



**THE EFFECT OF DIGITAL TECHNOLOGY ON THE RISK
MANAGEMENT OF AGRICULTURAL SUPPLY CHAIN
FINANCE - A CASE STUDY OF LONGPING HIGH-TECH**

**WANG LIN
6317195858**

**AN INDEPENDENT STUDY SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF BUSINESS ADMINISTRATION
GRADUATE SCHOOL OF BUSINESS
SIAM UNIVERSITY**

2024



**THE EFFECT OF DIGITAL TECHNOLOGY ON THE RISK
MANAGEMENT OF AGRICULTURAL SUPPLY CHAIN
FINANCE - A CASE STUDY OF LONGPING HIGH-TECH**

WANG LIN

This Independent Study has been Approved as a Partial Fulfillment of the
Requirements for the Degree of Master of Business Administration

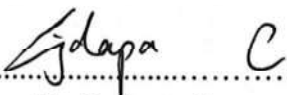
Advisor: *Jidapa C.*
(Dr. Jidapa Chollathanrattanapong)

Date: *19 / Aug / 2024*

..... *JM*
(Associate Professor Dr. Jomphong Mongkhonvanit)
Dean, Graduate School of Business

Date: *26 / W-U. / 67.*
Siam University, Bangkok, Thailand

Title: The Effect of Digital Technology on the Risk Management of Agricultural Supply Chain Finance - A Case Study of Longping High-Tech
By: Wang Lin
Degree: Master of Business Administration
Major: International Business Management

Advisor: 
(Dr. Jidapa Chollathanrattanapong)

Date: 19 / Aug / 2024

ABSTRACT

Digital technology plays a pivotal role in agricultural supply chain finance. They can address issues such as insufficient funding sources, information asymmetry, and high transaction costs, thereby facilitating the growth of agricultural supply chain finance.

The objective of this study was to explore the effect of the coverage of digital technology, the usage depth of digital technology, and the digitalization on risk management of agricultural supply chain finance.

This study adopted the quantitative research method. In this study, a total of 400 questionnaires were distributed, with 349 valid questionnaires and the response rate was 82.75%. The population included farmers, suppliers, financial institutions, and internal managers of Longping High-Tech. This study found that the coverage of digital technology, the usage depth of digital technology, and the digitalization have a significant positive effect on risk management of agricultural supply chain finance. For recommendations, Longping High-Tech should focus on the following aspects: 1) Enhancing digital technology coverage; 2) Deepening the utilization of digital technology; 3) Enhancing digitalization.

Keywords: agricultural supply chain finance, digital technology, information asymmetry, transaction costs

ACKNOWLEDGEMENT

First of all, I would like to express my sincere gratitude to my supervisor. He gave me selfless help and guidance in the process of conducting my independent study. Whether in the process of topic selection, research, or the actual writing process, he always patiently communicated with me and gave me valuable advice and suggestions. Without his help, I may not be able to finish this independent study. Secondly, I would like to thank all the teachers and leaders of the school. Their teaching and training have benefited me academically. I am grateful for their support and help during my schooling. In addition, I would like to thank my classmates and friends. They have given me a great deal of help and support throughout the independent study writing process. Without their company and encouragement, I might not have been able to make it to the end. Finally, I would like to thank my family. They are always my most solid support. During the process of writing my independent study, they gave me selfless support and encouragement and accompanied me through countless sleepless nights.

With this independent study completion, I deeply feel that my academic level still needs to be improved. Although this independent study has been revised and improved many times, it is inevitable that there are still some shortcomings. I hope that in the future study and practice, I can continue to make progress and make my own contribution to the development of the business administration discipline.

Thanks again to all those who have supported, helped and encouraged me. I will cherish this valuable experience and keep working hard to become a better MBA graduate.

Wang Lin
May 24, 2024

DECLARATION

I, Wang Lin, hereby certify that the work embodied in this independent study entitled “The Effect of Digital Technology on the Risk Management of Agricultural Supply Chain Finance - A Case Study of Longping High - Tech” is result of original research and has not been submitted for a higher degree to any other university or institution.

Wang Lin

Wang Lin
May 24, 2024



CONTENTS

ABSTRACT.....	I
ACKNOWLEDGEMENT	II
DECLARATION	III
CONTENTS.....	IV
LIST OF TABLES.....	VI
LIST OF FIGURES	VII
Chapter 1 Introduction	1
1.1 Background of the Study	1
1.2 Questions of the Study	4
1.3 Objectives of the Study.....	5
1.4 Scope of the Study	5
1.5 Significance of the Study.....	6
1.6 Definition of Key Terms.....	7
1.7 Limitations of the Study.....	8
Chapter 2 Literature Review.....	9
2.1 Literature Review.....	9
2.2 Research Relevant.....	21
2.3 Conceptual Framework.....	28
Chapter 3 Research Methodology.....	30
3.1 Research Design.....	30
3.2 Questionnaire Design.....	30
3.3 Hypothesis.....	32
3.4 Population and Sampling	33
3.5 Data Collection	33
3.6 Data Analysis	34

Chapter 4 Findings.....	38
4.1 Introduction.....	38
4.2 Demographic Characteristics of Participants.....	38
4.3 Results of the Study	41
Chapter 5 Conclusion and Recommendation.....	44
5.1 Conclusion	44
5.2 Recommendation	46
References.....	50
Appendix.....	53



LIST OF TABLES

Table 3.1 Questionnaire Structure	30
Table 3.2 Variate Reliability Test.....	34
Table 3.3 KMO and Bartlett's Test	35
Table 3.4 Total Variance Explained	35
Table 3.5 Rotated Component Matrix	36
Table 4.1 Distribution of Gender-Age of Samples (N = 379)	39
Table 4.2 Distribution of Education-Position-Tenure of Samples (N = 379).....	39
Table 4.3 Descriptive Statistics.....	40
Table 4.4 Correlation Between Variables (Pearson Correlation Matrix)	41
Table 5.1 Hypothesis Test Results.....	46

LIST OF FIGURES

Figure 2.2 Conceptual Framework	29
Figure 3.1 Hypotheses	33



Chapter 1 Introduction

1.1 Background of the Study

Since the 1990s, the "agriculture, rural areas, and farmers" issue has always been a key focus for the Party and the government. In order to guide and promote the development of national "three rural" work, the Central Committee of the Communist Party of China has issued 21 central documents focusing on "three rural" issues. On October 26, 2020, at the Fifth Plenary Session of the 19th CPC Central Committee, special emphasis was placed on the importance and core position of solving the "three rural" issues, and it was clearly proposed to continue to promote the modernization of agriculture, rural areas, and implement the overall strategy of rural revitalization as an important task (Li, 2023). At the same time, the meeting emphasized the importance of the first agricultural industry, requiring the promotion of agricultural modernization transformation towards modern production methods, achieving specialization, scale, and intensive development. Agricultural modernization and rural revitalization require capital input, and cannot be separated from the powerful support of rural inclusive finance (Guo et al., 2022). Only by ensuring the stability and orderly development of rural inclusive finance can we effectively promote the rapid growth of agricultural industries, achieve rural revitalization and agricultural modernization.

