionally, big data analytics plays an indispensable role in supply chain management, human resource management, financial management, and other areas.

However, big data analytics is not an easy task. First, data collection and integration pose significant challenges. Due to the diverse sources and formats of data, effectively integrating these data and ensuring their accuracy and completeness is the primary task of big data analytics. Secondly, the technical threshold for data processing and analysis is relatively high. Various algorithms and models need to be applied to deeply explore and analyze the data to reveal its underlying meanings. Finally, the results of big data analytics need to be integrated with actual business operations to maximize their value.

To address these challenges, we need to continuously promote technological innovation and talent cultivation. In terms of technological innovation, it is necessary to continuously develop new algorithms and models to improve the efficiency and accuracy of data processing. At the same time, research on data security and privacy protection technologies also needs to be strengthened to ensure the legality and compliance of big data analytics. In terms of talent cultivation, it is essential to strengthen the training and introduction of talents in big data-related majors and establish a high-quality, professional big data analytics team.

Apart from the business sector, big data analytics also has widespread applications in other fields. In the medical field, analyzing vast amounts of medical data can assist doctors in making more accurate diagnoses and developing personalized treatment plans. In the

transportation sector, big data analytics can optimize traffic flow and reduce congestion and accidents. In the environmental protection field, analyzing environmental data can help detect environmental issues promptly and take effective measures for governance.

Overall, big data analytics is a field full of opportunities and challenges. It provides us with boundless possibilities but also demands our diligent efforts and wisdom. In future development, we need to delve deeper into researching and exploring the techniques and methods of big data analytics, continuously promoting its application and development in various fields. Only by doing so can we fully leverage the value of big data and contribute significantly to social development and progress.

Artificial Intelligence and Machine Learning

Artificial Intelligence (AI) and Machine Learning (ML) are closely related concepts that play crucial roles in modern technology fields.

Artificial Intelligence is a broad concept that encompasses the creation of intelligent machines capable of simulating human thinking capabilities and behaviors. These intelligent machines are able to mimic human intelligent behaviors, including natural language processing, image recognition, speech recognition, machine translation, recommendation systems, and more. The goal of AI is to endow computers with intelligence similar to humans, enabling them to better understand and handle complex problems.

Machine Learning, on the other hand, is a significant branch of AI that focuses on enabling computer systems to automatically learn and improve their algorithmic models from data. In ML, computers do not perform tasks through explicit programming but instead analyze vast amounts of data to discover patterns and regularities, enabling them to make predictions, classifications, clusterings, and other tasks independently. This ability to automatically extract knowledge from data plays a central role in the realization of AI.

Specifically, ML algorithms enable computers to identify features in data and optimize based on these features to improve performance. For instance, in the field of image recognition, ML algorithms can learn to identify different objects and scenes by analyzing a large amount of image data. This capability has led to the widespread application of ML in various fields, including speech recognition, natural language processing, intelligent

customer service, intelligent transportation, and more.

It's worth noting that ML is just one implementation method of AI, and the development of AI also includes other technical means such as expert systems, natural language processing, and knowledge representation. However, with the enhancement of computing power and the growth of data volume, ML has become the core of AI development. Especially in recent years, the development of ML technologies such as deep learning has brought significant progress to AI, enabling it to achieve important breakthroughs in multiple fields.

In conclusion, Artificial Intelligence and Machine Learning are intricately linked. ML provides an essential means for the realization of AI and drives its continuous development. At the same time, the widespread application of AI also provides more scenarios and development space for ML.

3.4 Mobile Payment and Digital Wallet

Mobile payments and digital wallets, as significant outcomes of modern financial technology, are profoundly altering our way of life. They not only simplify payment processes and improve transaction efficiency, but also play an active role in promoting the popularization and innovation of financial services.

Mobile payment, as the name suggests, refers to the method of completing payments through mobile devices such as smartphones. Its emergence has greatly facilitated people's daily lives. Whether it's shopping, dining, transportation, or other consumption scenarios, payments can be completed with a simple scan or click, eliminating the need to carry cash or bank cards, greatly enhancing the convenience of payment. At the same time, mobile payments are real-time and secure, making transactions faster and safer.

Digital wallets, on the other hand, are an important carrier for mobile payments. They integrate users' bank cards, electronic payment accounts, and other information into a virtual "wallet," allowing users to conduct payment operations anytime, anywhere. Digital wallets not only have the function of storing and managing electronic currency, but they can also record users' transaction history, points, and other information, providing users with more personalized services. Additionally, digital wallets can be integrated with various application

scenarios, such as online shopping, offline payments, and public transportation, offering users a richer payment experience.