1.1.1 Current Status and Challenges in the Development of Inclusive Finance in Rural Areas

At present, the main body of rural inclusive finance in China is traditional financial institutions. There are three types of financial institutions in rural areas: the first is national financial institutions, mainly large state-owned banks such as the Agricultural Bank and the Postal Savings Bank; the second is local financial institutions, mainly rural credit cooperatives, rural commercial banks, and township banks; and the third is non-bank financial institutions, such as rural finance companies and village banks. With the efforts of traditional financial institutions, traditional rural inclusive finance has achieved certain achievements. According to the People's Bank of China's "Analysis Report on Inclusive Finance Indicators (2022)," by the end of 2022, a total of 495.2 million personal bank settlement accounts had been opened in rural areas, and 404.8 billion bank cards had been issued. According to the "2022 China Banking Industry Service Report" released by the China Banking Association, the outstanding balance of agricultural loans was 4.925 trillion yuan by the end of 2022, an increase of 22.85 trillion yuan from the end of 2015; the outstanding balance of small and micro

enterprise loans was 597 billion yuan, an increase of 36.2 billion yuan from the end of 2015; and the outstanding balance of loans to rural poverty alleviation population was 103 billion yuan (Liang, 2023).

At the same time, there are long-term problems in rural financial services, such as low access to funds, difficulties in risk control and management, low service efficiency, and information asymmetry. At present, China has entered the comprehensive promotion stage of rural revitalization, farmers' credit demand is more vigorous, and higher requirements are put forward for financial inclusion. Guiding and leveraging financial resources to flow into the agricultural and rural areas is an important measure to promote rural revitalization in China (Li, 2023). But economically backward areas face a situation of insufficient financial supply. Rural areas with insufficient financial supply gradually become the focus of inclusive finance. Since the 20th National Congress of the Communist Party of China, China has entered the stage of comprehensive promotion of rural revitalization, and economic activities in rural areas have continued to develop, with farmers' credit demand becoming more and more robust. As a means of solving the "three rural" problems, the importance of the factor of funds is increasingly evident. It is necessary to address the question of "where the money comes from." (Ma, 2024).

1.1.2 Developments in Agricultural Supply Chain Finance

In recent years, traditional rural inclusive finance based on consumption has become relatively mature, while rural inclusive finance based on production has problems such as a lack of diversified financial products, dependence on collateral or pledges, and being unable to meet financing needs, and thus needs further development. Market entities such as financial institutions and core enterprises have innovated financing methods based on supply chains in practice and developed agricultural supply chain finance, becoming an important force to promote rural inclusive finance.

Since August 2011, the People's Bank of China, the former China Banking Regulatory Commission, the China Securities Regulatory Commission, and the former China Insurance Regulatory Commission jointly issued a document in which they first proposed the concept of "agricultural supply chain finance." Subsequently, in Document No. 17 issued by the General Office of the State Council in 2014, the necessity of promoting the development and popularization of financial models in the agricultural field was explicitly stated. In 2017, the "Guiding Opinions on Actively Promoting Supply Chain Innovation and Application" document, issued by the General Office of the State Council after being approved by the State Council, highlighted the integration of rural industries, and proposed extending supply chain finance services to

the agricultural sector (Ruan et al., 2022). In 2020, the Office of the Central Leading Group for Agricultural Work and other departments issued the Opinions on Expanding Effective Investment in Agriculture, Rural Areas and Improving the Shortcomings of the "Three Agricultural" Fields, which further pointed out that financial credit support and innovation of financial products and services are needed to effectively support the "Three Agricultural" work and solve the financing difficulties in agriculture and rural areas. At the same time, the People's Bank of China and other departments jointly issued the Opinions on Standardizing the Development of Supply Chain Finance, Supporting the Stable Circulation and Optimization Upgrading of Supply Chains and Industrial Chains, which proposed promoting the steady development of supply chain finance, promoting supply chain finance innovation, and safeguarding the legitimate rights and interests of small and micro enterprises through supply chain finance (Dong et al., 2020).

1.1.3 Digital Technology Brings New Opportunities to Agricultural Supply Chain Finance

According to the China Digital Rural Development Report (2022), our rural areas have been fully covered by network infrastructure, and the historical problem of poor communication in rural areas has been solved. By June 2022, the internet penetration rate in rural areas had increased to 58.8%, a significant narrowing of the gap between urban and rural areas compared to the initial stage of the 13th Five-Year Plan, with a reduction of nearly 15 percentage points. The number of rural internet users reached 293 million. The agricultural production informationization rate was 25.4% in 2021 (Agricultural Rural Department Information Center, 2023). According to the China People's Bank's "Analysis Report on Universal Financial Indicators in 2022", the banking and financial institutions in the rural areas achieved significant growth in mobile financial services, with a total of 19.93 billion mobile banking transactions completed throughout the year. Meanwhile, non-bank payment institutions were active in the field of online payment, with a total of 1021.81 billion online payment transactions processed (Shao et al., 2021). During the same period, the non-bank payment institutions processed a total of 5919.25 billion online payment transactions, of which a significant portion was targeted at rural areas (China People's Bank Poverty Alleviation and Financial Inclusion Working Group, 2023). The digital RMB service system is gradually penetrating into the county and rural areas of the pilot regions, targeting unique scenarios such as agricultural product circulation and trading, and the distribution of agricultural policy funds, continuously expanding the reach of rural financial services and driving the process of rural revitalization and digital rural development. The foundation for the development of rural inclusive finance and agricultural supply chain finance has been further consolidated.

In December 2019, the Ministry of Agriculture and Rural Affairs and the Office of the Central Commission for Network Security and Informationization jointly launched the "Development Plan for Digital Agriculture, Rural Areas (2019-2025)," which

charted the direction for the future digital development of rural areas (Guo et al., 2022). The plan proposed a series of measures, such as enhancing the application of digital technology in agricultural finance, promoting the integration of agriculture, rural areas and new technologies, and establishing rural digital markets and trading platforms. By applying digital technology, it can effectively solve the spatial and temporal limitations and information barriers, improve the modern agricultural supply chain system that is market-oriented, profit-based, and large enterprises as the core, thereby extending the rural industrial chain, upgrading the agricultural value chain, and promoting the deep integration of rural first, second and third industries. This will become a key means to promote the rural revitalization strategy and bring new opportunities for the development of agricultural supply chain finance (Ministry of Agriculture and Rural Affairs, 2020).

1.2 Questions of the Study

This research aims to analyze the role of digital technology in agricultural supply chain finance. It revisits the current state of inclusive rural finance. To address the issues of insufficient funding sources and information asymmetry within inclusive rural finance, agricultural supply chain finance emerged as a solution. This study delves into the current status and problems of agricultural supply chain finance development. Digital technology play a pivotal role in agricultural supply chain finance. They can address issues such as insufficient funding sources, information asymmetry, and high transaction costs, thereby facilitating the growth of agricultural supply chain finance. The focus of this research lies in the issue of how digital technology drive the development of agricultural supply chain finance. This study organizes and reviews the research progress and achievements related to the role of digital technology in agricultural supply chain finance. It aims to identify the influencing factors of digital technology on risk management in agricultural supply chain finance. Furthermore, taking Longping High-Tech as a case study, this research analyzes specific issues of the observed phenomena.

1. Does the coverage of digital technology affect risk management of agricultural supply chain finance?

2. Does the usage depth of digital technology affect risk management of agricultural supply chain finance?

3. Does the digitalization affect risk management of agricultural supply chain finance?

1.3 Objectives of the Study

The research objective of this study was to analyze the agricultural supply chain finance scenarios of Longping High-Tech, focusing on identifying the financing pain points of various parties within the supply chain. By leveraging digital technology, the study aimed to establish a financial routing platform for the agricultural industry chain and unified management of supply chain finance partners and their products. This platform will enhance credit evaluation and risk management capabilities. Additionally, with the robust risk control model, the study aimed to uncover and harness the potential value of digital finance, ensuring that it effectively addresses the financing challenges faced by all stakeholders in the agricultural supply chain. Therefore, combined with the above analysis, the purpose of this study is:

1. To explore the effect of the coverage of digital technology on risk management of agricultural supply chain finance.
2. To explore the effect of the usage depth of digital technology on risk management of agricultural supply chain finance.
3. To explore the effect of the digitalization on risk management of agricultural supply chain finance.