The popularization of mobile payments and digital wallets has not only enhanced consumers' payment experience but also driven innovation in financial services. Traditional financial services are often limited by factors such as geography and time, but mobile payments and digital wallets have broken these barriers, making financial services more accessible and convenient. Whether it's in bustling urban commercial areas or remote rural regions, as long as there is a mobile phone and an internet connection, convenient financial services can be enjoyed.

Moreover, mobile payments and digital wallets have also promoted the personalization of financial services. Through the collection and analysis of users' transaction data, financial institutions can gain a deeper understanding of users' consumption habits and needs, thereby providing more targeted products and services. For example, based on users' shopping records, they can recommend corresponding promotional activities or financial products; based on users' travel habits, they can provide customized transportation payment solutions.

However, the development of mobile payments and digital wallets also faces some challenges. The first is security issues. With the increasing popularity of mobile payments and digital wallets, the problems of network security and privacy protection have become increasingly prominent. Ensuring the security of users' funds and information is a crucial issue in the development of mobile payments and digital wallets. The second is regulatory issues. As emerging financial formats, the regulatory system for mobile payments and digital wallets is still not perfect. Formulating reasonable regulatory policies that both safeguard the stability of the financial market and promote the healthy development of mobile payments and digital wallets is an urgent issue to be addressed.

To address these challenges, we need to take a series of measures. Firstly, strengthen technological research and development to improve the security performance of mobile payments and digital wallets. This includes adopting more advanced encryption algorithms and establishing multi-layer security protection systems. Secondly, improve regulatory policies and establish a regulatory system that is suitable for the development of mobile

payments and digital wallets. This includes clarifying regulatory authorities, formulating regulatory standards, and strengthening regulatory cooperation. Finally, strengthen user education and promotion to enhance users' understanding and ability to use mobile payments and digital wallets.

In conclusion, mobile payments and digital wallets, as significant achievements of modern financial technology, are profoundly changing our way of life and financial service models. Facing future challenges and opportunities, we need to continuously innovate and improve, promoting the healthy development of mobile payments and digital wallets, bringing more convenience and surprises to people's lives.

Cloud computing and distributed systems, as the two core pillars of modern information technology, have played a crucial role in promoting the innovation and development of data processing, storage, and application services. These two fields are closely related in many aspects, while also having their unique advantages and application scenarios.

First, let's take a closer look at cloud computing. Cloud computing is an internet-based computing approach that allows shared, configurable computing resource pools (such as networks, servers, storage, applications, and services) to be rapidly provided and managed in an on-demand, self-service manner, with minimal management effort or interaction with service providers. The core features of cloud computing include on-demand self-service, broad network access, resource pooling, rapid elasticity, and service metering. These characteristics make cloud computing significantly advantageous in handling large-scale data processing, elastic scaling, and reducing IT costs.

Cloud computing platforms typically come in various forms, including public clouds, private clouds, and hybrid clouds. Public clouds provide services to the general public, offering high flexibility and scalability; private clouds are dedicated to internal use within enterprises or organizations, with a focus on data security and privacy protection; and hybrid clouds combine public and private clouds, allowing flexible allocation of resources based on actual needs.

Distributed systems, on the other hand, consist of a group of computers interconnected through a network, each with independent processing capabilities and working collaboratively to complete common tasks. The advantage of distributed systems lies in their ability to fully utilize the computing and storage resources of multiple computers, enhancing overall performance. At the same time, they ensure high availability through data redundancy and fault tolerance mechanisms.

Within distributed systems, each node typically has a relatively independent status and function, communicating and collaborating through communication protocols. Challenges faced by distributed systems include data consistency, fault tolerance, load balancing, and security issues. To address these challenges, researchers have proposed various algorithms and technologies, such as distributed locks, consistent hashing, and replica management.

There is a close relationship between cloud computing and distributed systems. In fact, many cloud computing platforms adopt a distributed system architecture. For instance, in cloud computing platforms, a vast number of virtual machines, containers, or server nodes are connected through a network, forming a 庞大 distributed system. These nodes work together to provide users with computing, storage, and application services. Additionally, cloud computing platforms offer extensive management and scheduling capabilities, enabling users to conveniently manage and utilize these distributed resources.

Furthermore, cloud computing and distributed systems have found widespread applications in various fields. For instance, in big data processing, cloud computing platforms provide powerful computing and storage capabilities to support big data analysis. In the field of the Internet of Things, distributed systems enable collaborative work and data sharing among devices. In the realm of artificial intelligence, cloud computing and distributed systems jointly provide an efficient computing environment for algorithms such as machine learning and deep learning.