1.4 Scope of the Study

The research population of this study was the employees of Longping High-Tech. A questionnaire survey was conducted using the online platform Wen Juan Xing, specifically targeting employees of Longping High-Tech, including those involved in agricultural supply chain risk management, financial staff, and relevant managers. The study utilized the Wen Juan Xing online questionnaire link to collect and organize relevant data through its backend system. Longping High-Tech employs over 5,000 people and has a factory building area of over 120,000 square meters. The survey content covered various aspects, including the breadth of digital finance coverage, the depth of digital finance usage, the level of digitalization, and agricultural supply chain risk management. The survey was conducted from April 10, 2024, to July 10, 2024, aiming to gather comprehensive insights into the digital transformation and supply chain finance practices within Longping High-Tech.

1.5 Significance of the Study

1.5.1 Theoretical Significance of Research on Agricultural Supply Chain Finance

In recent years, traditional consumption-based rural inclusive finance has been relatively mature, and production-based rural inclusive finance still needs to be developed. Due to the lack of collateral, sloppy financial management, information asymmetry and other factors of rural small and medium-sized enterprises and other business subjects, traditional business loans cannot fully meet the financing needs of rural small and medium-sized enterprises and other business subjects, in recent years, the development of agricultural supply chain finance has put forward a new way of thinking for the rural inclusive finance, and has become an important force to promote the development of rural inclusive finance. Research on agricultural supply chain finance from the perspective of digital technology, using the relevant information asymmetry theory, transaction cost theory, supply chain finance theory, fully explore the role of digital technology for agricultural supply chain finance, break through the traditional perspective of financial products, financial institutions to study the mode of agricultural supply chain finance, so that the research of agricultural supply chain finance can be obtained from a new perspective to solve the problem. Through interviews and relevant case studies, the research results related to the application of digital technology in agricultural supply chain finance can be deepened.

1.5.2 Practical Significance of Research on Agricultural Supply Chain Finance

Longping High-Tech is a leading enterprise in the domestic seed industry, its business model is highly representative, and the problems encountered in its agricultural supply chain finance are also more typical. Through in-depth analysis of Longping High-Tech's agricultural supply chain finance business, this study analysed the financing status quo and problems of Longping High-Tech and downstream dealers, focuses on the financing pain points of Longping High-Tech and downstream dealers, and applied the guidance of the information asymmetry theory, the transaction cost theory, and the supply chain finance theory, to set up an agricultural supply chain finance platform through digital science and technology, to help small and medium-sized enterprises of upstream and downstream to conveniently raise funds and reduce the cost of financing, to realize Longping High-Tech's financing of the agricultural supply chain. It also realizes Longping High-Tech's unified control of the agricultural

supply chain, helps financial institutions accurately dock customer groups to reduce transaction costs, and reduces information asymmetry by applying the results of the risk control model provided by the supply chain finance platform. These case details help to enrich the application scenarios of related theories and provide realistic references for other core enterprises to develop agricultural supply chain finance business.

1.6 Definition of Key Terms

Digital Technology refers to the utilization of electronic devices and information technology for data processing, transmission, and storage, encompassing technologies such as the Internet, mobile communication, big data, cloud computing, and artificial intelligence. In the context of this study, digital technology specifically refers to those applied in agricultural supply chains and financial services, including online payment platforms, agricultural Internet of Things, smart contracts, and more.

Agricultural Supply Chain represents the interconnected sequence of activities involved in agricultural inputs, production, processing, storage, transportation, and sale of agricultural products, ultimately reaching consumers. It encompasses the entire process from farms to consumers. For this research, the agricultural supply chain specifically encompasses all stages of Longping High-Tech's operations in seed production, sales, and related support services.

Digital Technology Coverage measures the digital technology adopted across different segments and entities within the agricultural supply chain. Criteria for measurement include the number of farmers and enterprises using digital technology, the geographical areas covered, and the variety of technologies involved. In this study, coverage breadth assesses the adoption of digital technology by Longping High-Tech and its upstream and downstream supply chain partners across various stages.

Digital Technology Usage Depth refers to the extent and frequency of digital technology utilization by various entities within the agricultural supply chain. Metrics for measurement include average usage duration per user, frequency of use, and level of dependency. In this study, usage depth evaluates the extent to which Longping High-Tech and its partners rely on and frequently use digital technology in their business operations.

Digitalization Level assesses the extent to which digital technology is widely and deeply integrated into various segments and entities within the agricultural supply chain. Criteria for measurement include the types of digital technology used, the prevalence

of digital devices, and the sophistication of digital platform applications. In this study, the digitalization level is measured by evaluating the comprehensiveness and integration of digital technology adopted by Longping High-Tech across its business operations.

Risk Management of Agricultural Supply Chain Finance involves identifying, assessing, and controlling various financial-related risks (such as credit risk, market risk, and liquidity risk) within the agricultural supply chain. Criteria for evaluation include the comprehensiveness of risk identification, the accuracy of risk assessment, and the effectiveness of risk control measures. In this study, financial risk management specifically assesses how Longping High-Tech utilizes digital technology to identify and address financial risks, such as loan defaults and market price fluctuations.

1.7 Limitations of the Study

In studying the impact of digital technology on risk management of agricultural supply chain finance, despite adopting a systematic research approach, there remain several limitations and constraints. One significant challenge is the limited availability of comprehensive and accurate data. Some data are considered commercial secrets, and companies may be reluctant to disclose them. Furthermore, data collection was hindered by time and resource constraints. Although this study focuses on Longping High-Tech as a case study, offering an in-depth analysis, the representativeness of a single case may not be sufficient to encompass the full spectrum of agricultural supply chains.

External environmental factors also play a crucial role. Both digital technology and agricultural supply chain financial risk management are influenced by external changes such as policy shifts, technological advancements, and market fluctuations. These external factors can evolve during the study period, potentially affecting the universality and accuracy of the research findings. Digital finance encompasses a complex array of technologies and application scenarios, and different types of digital financial products and services may have varying impacts on agricultural supply chain risk management. This study may not fully encompass digital financial applications.

Additionally, the impact of digital technology on risk management of agricultural supply chain finance necessitates long-term observation and assessment. However, due to time and resource constraints, this study was unable to evaluate long-term effects. Socioeconomic factors, such as farmers' education levels, digital acceptance, and regional economic development, influence the effectiveness of digital technology applications and risk management strategies.

Chapter 2 Literature Review

2.1 Literature Review

2.1.1 Agricultural Supply Chain Finance

(1) Definition of Agricultural Supply Chain Finance

In the understanding and interpretation of agricultural supply chain finance, different scholars and experts have put forward their own views and definitions. Emphasizing the role of core enterprises in the agricultural industry chain, it is believed that agricultural supply chain finance is a mode of providing financing and other financial services to upstream and downstream enterprises centered on core enterprises through the assessment and monitoring of supply chain information (Dong et al., 2020). With the help of collaboration with financial institutions and their upstream and downstream chain enterprises, industrial core enterprises use the power of science and technology to implement financial operations such as capital raising, payment processing and risk control for each link of the industrial chain, aiming to promote the optimization of capital flow and enhance the efficiency of the access to funds by all parties in the chain, while cutting down the cost burden of the whole operation (Li, 2023).