In conclusion, cloud computing and distributed systems are the two pillars of modern information technology, each with unique advantages and application scenarios while also relying on and promoting each other. With the continuous development of technology, we have reason to believe that cloud computing and distributed systems will play an even more

crucial role in the future, driving continuous innovation and development in information technology.

3.IMPROVEMENT OF MEANS OF SUPPORTING THE FINANCIAL STABILITY OF THE BANKING SYSTEM

3.1 Key methods in fields of finance and banking technology

The main methods of data analysis and mining mainly include the following:

Classification: Identify the common characteristics of a group of data objects in the database and classify them into different categories according to the classification model. Its purpose is to map the data items in the database to a given category through the classification model.

Regression analysis: Reflect the characteristics of attribute values in transactional databases over time, and discover the dependency relationships between variables or attributes by generating a function that maps data items to a real-valued predictor variable. Its main research issues include the trend characteristics of data sequences, the prediction of data sequences, and the correlation between data.

Cluster analysis: Divide a group of data into several categories based on similarity and difference. Its purpose is to maximize the similarity between data belonging to the same category and minimize the similarity between data in different categories. It can be applied to customer segmentation, customer background analysis, customer purchase trend prediction, market segmentation, etc.

Association rule mining: Discover interesting associations or correlations between itemsets from large-scale datasets. These associations or correlations can help companies understand customer purchasing behavior, market trends, etc., thereby formulating more effective marketing strategies.

Feature analysis: Extract feature expressions from a group of data in the database, which express the overall characteristics of the dataset.

Data cleaning: Preprocess the data, including removing duplicate data, handling missing values, and handling outliers. This is the first step of data analysis. Only when the data is cleaned can the accuracy and reliability of subsequent analysis results be guaranteed.

Data visualization: Present data in the form of charts, graphics, etc., to more intuitively understand the distribution, trends, and patterns of the data. Common data visualization tools include Excel, Tableau, etc.

Deep learning and neural networks: Deep learning is a special form of machine learning that uses multi-layer neural networks to learn complex data features, suitable for processing large-scale, high-dimensional data. Neural networks use repetitive learning methods to present a series of examples for learning, enabling them to summarize distinguishable patterns.

In addition to the above methods, there are some other commonly used data analysis and mining techniques, such as link analysis, online analytical processing (OLAP), data modeling, predictive analysis, change and deviation analysis, etc. These methods and techniques often need to be selected and combined according to specific problems and data characteristics in practical applications to achieve the best analysis results.

Data collection and preprocessing are two indispensable and crucial steps in the process of data analysis.

Data collection refers to the process of gathering data from various data sources, which can be structured, semi-structured, and unstructured. The main sources of big data include business data, internet data, and IoT data. During the data collection process, various techniques can be adopted, such as system log collection methods, unstructured data collection methods, and other collection technologies.

Data preprocessing involves a series of operations on the data before analysis, including cleaning, transformation, and reduction, to achieve better mining results. The basic steps of preprocessing include:

Data cleaning: The main objective is to remove noise and irrelevant data, including handling missing values, smoothing noisy values, identifying and addressing outliers, and resolving data inconsistencies.

Data integration: Merging data from multiple sources into a consistent data storage, such as a data warehouse. This process may encounter issues such as entity recognition.

Data transformation: Converting raw data into a format suitable for data mining.

Data reduction: Extracting critical and useful information from raw data mainly through methods such as data cube aggregation, dimension reduction, data compression, numerical reduction, discretization, and concept hierarchy.

Apart from the basic steps mentioned above, there are also some key considerations and technical details to be aware of in data collection and preprocessing.

During data collection, the quality and integrity of the data are crucial. To ensure data quality, we need to obtain data from credible sources and perform verification and validation. Additionally, different collection strategies and techniques need to be adopted for structured and unstructured data. For structured data, we can use database query statements to extract the required information. However, for unstructured data such as text, images, or audio, specific tools or APIs may be required for parsing and extraction.

In the data preprocessing stage, apart from cleaning, transformation, and reduction, feature selection and extraction are also essential. Feature selection involves picking the most representative and discriminative features from the original ones to reduce data dimensionality and complexity. Feature extraction, on the other hand, involves extracting hidden features or patterns from the raw data to better describe its characteristics. The methods for feature selection and extraction can be chosen and applied based on the specific analysis task and data type.

Furthermore, with the continuous development of big data and artificial intelligence technologies, new data collection and preprocessing techniques have emerged. For instance, streaming data collection techniques can collect and process data streams in real-time, suitable for scenarios that require rapid response and real-time analysis. Unsupervised learning algorithms can automatically identify and classify patterns and structures in data, thereby reducing the workload of manual preprocessing.

Additionally, data security and privacy protection are indispensable considerations during data collection and preprocessing. We must adhere to relevant laws, regulations, and privacy policies to ensure the legality and privacy of personal data. For sensitive data, appropriate encryption and desensitization measures should be taken to prevent data leakage and misuse.

In conclusion, data collection and preprocessing are crucial steps in the data analysis process, requiring comprehensive consideration of data quality, feature selection, new technology applications, as well as data security and privacy protection. Only through carefully designed and implemented data collection and preprocessing can accurate, reliable, and valuable information be provided for subsequent data analysis.

Statistical analysis and model building are two important links in data analysis. They play different roles in processing data, but often rely on and support each other.

Statistical analysis is one of the core methods in data science, involving the collection, collation, interpretation, and inference of data. It can help us understand the distribution, trends, and correlations of data, thus revealing the information hidden behind it. Common statistical analysis methods include variance analysis, regression analysis, cluster analysis, correlation analysis, etc. Variance analysis is mainly used to test the differences between different groups and how these factors affect numerical variables. Regression analysis is used to study the proportional relationship between dependent and independent variables to predict the value of dependent variables.

Model building is based on the results of statistical analysis, establishing mathematical models that can explain and predict data relationships. In the process of model building, we will select appropriate algorithms and parameters according to the nature of the problem and the characteristics of the data. Through training and optimizing the model, it can accurately reflect the inherent laws of the data. The goal of model building is not only to explain existing data, but more importantly, to provide prediction and decision support for future data.

During the process of statistical analysis and model building, the following points need to be noted:

Data quality: High-quality data is the basis for effective statistical analysis and model building. Therefore, before analysis, it is necessary to clean, organize, and verify the data to ensure its accuracy and completeness.

Variable selection: Selecting appropriate variables is the key to statistical analysis. It is necessary to select the most representative and relevant variables for analysis according to the nature and purpose of the problem.

Model validation and optimization: After building the model, it needs to be validated and optimized to ensure its accuracy and generalization ability. This usually includes methods such as cross-validation and parameter adjustment.

Data visualization and report generation are two crucial stages in the process of data analysis. They not only assist people in better understanding and interpreting data, but also effectively communicate analysis results, promoting decision-making and optimization. In the era of informatization and digitization, the importance of data visualization and report generation is increasingly prominent, providing powerful support for data presentation and interpretation.

Data visualization is the process of presenting data in graphical, image, animation, and other forms. It transforms complex data into intuitive and easily comprehensible visual representations. Through data visualization, people can clearly see the distribution, trends, and correlations of data, thereby gaining a deeper understanding of its essence. Data visualization not only improves the efficiency of data analysis but also helps people discover hidden patterns and regularities in data, providing powerful support for decision-making.

Choosing the right visualization tools and techniques is crucial in the process of data visualization. Currently, there are many popular data visualization tools available, such as Tableau, Excel, R language, and Python's plotting libraries. These tools offer a rich variety of visualization options and interactive features, enabling customized visualization designs based on different data types and requirements. Meanwhile, with the development of virtual reality and augmented reality technologies, data visualization is gradually moving towards a more immersive and interactive direction, providing richer visual experiences.

Report generation, on the other hand, involves presenting the results of data analysis in written form, summarizing and showcasing the work done. A good report should possess a clear structure, accurate data, and profound analysis, effectively communicating the analysis results and conclusions, providing valuable references for decision-makers. Report generation requires analysts to possess solid data analysis skills and professional knowledge, as well as excellent writing and communication skills to translate complex data and analysis

results into easily understandable language.

During the report generation process, analysts need to select the appropriate report format and content based on the purpose and audience of the report. For example, for top management, the report should highlight key indicators and conclusions, presenting the analysis results in a concise and straightforward manner. For researchers or fellow analysts, however, the report should provide more detailed data and methodology to enable them to deeply understand the analysis process and results. Additionally, the visual elements of the report are crucial, as they assist readers in better understanding the data and conclusions, enhancing the readability and attractiveness of the report.

Data visualization and report generation play complementary roles in data analysis. Data visualization makes the analysis results more intuitive and easily understandable, providing powerful visual support for report generation. Conversely, report generation summarizes and extracts the work of data analysis, presenting the results in a more systematic and comprehensive manner through the combination of text and charts. Together, they not only improve the efficiency and accuracy of data analysis but also promote information transmission and communication, providing powerful support for decision-making.

With the continuous development of big data and artificial intelligence technologies, data visualization and report generation will face more challenges and opportunities. On the one hand, as the amount of data continues to grow and its complexity increases, effectively visualizing and generating reports will become an important issue. On the other hand, with continuous technological advancements and innovations, data visualization and report generation will also usher in more possibilities and development spaces.