From the perspective of promoting the upgrading of the agricultural industry and the development of the rural economy, agricultural supply chain finance is regarded as a financial model that takes agriculture as the core and realizes the purpose of supply chain finance through the opening up of capital flow (Ruan et al., 2022). Through organic integration with specific industrial organization forms, under the condition of reasonable institutional arrangements, bank credit can be used to allocate financial resources to the traditional farming segment with scarce capital by means of credit transactions of leading enterprises or by transforming the credit relationship between enterprises and farmers into the form of credit guarantee (Jiang et al., 2014). Supply chain finance is a financial service model that optimizes capital flow and risk control through transaction data and technology (Hofmann et al., 2011). Agricultural supply chain finance provides financial services for the agricultural industry through supply chain finance to solve the financing needs including core enterprises, upstream and downstream enterprises and other participants (Liang, 2023). Agricultural supply chain finance relies on the guarantee of core enterprises to solve the financing problems of small and medium-sized enterprises (SMEs) that have direct business connections with

core enterprises (Li et al., 2023). Resource integration and credit rating system of all parties in the supply chain play an important role in solving the financing problems of SMEs (Pfohl et al., 2009).

Agricultural supply chain finance is a form of finance based on collaboration and trust in the supply chain to jointly meet financial needs, which requires the establishment of a long-term stable collaborative relationship (Eddie Ma, 2024). Agricultural supply chain finance is not only the cooperation between core enterprises and upstream and downstream enterprises, but also includes multi-party cooperation with financial institutions and third-party logistics enterprises to provide comprehensive financial services for agriculture-related enterprises (Guo et al., 2022). In summary, although various experts and scholars have their own definitions and understandings of agricultural supply chain finance, they all agree on the positive role of supply chain finance in promoting the development of the agricultural industry, solving the financing problems of SMEs, and improving the liquidity and efficiency of funds. These views together constitute a comprehensive and in-depth understanding of agricultural supply chain finance.

(2) Advantages of Agricultural Supply Chain Finance

Numerous scholars have explored the advantages of agricultural supply chain finance from different perspectives and have drawn a series of useful conclusions. The advantage of agricultural supply chain finance lies in its ability to optimize the distribution of funds, reduce financing costs and improve overall business efficiency. At the same time, it also helps to improve the level of rural credit risk management and reduce the financing barriers for small, medium and micro enterprises in the agricultural industry chain (Li, 2023). Customized financial product supply makes agricultural supply chain finance effective in reducing information asymmetry, cutting lending and borrowing transaction expenses, and enhancing the accessibility of financing for each business entity in the supply chain, while opening up a wide selection of financing channels for enterprises (Dong et al., 2020). From the perspective of enhancing the operational capacity of the entire agricultural supply chain, agricultural supply chain finance can solve the capital problems in the supply chain, assist farmers in solving the loan guarantee problem, and reduce credit risks by utilizing the cash flow in the supply chain trade contract as a repayment guarantee (Eddie Ma, 2024). The agricultural supply chain finance model can effectively reduce the financing constraints involving agricultural enterprises, improve their production efficiency and market competitiveness, and then strengthen the market position of enterprises (Guo et al., 2022).

By taking advantage of the information flow and technology in the supply chain, agricultural supply chain finance can optimize capital flow, reduce financial risks, lower financing costs, and improve the overall efficiency of the supply chain through digital management. In addition, agricultural supply chain finance also helps to strengthen the trust between partners, expand market opportunities, and enhance the competitiveness of enterprises (Pfohl et al., 2009). Agricultural supply chain finance not only promotes the development of the agricultural industry and the revitalization of the countryside, but also enhances the financing capacity and efficiency of small and medium-sized enterprises (SMEs) involved in agriculture, and promotes the synergistic progress of the agricultural industry chain (Liang, 2023). Agricultural supply chain finance can effectively reduce financing costs, improve financing efficiency, and accelerate the circulation of agricultural products, promote the marketization process, solve the financing problems in rural areas, and then promote the upgrading and development of the agricultural industry (Shao et al., 2021). Agricultural supply chain finance can promote the expansion of the business scale of modern agricultural business entities and realize large-scale operation. At the same time, it also helps farmers and small and medium-sized enterprises (SMEs) integrate with modern agriculture (Dong et al., 2020). Agricultural supply chain finance helps to improve the efficiency and quality of agricultural production, which is a key means to promote agricultural modernization (Ruan et al., 2022).

The agricultural supply chain finance model shows significant advantages in optimizing capital allocation, reducing financing costs, improving operational efficiency, and promoting agricultural industry upgrading and rural economic development. By providing structured financial services, this model alleviates the problem of information asymmetry, reduces credit transaction costs, enhances trust among supply chain parties, and expands market opportunities, thus providing strong support for the development of the agricultural industry and rural revitalization.

(3) Business Model of Agricultural Supply Chain Finance

As a diversified financial service model, agricultural supply chain finance covers a variety of different operation methods and operation mechanisms. Numerous scholars have conducted in-depth research on it and put forward their own insights and classifications.

Internal financing model: This model is applicable to the case where the core enterprise builds its own bank or microfinance company, which can minimize the risk through credit rationing, and at the same time can accurately and efficiently carry out

transportation and ensure the quality of agricultural products (Shao et al., 2021). In addition, in the complex network of the agricultural supply chain, enterprises at the core can make full use of their resource advantages to directly provide strong financial assistance to upstream and downstream enterprises. Such support covers a wide range of financial measures: from allowing downstream enterprises to defer payment of the costs of purchasing production materials, to paying upstream enterprises in advance for the purchase of goods, and even directly granting loans to upstream and downstream enterprises, so as to comprehensively promote the smooth progress of agricultural production activities, and to ensure the stability and efficient operation of the supply chain as a whole (Dong et al., 2020).

Order financing model: This mode applies to the situation where upstream SMEs sign contracts with core enterprises, and banks can provide loans for SMEs according to orders, thus solving the problem of financing difficulties for SMEs (Shao et al., 2021).

Accounts receivable model: Upstream enterprises can apply for loans from banks by using the vouchers of accounts receivable as collateral. The core enterprise provides payment guarantee to the bank, and the bank will grant loans to the upstream enterprise after conducting assessment (Shao et al., 2021). Upstream enterprises also have the right to choose to assign accounts receivable to financial institutions as a means of financing, thus realizing quick access to funds. The financial institution will collect the corresponding amount directly from the downstream customers of that upstream firm when the stipulated repayment period for the accounts receivable arrives. The downstream enterprise can also pay the upstream enterprise first, and once the downstream enterprise has made these payments, the upstream enterprise can repay the loan principal and interest to the financial institution. (Li, 2023).

Model with third-party logistics involvement: This model usually involves commercial banks, core enterprises, third-party logistics companies, and small and medium-sized agricultural producers. In this model, the third party logistics company acts as a regulator and guarantor. Commercial banks or financial institutions will entrust the transaction process to the third-party logistics company and make decisions based on the data provided by the logistics company, thus making loan issuance more standardized and principled (Shao et al., 2021). Financial institutions establishing cooperative relationships with third-party logistics companies can more comprehensively understand and supervise the loan performance of agriculture-related enterprises. Farming-related enterprises will actively fulfill their loan contracts in order to maintain the stability of the entire agricultural supply chain (Guo et al., 2022).