In summary, data visualization and report generation are indispensable stages in data analysis. Through intuitive and easily understandable presentations of data and analysis results, they assist people in better understanding and utilizing data, providing powerful support for decision-making. In the future, with continuous technological advancements and expanding application scenarios, data visualization and report generation will play even more crucial roles, providing more comprehensive and in-depth support for data-driven decision-making.

3.2 Challenges and prospects in the financial and banking technology fields

In recent years, significant progress has been made in the field of financial and banking technology, but it has also faced numerous challenges and issues. Among them, technical security and privacy protection are currently one of the most prominent problems. These two aspects are not only related to the reputation of financial institutions and the trust of customers, but also directly related to the stability and security of the financial system. Therefore, in-depth discussions on these issues and their solutions are of great significance for the sustainable development of financial and banking technology.

Technical security is the primary challenge faced by financial and banking technology. With the rapid development of digitization and networking, the business of financial institutions is increasingly dependent on information systems and network technology. However, this also exposes financial institutions to increasingly complex and diverse security threats from hackers, network viruses, malicious software, and the like. If the information systems of financial institutions are attacked, it may lead to serious consequences such as customer information leakage and capital losses. Therefore, how to ensure the security and stability of information systems and prevent external threats from intruding is an urgent issue that financial institutions need to address.

To address technical security issues, financial institutions need to take a series of measures. Firstly, they should strengthen the security protection of information systems, including establishing a multi-level security protection system, regularly conducting security vulnerability scans and repairs, and enhancing employee security awareness training. Additionally, adopting advanced technological means such as artificial intelligence and big data for real-time monitoring and early warning of network security can help detect and respond to potential security threats in a timely manner. Financial institutions should also collaborate with regulatory agencies, security vendors, and others to jointly build a secure ecosystem and enhance the security level of the entire industry.

Privacy protection is another crucial issue facing financial and banking technology. In the digital era, financial institutions possess vast amounts of customer data, including

sensitive information such as identity details and transaction records. Proper handling and protection of these data to prevent data leakage and misuse are significant challenges that financial institutions must face. Simultaneously, with the continuous improvement of data protection regulations, the responsibility of financial institutions in privacy protection is also increasing.

To strengthen privacy protection, financial institutions need to adopt a series of measures. Firstly, they should establish a sound data management system, clarifying the responsibilities and requirements for data collection, storage, usage, and destruction. Secondly, adopting advanced technological means for data encryption and desensitization can ensure the security of data during transmission and storage. Additionally, financial institutions should strengthen employee training on privacy protection awareness to ensure that employees strictly adhere to relevant regulations when handling customer data.

Besides the challenges mentioned above, the field of financial and banking technology faces other issues such as pressure from technological upgrades and shortages of talents. These problems also require joint efforts from financial institutions and the entire industry to address.

Looking ahead, the field of financial and banking technology still has broad development prospects. With continuous technological advancements and innovations, financial institutions will be able to provide customers with more convenient, efficient, and secure financial services. Simultaneously, with the improvement of data protection regulations and the increasing awareness of privacy protection in society, the efforts of financial institutions in privacy protection will gain more recognition and support.

The development of finance and banking technology is not only driven by technological innovation and market demand, but also influenced by regulatory and policy environments. In the current context of globalization, digitization, and strengthened regulation, financial and banking institutions need to actively adapt to the constantly changing regulatory and policy environment to ensure business compliance and sustainable development. With the continuous development of financial markets and the increasing prominence of risks, regulatory authorities in various countries have increasingly strict regulatory requirements for financial and banking institutions. This includes strict

supervision of compliance with technology applications, data security and privacy protection, anti money laundering, and counter-terrorism financing. Financial institutions need to constantly update and improve their technical systems and business processes to adapt to these increasingly stringent regulatory requirements. With the acceleration of financial globalization, cross-border business has become an important development direction for financial and banking institutions. However, there are significant differences in regulations and policy environments among different countries and regions, and financial institutions need to face complex compliance challenges when conducting cross-border business. This includes understanding and complying with regulatory requirements from different countries, handling cross-border data transmission, and privacy protection issues. The continuous innovation in the fields of finance and banking technology has brought unprecedented opportunities with new technological applications such as blockchain and artificial intelligence, but at the same time, it has also brought regulatory gaps and uncertainties. Regulatory agencies need time to develop and improve relevant regulations, while financial institutions need to conduct technological innovation and business exploration in situations where regulations are unclear, which increases compliance risks and business uncertainty. Faced with increasingly strict regulatory requirements, financial institutions need to strengthen communication and cooperation with regulatory authorities, understand their policy guidance and regulatory priorities, and actively participate in the formulation and discussion of relevant rules. Through cooperation with regulatory agencies, financial institutions can better understand regulatory requirements, plan their business layout in advance, and reduce compliance risks. Financial institutions should establish a comprehensive compliance management system, including formulating compliance policies, establishing compliance departments, and strengthening employee training. Through the construction of a compliance management system, financial institutions can ensure the compliance of their business activities, timely detect and correct violations, and reduce the probability of compliance risks occurring. Technological innovation can not only bring business innovation and development opportunities to financial institutions, but also improve compliance efficiency. Financial institutions can use technologies such as big data and artificial intelligence to monitor and analyze business data in real-time, identifying potential

risks and violations. Meanwhile, through automated and intelligent compliance management systems, manual intervention and misjudgment can be reduced, improving the accuracy and efficiency of compliance management. In the face of compliance challenges in cross-border business, financial institutions can actively promote international regulatory cooperation and standardization. By participating in international financial regulatory organizations and strengthening cooperation and exchanges with regulatory agencies in other countries, we aim to promote the development of unified cross-border business regulatory standards and norms, and reduce the compliance costs and risks of cross-border business.

In recent years, significant progress has been made in the fields of finance and banking technology, especially in areas such as digitization and intelligence. However, with the rapid development of technology, the regulatory and policy environment is also constantly changing, posing new challenges to financial and banking institutions. With the continuous development of financial markets and changes in risks, governments around the world are strengthening their supervision of financial and banking institutions. This means that financial institutions need to constantly monitor the latest regulatory changes to ensure that their business operations comply with regulatory requirements. This rapidly changing regulatory environment requires financial institutions to have a high degree of flexibility and adaptability. Financial globalization has made cross-border business an important development direction for financial institutions. However, there are significant differences in regulations and policies among different countries and regions, which poses compliance challenges for cross-border business of financial institutions. Financial institutions need to ensure smooth business operations while meeting regulatory requirements in various countries, which puts higher demands on their compliance and risk management capabilities. With the development of big data and artificial intelligence technology, financial institutions are facing increasingly strict data privacy and protection requirements when processing customer information. Regulations require financial institutions to comply with relevant regulations and protect the privacy rights and interests of customers when collecting, using, storing, and transmitting customer data. This poses new challenges to the data management and technical capabilities of financial institutions. Faced with the rapidly changing regulatory environment, financial institutions need to strengthen communication and

cooperation with regulatory agencies, and establish long-term stable cooperative relationships. Through regular communication and exchange with regulatory agencies, financial institutions can timely understand the need for them to continuously improve their compliance management capabilities, including establishing sound compliance systems, strengthening employee training, and enhancing compliance awareness. By enhancing compliance management capabilities, financial institutions can better respond to the challenges brought about by regulatory changes, ensuring the compliance and robustness of their businesses. Changes and trends in regulatory policies, planning business layout in advance, and reducing compliance risks. Financial institutions can use technological innovation to improve compliance efficiency. For example, using artificial intelligence and big data technology to monitor and analyze business data in real-time, identifying potential compliance risks; By utilizing blockchain technology, ensure the authenticity and immutability of transaction data, and reduce the probability of compliance risks occurring. Financial institutions can actively participate in industry self-discipline organizations to promote the formulation and implementation of industry standards. Through industry self-discipline and standardization construction, financial institutions can jointly address regulatory challenges, enhance the compliance level and competitiveness of the entire industry.

The fields of finance and banking technology face many challenges and prospects, among which the integration of technology and business models is a core issue. With the rapid development of technology, financial and banking institutions need to constantly explore how to combine advanced technology with business models to achieve more efficient, convenient, and secure financial services. New technologies are constantly emerging in the fields of finance and banking technology, such as artificial intelligence, blockchain, cloud computing, etc. The rapid development of these technologies requires financial institutions to quickly follow up and master relevant technologies. However, the rapid updates and iterations of technology also bring challenges, and financial institutions need to invest a large amount of resources in technology research and talent cultivation to cope with the continuous changes in technology. The traditional banking business model is deeply rooted, and to achieve innovation in the business model, many obstacles need to be