Cooperative participation model: This model relies on a leading enterprise and a rural cooperative to build a comprehensive financial service network by combining the participation of agriculture-related SMEs, logistics companies, commercial banks, and other parties. The “1+1+N” agricultural supply chain finance model aims to solve the problems of loose structure of the agricultural supply chain, the difficulty of auditing enterprise qualifications and risk control (Li et al., 2023). Taking cooperatives as the core body of the supply chain helps to grasp the information of all parties to manage the supply chain (Ruan et al., 2022).

E-commerce platform-led model: This model improves financing efficiency and reduces risks and costs by integrating the production and sales data of upstream and downstream enterprises, which can provide more convenient and flexible financial support for agricultural enterprises and help promote the digital transformation and upgrading of the entire industrial chain (Ruan et al., 2022). With rich user transaction data, e-commerce platforms are able to gain insight into the transaction behavior, capital flow and credit status of borrowers (e.g., farmers and dealers) through data analysis models. Based on these analyses, e-commerce platforms are able to provide customized financing services to minimize risks (Liang, 2023).

Warehouse receipt pledge model: Financing through warehouse receipt pledge means that farmers or enterprises use agricultural products stored in warehouses as collateral to seek loan channels from financial institutions. Specifically, they will first store their agricultural products in an agreed warehouse to harvest warehouse receipts; next, using this warehouse receipt as a guarantee, they will submit a loan request to the financial institution. Until the expiration of the loan period, the borrower is required to return the principal in full and pay the interest, at which point the pledge arrangement based on the warehouse receipts is dissolved (Li, 2023).

Digital agriculture supply chain finance model: Improving the rural credit process with the power of data elements can effectively strengthen the safety net of the rural financial system. The operating mechanism of digital agricultural supply chain finance is rooted in a new model of rural finance centered on big data. Under this model, agribusinesses and farmers, as the two pillars of the supply chain, work together to contribute key data resources to the platform. The platform not only accepts internal data, but also actively interfaces with other external platforms to collect a wide range of information on the business behavior, fiscal records and financial activities of farmers and enterprises in the agricultural supply chain. These valuable data, integrated and processed by the platform, become the basis for in-depth analysis by financial institutions. Once the audit process is completed, the financial institutions will then

provide financial support to farmers, agricultural enterprises or the entire supply chain, realizing the precise placement of financial services (Li, 2022).

The diversity and innovativeness of agricultural supply chain finance models provide a wide range of financial support and services for various links in the agricultural industry chain, and help promote the modernization and marketization of the agricultural industry. Through the organic combination and effective use of different models, it can better serve agricultural enterprises and farmers and promote the overall development and enhancement of the agricultural industry.

2.1.2 Risk Management Mechanism of Agricultural Supply Chain Finance

As a special financial service model, the risk management mechanism of agricultural supply chain finance is the key to ensure its healthy development and stable operation. At present, there is the problem of unreasonable credit rating of supply chain credit service in China's agricultural supply chain finance, due to the incomplete credit information of farmers, coupled with the uneven quality of credit personnel, which leads to the subjective rating with arbitrariness and increases the risk of lending. At the same time, agricultural supply chain finance also has the problem of long audit cycle of credit service business, due to the high cost of manpower investigation and complex process, in the process of audit and lending, if the planting time is missed, the loan obtained cannot play a key role, which directly affects the effective development of planting or breeding (He et al., 2023). Strengthening the service capacity of financial institutions and accelerating the improvement of the agricultural supply chain financial ecosystem is the core of risk management. Financial institutions need to continuously improve their professional skills and service level, while building a more mature and efficient financial service ecosystem (Liang, 2023). Different scholars have discussed this in depth and put forward their own insights and suggestions.

Currently, there are difficulties in credit information collection in agricultural supply chain finance credit services in China, due to the small industrial scale of small farmers and contractors and the lack of complete and standardized transaction records, which leads to their inability to provide compliant credit information materials to financial institutions (He et al., 2023). Risk assessment and monitoring play an important role in agricultural supply chain finance, and measures such as the establishment of a sound risk early warning mechanism and the establishment of risk reserves can help to identify and respond to potential financial risks in a timely manner and ensure the smooth operation of agricultural supply chain finance (Dong et al., 2020).

Risk management tools such as big data analysis play an important role in agricultural supply chain finance to improve the transparency of the agricultural industry chain, thus enhancing the stability and predictability of the entire supply chain and reducing the cost of financing (Li, 2023).

By strictly controlling credit risk, strengthening the monitoring of core enterprises, establishing a sound information disclosure system, and introducing third-party institutions to conduct assessments and other risk management mechanisms, the security and compliance of supply chain financial activities are ensured and potential financial risks are reduced (Shao et al., 2021). In addition, risk management measures such as strengthening post-loan management, establishing a risk early warning mechanism and strengthening credit ratings can improve the professionalism and refined management of financial services, which can help identify and deal with potential risk problems in a timely manner (Guo et al., 2022).

The establishment of a sound supply chain finance risk management system, information disclosure system and strengthening risk prevention awareness play an important role, and these measures help build a more robust and transparent agricultural supply chain finance environment (Eddie Ma, 2024). Measures to optimize the regulatory mechanism include strengthening the construction of the risk supervision system, formulating differentiated regulatory measures and establishing an information disclosure system. These measures aim to enhance the overall risk management level of agricultural supply chain finance by strengthening regulation and improving transparency (Ruan et al., 2022).

The risk management mechanism of agricultural supply chain finance involves a number of aspects, including credit risk control, core enterprise monitoring, information disclosure, third-party assessment, risk assessment and monitoring, regulatory system construction, and service capacity improvement. The implementation of these mechanisms and measures can help reduce the risk of agricultural supply chain finance and improve the efficiency and security of its operation, so as to provide more stable and reliable financial support for the development of the agricultural industry.

2.1.3 Marketing Theory

(1) Definition of Marketing Theory

The marketing theory refers to the theoretical system that studies and summarizes

the laws and principles of marketing activities. The marketing theory emphasizes market-oriented, that is, through in-depth understanding and analysis of market demand, competitive environment, and consumer behavior, to develop and adjust the enterprise's marketing strategy and plan to meet market demand and improve market competitiveness. The marketing theory believes that market transaction is a process of value exchange, enterprises need to provide valuable products or services to meet consumer demand, and through the exchange of obtaining the corresponding return, to maximize the interests of both parties. The marketing theory refers to the theoretical system that studies and summarizes the laws and principles of marketing activities, the core of which lies in market-oriented, customer-centered and realizes the long-term growth and competitive advantage of the enterprise by constantly understanding and satisfying market demand (Shapiro, 2011).

The marketing theory emphasizes customer-centeredness, i.e., to achieve long-term customer value and loyalty by constantly understanding and satisfying customer needs and establishing good customer relationships, to maintain the competitive advantage of the enterprise. The marketing theory divides marketing activities into four aspects: product, price, channel, and promotion. Companies need to consider and manage these four elements in an integrated way to achieve comprehensive and effective marketing. The marketing theory emphasizes the importance of market segmentation and positioning, i.e., dividing the market into different segments according to the characteristics and needs of the market, and choosing appropriate market positioning strategies to achieve precise marketing to the target market. The marketing theory emphasizes the analysis and evaluation of the external environment and internal resources, as well as the concern and understanding of various stakeholders, such as competitors, suppliers, consumers, and the government, to guide firms' marketing decisions and actions (Sandıkcı & Jafari, 2011).

(2) Marketing Mix Strategy

The marketing mix strategy refers to the enterprise according to market demand and the competitive environment, the integrated use of products, prices, channels and promotions, and other marketing elements, design and implementation of a comprehensive, coordinated marketing strategy. The implementation of a marketing mix strategy requires enterprises to comprehensively consider and balance these four marketing elements, to ensure that they are coordinated and complement each other to achieve the best market results. Enterprises can flexibly adjust and optimize each marketing element according to the market characteristics and the actual situation of the enterprise, to meet different market demands and achieve market goals (Sandıkcı &

Jafari, 2011). The marketing mix strategy emphasizes the comprehensiveness and coordination of marketing activities, and enterprises need to comprehensively consider and balance the four marketing elements of products, prices, channels, and promotions when formulating and implementing marketing strategies, to meet consumer demand, achieve market objectives and enhance enterprise competitiveness. Enterprises need to design and develop products or services that meet market demand according to market demand and consumer preferences, including decisions on product characteristics, quality, packaging, and branding (Tadajewski, 2012). Enterprises need to determine appropriate price levels to match product prices with market demand and the competitive environment, including pricing strategies, pricing methods, discounts, and promotional activities. Enterprises need to choose appropriate sales channels and distribution strategies to ensure the smooth flow of products to consumers, including arrangements for channel selection, middleman management, logistics, and inventory management. Enterprises need to adopt a variety of promotional methods and strategies to increase the visibility and attractiveness of their products in the market, including promotional efforts in advertising, sales promotion, public relations activities, direct marketing, and digital marketing (Shapiro, 2011).

2.1.4 Coverage of Digital Technology

With the rapid development of digital technology, the digitalization of various links within agricultural supply chains has continually increased, not only enhancing supply chain efficiency but also presenting new opportunities and challenges for financial risk management. The breadth of digital technology coverage refers to the extent of its penetration across different links and entities within agricultural supply chains. The metrics for measuring this include the number of farmers and enterprises utilizing digital technology, the geographical areas covered, and the technologies involved. Literature indicates that extensive digital technology coverage can improve information transparency, enhance supply chain management efficiency, and strengthen financial risk management capabilities (Liang, 2023).

The digital technology coverage breadth significantly boosts information transparency within agricultural supply chains. The proliferation of the internet and mobile technologies facilitates smoother information flows among supply chain links, mitigating information asymmetry issues (Liang, 2023). This improved transparency enables financial institutions to more accurately assess the credit risks of farmers and enterprises, thereby reducing loan default rates. The extensive application of digital technology has also fortified the resilience and adaptability of agricultural supply chains. For instance, Internet of Things technologies enable real-time monitoring of crop

growth, climatic changes, and logistics conditions, minimizing risks stemming from natural disasters and market fluctuations. This aids farmers and enterprises in enhancing their risk early warning capabilities, while financial institutions can conduct risk assessments and management more effectively (Liang, 2023).

Moreover, the breadth of digital technology coverage optimizes resource allocation within agricultural supply chains. Big data and artificial intelligence technologies can analyze and predict market demands, assisting farmers and enterprises in optimizing production and sales strategies. This not only elevates supply chain efficiency but also mitigates financial risks arising from supply-demand imbalances. Financial institutions can utilize these data to refine loan and insurance products, reducing risk exposures (Shao et al., 2021). The extensive coverage of digital technology has ameliorated the accessibility of financial services within agricultural supply chains. Mobile payments and Internet finance platforms make it easier for farmers and small-to-medium enterprises (SMEs) to access loans, insurance, and other financial services. Studies reveal that the proliferation of financial services significantly reduces financing costs for small farmers and SMEs, enhancing their capabilities to manage financial risks. Taking Longping High-Tech as an example, the company extensively applies digital technology, such as smart agricultural equipment and online trading platforms, in its seed production and sales processes. These technologies not only enhance the company's operational efficiency but also bolster its resilience against market risks and natural disasters. By collaborating with financial institutions and leveraging digital technology, Longping High-Tech has improved the accuracy of credit assessments, optimized loan and insurance products, and thus effectively manage financial risks (Shao et al., 2021).

In conclusion, the breadth of digital technology coverage exerts a notable positive impact on financial risk management in agricultural supply chains. By enhancing information transparency, bolstering supply chain resilience, optimizing resource allocation, and improving financial service accessibility, digital technology provide robust support for financial risk management within agricultural supply chains. Future research could further delve into the specific applications of different types of digital technology in risk management and explore ways to promote these technologies on a broader scale.

2.1.5 Usage Depth of Digital Technology

The depth of digital technology usage refers to the extent and frequency of digital

technology adoption by various entities within the agricultural supply chain. The measurement criteria encompass average usage duration per user, frequency of usage, level of dependence, and the extent of adoption of sophisticated technological solutions. A high depth of usage typically indicates a more comprehensive integration and application of digital technology across various links in the agricultural supply chain, thereby enhancing overall management efficiency and risk response capabilities (Pfohl et al., 2009). Literature suggests that the depth of digital technology usage significantly improves information flow and decision-making quality within the agricultural supply chain. Through the profound utilization of big data analytics, artificial intelligence (AI), and the Internet of Things, farmers and enterprises can obtain real-time market dynamics, weather forecasts, and production management information, enabling more precise decision-making (Liang, 2023). These technological applications reduce information asymmetry, enhance supply chain transparency, and allow financial institutions to assess risks more accurately.

The deep integration of digital technology with high usage depth fosters collaboration and efficiency within the agricultural supply chain. The profound application of cloud computing and block chain technology enables seamless data sharing and real-time communication among various links in the supply chain. This high degree of collaboration not only improves operational efficiency but also strengthens mutual trust among links, reducing the risk of supply chain disruptions (Shao et al., 2021). Consequently, financial institutions can more effectively monitor and manage supply chain financial risks, offering more targeted financial services. Literature highlights that the deep usage of digital technology significantly enhances risk prediction and management capabilities within the agricultural supply chain. By deeply applying AI and machine learning algorithms, agricultural enterprises can establish complex risk prediction models to anticipate potential market fluctuations, natural disasters, and production risks (Ruan et al., 2022). This proactive risk management capability enables financial institutions to foresee and avoid potential risks, optimizing the design and pricing of loans and insurance products.

Another significant impact of the depth of digital technology usage in agricultural supply chain financial risk management is the improvement of credit evaluation and the quality of financial services. The in-depth application of financial technology allows for a more comprehensive and accurate assessment of farmers' and enterprises' credit status and operational performance. This mitigates credit risks for financial institutions and improves the access and cost-effectiveness of financial services for farmers and small and medium-sized enterprises (Ruan et al., 2022). The depth of digital technology usage exerts a markedly positive influence on agricultural supply chain financial risks.

By enhancing information flow and decision-making quality, fostering supply chain collaboration and efficiency, upgrading risk prediction and management capabilities, and improving credit evaluation and financial services, the profound usage of digital technology provides robust support for the financial risk management of agricultural supply chains. Future research can delve deeper into the deep-seated applications of digital technology in contexts and explore ways to promote their widespread adoption through policies and training.

2.1.6 Digitalization

Digitalization level refers to the extent and depth of digital technology adoption by various links and entities within the agricultural supply chain. The measurement criteria encompass the prevalence of digital equipment, the application level of digital platforms, and the comprehensiveness of data sharing and analysis (Liang, 2023). A high digitalization level typically signifies the widespread and profound integration of digital technology across various links in the agricultural supply chain, thereby enhancing overall management efficiency and risk response capabilities. Literature indicates that digitalization significantly enhances information transparency and traceability within the agricultural supply chain. Through the extensive application of technologies such as the Internet of Things and block chain, various links in the supply chain can achieve real-time information sharing and transparent tracing. This information transparency aids financial institutions in more accurately assessing the credit risks of farmers and enterprises, reducing loan default rates (Shao et al., 2021).