overcome. This includes adjustments to organizational structure, transformation of business processes, and improvement of risk management. In addition, innovative business models also need to consider factors such as market acceptance and regulatory policies, which increases the difficulty and risk of innovation. The integration of technology and business models is not simply a superposition, but requires a deep understanding and grasp of the inherent connection between technology and business. Financial institutions need to find a balance between technological application and business model innovation, fully leveraging the advantages of technology while ensuring the feasibility and sustainability of business models. This requires financial institutions to have cross-border thinking and capabilities, as well as rich practical experience. By introducing technologies such as artificial intelligence and big data, financial institutions can achieve intelligent services and provide customers with more convenient and personalized financial products and services. For example, intelligent customer service can answer customer inquiries in real-time, and intelligent investment advisors can provide personalized investment advice to customers. These intelligent services will greatly enhance customer experience and enhance customer stickiness. Digital transformation is an important way for financial institutions to achieve the integration of technology and business. By introducing technologies such as cloud computing and blockchain, financial institutions can digitize and automate their business processes, improving operational efficiency. For example, blockchain technology can be used in fields such as cross-border payments and supply chain finance to achieve fast, secure, and low-cost transactions. Open banking is an important trend in the integration of technology and business models. Through open API interfaces, financial institutions can share data and resources with third-party developers and partners to jointly develop innovative financial products and services. This will help financial institutions expand their business boundaries, achieve cross-border cooperation and win-win outcomes. The integration of technology and business models will also help financial institutions enhance their risk management capabilities. By introducing technologies such as big data and artificial intelligence, financial institutions can achieve real-time monitoring and early warning of risks, improving the accuracy and efficiency of risk management. This will help financial institutions better cope with market and operational risks, and ensure the stable

development of their businesses.

3.3 Future development trends and prospects Deep intergration of financial technology

The fields of finance and banking technology are undergoing unprecedented changes, and the deep integration of financial technology is an important trend for future development. The deep integration of financial technology involves multiple technological fields, such as artificial intelligence, big data, blockchain, cloud computing, etc. These technologies each have unique advantages and characteristics, but how to effectively integrate and integrate them into financial business is a huge challenge. Financial and banking institutions need to overcome compatibility issues between technologies to ensure smooth operation and data exchange between different technology systems. With the deep integration of financial technology, data collection, storage, analysis, and sharing have become increasingly common. However, this also brings challenges in data security and privacy protection. Financial and banking institutions need to take strict security measures to ensure the security and privacy of customer data, and prevent data leakage and abuse. The development of financial technology has also brought about continuous adjustments and changes in regulatory policies. Financial and banking institutions need to closely monitor changes in regulatory policies to ensure compliance with their business models. At the same time, they also need to maintain close communication with regulatory agencies to jointly promote the healthy development of financial technology.

With the continuous development of artificial intelligence technology, intelligent financial services will become the mainstream in the future. Financial and banking institutions can utilize artificial intelligence technology to achieve more accurate customer demand analysis, more intelligent risk assessment, and more efficient business processes. This will greatly enhance the customer experience, enhance the convenience and personalization of financial services. The deep integration of financial technology will promote the comprehensive digitization of financial services. Financial and banking institutions will build a more open and interconnected digital financial ecosystem, achieving

deep cooperation with other financial institutions, technology enterprises, government departments, etc. This will help break down information barriers and improve the efficiency and coverage of financial services. With the acceleration of globalization, the demand for cross-border financial services is becoming increasingly strong. The deep integration of financial technology will provide stronger support for cross-border financial services. Through technologies such as blockchain and cloud computing, financial and banking institutions can achieve faster, safer, and more convenient cross-border payments and settlements, promoting the interconnectivity of global financial markets. Facing the challenges of global climate change and sustainable development, green financial technology will become an important direction for future development. Financial and banking institutions will actively explore the application of financial technology in the field of green finance, promoting innovation in green finance products and upgrading service models. This will help promote sustainable economic and social development.

The financial and banking technology fields are facing many challenges and prospects, among which the intelligence and personalization of banking services have become the focus of industry attention. With the rapid development of technology, especially the rise of technologies such as artificial intelligence and big data, banking services are undergoing unprecedented changes. To achieve intelligent and personalized services, banks first face the challenge of technology integration and application. This includes how to effectively integrate advanced technologies such as artificial intelligence, big data, and cloud computing into banking business processes, as well as how to ensure the stable and efficient operation of these technologies. Intelligence and personalized services rely on a large amount of customer data. However, the accuracy and security of data have become important issues faced by banks. How to ensure the authenticity and integrity of data, while preventing data leakage and abuse, is a key issue that banks need to address. With the diversification of customer needs, banks need to provide more personalized services. However, how to accurately capture customer needs and provide personalized services that meet customer expectations is a challenge that banks need to face. With the continuous advancement of technology, the intelligence of banking services will become the mainstream in the future. Through artificial intelligence technology, banks can achieve functions such as intelligent

customer service, intelligent risk control, and intelligent investment advisory, improving service efficiency and quality. With the help of big data and artificial intelligence technology, banks can gain a deeper understanding of customer consumption habits, risk preferences, and other information, providing customers with more personalized products and services. This can not only improve customer satisfaction, but also help banks expand market share. In order to achieve more intelligent and personalized services, banks need to engage in deep cooperation with cross-border partners such as technology companies and e-commerce platforms. By sharing data, technological resources, etc., we jointly develop innovative financial products and services to meet the diverse needs of our customers. The core of intelligent and personalized services lies in improving customer experience. By optimizing business processes, simplifying operational steps, and providing convenient service channels, banks can provide customers with a more comfortable and convenient service experience.

The financial and banking technology fields are facing unprecedented challenges and opportunities in cross-border cooperation and innovation ecosystem construction. With the rapid development of technology, financial and banking institutions need to constantly seek cross-border cooperation with enterprises in different fields, jointly build an innovation ecosystem to adapt to market changes and enhance competitiveness. The primary challenge of cross-border cooperation lies in how to screen and match suitable partners. Financial and banking institutions need to find partners with complementary advantages that can jointly promote business development. However, due to differences in business models, cultural differences, and regulatory policies in different fields, selecting suitable partners is not an easy task. The primary challenge of cross-border cooperation lies in how to screen and match suitable partners. Financial and banking institutions need to find partners with complementary advantages that can jointly promote business development. However, due to differences in business models, cultural differences, and regulatory policies in different fields, selecting suitable partners is not an easy task. Cross border cooperation often involves more complex regulatory and policy environments. Financial and banking institutions need to fully consider compliance risks and regulatory challenges when collaborating with enterprises in different fields. This includes understanding and complying with regulatory requirements in different fields, as well as addressing potential regulatory arbitrage and regulatory gaps.

Through cross-border cooperation, financial and banking institutions can jointly build an innovation ecosystem with enterprises in other fields. This helps to break down industry barriers, achieve resource sharing and complementary advantages, and promote the upgrading and innovation of financial services. With the continuous development of the innovation ecosystem, financial and banking institutions will be able to provide more diversified and personalized products and services to meet the diverse needs of customers. Cross border cooperation will bring expansion and deepening of new technology applications to financial and banking institutions. Through cooperation with technology enterprises, financial and banking institutions can introduce advanced technologies such as artificial intelligence, blockchain, and cloud computing to improve business efficiency and risk management level. At the same time, the application of new technologies will also promote the intelligent and personalized development of financial services, improving customer experience. Cross border cooperation helps financial and banking institutions expand market space and enhance competitive advantages. Through cooperation with enterprises in different fields, financial and banking institutions can enter new markets and customer groups, expand their business scope and revenue sources. Meanwhile, by sharing resources and complementing advantages, financial and banking institutions can enhance their competitiveness and influence in the market.

CONCLUSIONS

With the rapid development of technology, the financial and banking technology fields have undergone earth shaking changes. FinTech is an important driving force for innovation in the financial sector. It is based on a series of technological innovations such as big data, cloud computing, artificial intelligence, and blockchain, bringing unprecedented changes to the financial industry. These innovations not only change the way financial services are provided, but also bring customers a more convenient, efficient, and secure experience. The progress in the field of banking technology is mainly reflected in the optimization and upgrading of financial services. For example, the emergence of new financial services such as mobile payments, online loans, and intelligent investment advisors are typical representatives of banking technology applications. These applications not only improve the efficiency and quality of financial services, but also provide customers with more choices and convenience. The widespread application of financial technology is changing the ecological landscape of the financial industry. The competitive relationship between traditional financial institutions and fintech companies is becoming increasingly complex, and industry boundaries are gradually becoming blurred. Meanwhile, with the popularization of financial technology, the threshold for financial services is gradually decreasing, and more participants are joining this ecosystem to jointly promote industry progress. The development of finance and banking technology has intensified industry competition. On the one hand, traditional financial institutions need to continuously invest resources in technological upgrading and innovation to cope with challenges from fintech companies; On the other hand, fintech companies also need to continuously improve their technological strength and service level in order to stand out in fierce market competition. With the increasing diversification and personalization of customer demand for financial services, the future development of finance and banking technology will pay more attention to improving customer experience. By introducing more intelligent and personalized services, we can meet the different needs of customers and improve their satisfaction and loyalty. With the continuous increase and

complexity of financial data, data security issues are becoming increasingly prominent. The future development of finance and banking technology will place greater emphasis on data security and privacy protection. By strengthening measures such as data encryption, risk assessment, and regulation, we ensure the security and compliance of customer data. In summary, the basic concepts and methods of scientific knowledge in the fields of finance and banking technology are constantly evolving and changing. Only by continuously innovating and applying new technologies, strengthening the optimization and upgrading of industry ecology and competitive landscape, and paying attention to customer experience and data security, can we promote sustained progress and development in the financial and banking technology fields.

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ПРОТОКОЛ
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