A high digitalization level strengthens the collaboration and response speed of the agricultural supply chain. Digital technology enable seamless data sharing and real-time communication among various links in the supply chain, thereby improving operational efficiency and response speed. Literature shows that this high degree of collaboration and rapid response enhances supply chain stability and fosters mutual trust among various links (Shao et al., 2021), mitigating the risk of supply chain disruptions. The enhancement of digitization level notably improves risk prediction and management capabilities within the agricultural supply chain. By deeply applying big data analytics, artificial intelligence (AI), and machine learning algorithms, agricultural enterprises can establish complex risk prediction models to anticipate potential market fluctuations, natural disasters, and production risks. This proactive risk management capability enables financial institutions to foresee and avoid risks, optimizing the design and pricing of loans and insurance products (Shao et al., 2021).

Agricultural supply chain with high digitalization can optimize resource allocation and decision-making efficiency. Through digital platforms, farmers and enterprises can obtain real-time market demand, weather forecasts, and production management information, facilitating more precise decision-making. This improves supply chain efficiency and mitigates financial risks arising from supply-demand imbalances. Another significant impact of digitalization level on agricultural supply chain financial risk management is the improvement of credit evaluation and financial service quality (Shao et al., 2021). Digital technology enable a more comprehensive and accurate assessment of farmers' and enterprises' credit status and operational performance. This reduces credit risks for financial institutions and enhances access to and cost-effectiveness of financial services for farmers and small and medium-sized enterprises.

In summary, digitalization influences agricultural supply chain financial risks. By enhancing information transparency and traceability, fostering supply chain collaboration and response speed, upgrading risk prediction and management capabilities, optimizing resource allocation and decision-making efficiency, and improving credit evaluation and financial services, the digitalization level provides robust support for the financial risk management of agricultural supply chains (Ruan et al., 2022). Future research can delve deeper into the specific applications of different digital technology contexts and explore ways to promote their widespread adoption through policies and training.

2.2 Research Relevant

(1) Problems in Agricultural Supply Chain Finance

As an innovative financial service model, agricultural supply chain finance plays a positive role in promoting the development of the agricultural industry and improving the financing efficiency of agricultural enterprises (Shao et al., 2021). However, the research of many scholars shows that this field still faces a series of challenges and problems.

Insufficient sources of funds for agricultural supply chain finance is a common problem, and the main reasons include: fewer financial institutions in rural areas and a single financing channel; poorer credit records of individual farmers, making it difficult to obtain loan support from financial institutions; higher fluctuations in the market for agricultural products, leading to higher financing risks; and lower technological level of the agricultural industry, which lacks the conditions to attract investment. These

problems make the source of funds for agricultural supply chain finance seriously limited, and it is difficult to meet the needs of agricultural production and development (Shao et al., 2021).

In terms of information asymmetry, due to the information asymmetry of each link in the supply chain, it is difficult for financial institutions to accurately assess the risk, and it is easy to have bad debts and other problems (Shao et al., 2021); in terms of transaction risk, due to the fluctuation and uncertainty of the market of agricultural products, it leads to higher transaction risk, such as the quality of the goods and the delay of the delivery time, etc.; in terms of legal risk, due to the unsoundness of the laws and regulations or their implementation Inadequate implementation of laws and regulations leads to contractual disputes, infringement of rights and other problems; especially for those decentralized farmers, their legal awareness of contracts is relatively weak. Even if a detailed purchase contract is signed with a grain purchasing enterprise, once the market supply and demand fluctuates significantly, default is easy to occur (Liang, 2023); in terms of operational risk, due to improper operation or mismanagement of each node in the supply chain, resulting in increased losses or risks (Shao et al., 2021). Supply chain finance is characterized by difficult risk management, high capital costs, high compliance and regulatory pressure and information asymmetry. These problems may lead to increased costs and reduced efficiency of supply chain financial services, affecting its development globally (Pfohl et al., 2009).

In the agricultural sector, agricultural supply chain finance continues to face the challenge of higher loan recovery risks due to the still unsound mechanisms for determining the value of agricultural products and the perishable nature of inventory goods. In addition, the lack of stability in the security and transfer of interests in pledges of movable assets makes the basic operations of supply chain finance, such as providing financing through the purchase of receivables or the creation of pledges of security, often difficult to implement. As a result, large banks are usually less motivated to develop and provide specialized supply chain financial services to SMEs in the supply chain. The status quo is that only a portion of small and medium-sized financial institutions are gradually exploring and getting involved in the field of agricultural supply chain finance in a limited way (Dong et al., 2020). In addition, considering the varying credit levels of enterprises in the agricultural industry chain and the difficulty of implementing effective supervision, banks and other financial institutions tend to show low enthusiasm in launching supply chain finance-related products (Li et al., 2023).

Despite the rapid progress of Internet and big data technologies, most operators in

the agricultural supply chain still face significant constraints in the adoption of information technology. Although financial institutions, core enterprises, logistics service providers and e-commerce platforms and other important participants may be equipped with cutting-edge information technology tools, unfortunately, these technical standards are different and lack the necessary interoperability, forming an information island. This status quo hinders the immediate and efficient integration and verification of capital flow, logistics and information flow under the framework of supply chain finance, which in turn inhibits the overall effectiveness of supply chain financial services (Dong et al., 2020).

Regarding the synergistic operation of the industry chain, although the core enterprises in the center of the supply chain should play the role of leading and supporting small and medium-sized micro-agribusinesses and farmers, in reality they tend to transfer their financial pressure to these vulnerable groups. Once the supply chain encounters liquidity constraints, this financial burden will be transmitted up and down the supply chain, thereby hindering production activities and severely restricting the overall progress of the agricultural industry chain. On the issue of credit guarantee, supply chain financing for agriculture-related enterprises is highly dependent on the credit endorsement of core enterprises. However, given the laxity of the internal management of the agricultural supply chain and the negative attitude of the guarantee enterprises, supply chain financing in essence only benefits those small and medium-sized micro-agribusinesses that have close direct business dealings with the core enterprises, while for many other small and medium-sized enterprises in the supply chain, their financing bottlenecks are still not effectively cracked (Li et al., 2023).

Although the government's financial investment in the agricultural sector has risen, the injection of capital in the improvement of the infrastructure of the agricultural industry chain still appears to be insufficient, coupled with the scarcity of high-quality farmland resources, these factors seriously impede the process of modernization of agriculture and the expansion of the supply chain. In addition, the government's policy to promote agricultural supply chain finance platforms is insufficient, resulting in a small number of enterprises and farmers adopting financing modes such as prepayment of deposits and credit sales of agricultural materials. Meanwhile, insufficient understanding of the importance and potential of applying agricultural supply chain finance by enterprises at the core of the supply chain is also a major obstacle. (Eddie Ma, 2024).

Agricultural supply chain finance faces multiple challenges in the development process, including insufficient synergy, technological bottlenecks, market risks,

insufficient sources of capital, inadequate risk control, ineffective supervision, insufficient model innovation, unstandardized enterprise operations, incomplete information disclosure, weak competitiveness of core enterprises, trust consensus issues, and insufficient government support. The existence of these problems requires relevant policy makers, financial institutions and agricultural enterprises to make joint efforts to promote the healthy development of agricultural supply chain finance and the sustainable prosperity of the agricultural industry through measures such as system innovation, technology application, risk management and policy support.

(2) Suggestions for Developing Agricultural Supply Chain Finance

Aiming at the problems of agricultural supply chain finance, a number of scholars have put forward a series of recommendations aimed at promoting the healthy development and continuous innovation in this field. In order to adapt to the growing diversified financing needs of the agricultural supply chain, financial institutions need to continue to push forward, financial services and product innovation should be close to the unique attributes of the agricultural supply chain, to develop more tailored solutions, covering green credit, agricultural supply chain-based asset-backed securities (ABS) and many other innovative financial tools (Li, 2023). To promote the innovation of agricultural supply chain finance model, financial institutions should deepen the cooperation with industry pioneers, third-party logistics service providers and guarantee institutions to stimulate the innovation of the financial model. At the same time, established financial institutions need to make good use of the innovative energy of new financial institutions, and work together to promote the progress of intelligent agricultural supply chain finance, which aims to enhance the transparent flow of information, reduce transaction costs, and accelerate the efficiency of agribusinesses in obtaining funds through the supply chain finance path. The establishment of a three-dimensional, wide-coverage financial service ecosystem will provide a more thoughtful and in-depth financial backing for the comprehensive upgrading of the agricultural supply chain (Guo et al., 2022).

By scientifically designing each business operation link, a transparent, efficient, manageable and controllable business operation process should be constructed by combining the transaction cycle and capital flow characteristics of agricultural supply chain. In addition, the establishment of a closed-loop management mechanism for funds will help to effectively reduce default losses and safeguard the safety and stability of financial activities. This will provide a strong guarantee for the healthy development of agricultural supply chain finance (Liang, 2023). Taking agricultural supply chain finance as the core, coordinate the interests of different participants in the same supply chain, and abandon the traditional supply chain financial service model dominated by

the interests of core enterprises in the past. Make full use of the advantages of big data technology to balance the interests of “long-tail end” enterprises and individual farmers. The implementation of credit-based joint incentives and joint disciplinary mechanisms, relying on the construction of credit data, optimize the rural financial ecosystem, and achieve the common development and progress of all parties (Li, 2022).

With the ever-changing development of digital technology and its wide application in practice, it opens up a brand new growth opportunity for the agricultural supply chain financial services industry. Through the deep integration of big data analysis, cloud computing technology, block chain and other advanced technologies, it not only significantly enhances the degree of intelligence of supply chain financial services, but also effectively reduces the cost of services and accelerates the speed of service response. Financial institutions are now able to rely on digital technology tools to accurately diagnose the credit risk situation in the agricultural industry chain and customize personalized financial solutions for each participant accordingly. The integration of digital technology has also greatly increased the transparency of the agricultural supply chain, narrowed the information disparity gap, and strongly promoted the wider adoption of the supply chain finance model in the agricultural sector. This series of changes has laid a solid foundation for the innovative evolution of agricultural supply chain financial services, and at the same time provides a more extensive and efficient financial empowerment for various players in the agricultural industry chain (Li, 2023).

In order to realize efficient operation of agricultural supply chain finance, the core lies in relying on the leading enterprises in the supply chain to build an information technology system, so as to enhance the effectiveness of the use of information technology by all participants, promote the convergence and accumulation of information in the supply chain, and build a strong data support framework. By deeply integrating the discrete information of each link in the supply chain, it can ensure the rapid and precise connection between financial resources and demand. In this process, fully utilizing the unique advantages of supply chain finance in terms of information screening and contract execution mechanisms is crucial to enhancing service efficiency. This requires close cooperation among leading companies in the supply chain, financial service providers, farmers, and many small and medium-sized enterprises (SMEs) to drive the overall evolution of agricultural supply chain finance (Dong et al., 2020). Strengthen the construction of basic databases for leading enterprises in the agricultural industry chain, and actively collect key data on production, transactions, payments and sales within the agricultural supply chain. At the same time, rural enterprises are encouraged to adopt the latest software and hardware technologies to improve the

digital economy literacy of rural residents. Through these measures, the informatization level of the rural supply chain can be further improved and the accuracy and quality of agricultural data can be ensured (Li, 2022). Construct a modern agricultural supply chain data architecture, promote data sharing, and develop an efficient data processing platform. The platform will support retrieval, querying and in-depth analysis of big data, as well as provide data sharing and analysis services for internal and external users (Jing He et al., 2019).

As the government's attention to the agricultural industry chain continues to rise, it is expected that more policies and initiatives aimed at promoting the development of financial services in this area will emerge in the future. One of the government's priorities will be to optimize the financial policy environment, cultivate a more fertile soil for financial innovation in the agricultural sector, and intensify efforts to guide the influx of financial capital to agriculture in order to broaden the coverage of financial services in the agricultural industry chain. In addition, the construction and improvement of risk control mechanisms in the agricultural industry chain finance is aimed at reducing the operational risks faced by financial institutions, and at the same time, as an incentive, prompting financial institutions to create a richer and more diversified service product lines for the agricultural industry chain. This series of initiatives will undoubtedly pave the way for improving the quality of financial services in the agricultural industry chain and laying a solid foundation for the long-term sound development of agriculture (Li, 2023). By building a collaborative bridge between the formal and informal financial sectors and fully utilizing the synergistic effect of both in supply chain finance business, it can promote the formation of a diversified and inclusive financial market ecology and pave the way for the growth and breakthrough development of agricultural supply chain finance. (Dong et al., 2020). Increasing the promotion and publicity of agricultural supply chain financial services can deepen the community's knowledge and understanding of such financial services, and then accurately deliver more efficient and appropriate financial support to all participating entities in the agricultural industry chain (Eddie Ma, 2024).

(3) Economic and Social Benefits of Agricultural Supply Chain Finance

As an innovative financial service model, agricultural supply chain finance has a significant role in promoting the development of the agricultural industry chain and social and economic progress. Many scholars have conducted in-depth research on this and put forward their own insights.

Agricultural supply chain finance can effectively promote the overall development

of the agricultural industry chain, improve the financing ability and risk management level of small and medium-sized enterprises, and lay the foundation for sustainable development (Li, 2023). Agricultural supply chain finance injects stronger sustainability and competitiveness into the agricultural industry, bringing more opportunities and well-being to farmers and rural areas. Through this financial model, the agricultural industry can obtain more stable development momentum, and farmers and rural communities will also benefit from this and enjoy more development results (Liang, 2023). Agricultural supply chain finance can promote the pace of agricultural modernization, enhance the added value of the agricultural industry chain, drive the prosperity of the rural economy, increase the economic income of farmers, and at the same time promote the process of urban-rural economic integration. This financial model helps to realize the transformation and upgrading of the agricultural industry, creates more economic benefits for farmers, reduces the development gap between urban and rural areas, and promotes the balanced development of the social economy (Eddie Ma, 2024).

Agricultural supply chain finance can increase employment opportunities, improve farmers' income, and enhance the competitiveness of the agricultural industry, thus promoting social harmony and stability (Li, 2023). Promoting the development of agricultural supply chain finance can not only improve the economic benefits of agriculture-related small and medium-sized enterprises (SMEs), but also maximize rural revitalization and social benefits (Li et al., 2023). The agricultural supply chain finance model supports those disadvantaged farmers and agribusinesses by integrating supply chain resources and financial services. It is committed to building a sustainable, circular and competitive agricultural supply chain system, which not only highlights the commercial value of supply chain finance, but also is an important manifestation of its fulfillment of social responsibility (Guo et al., 2022).

Agricultural supply chain finance effectively improves the convenience and accessibility of financial services for small farmers, buyers and sellers, processors and other types of subjects by closely connecting the main bodies in the value chain that provide various types of business services with the institutions that provide financial services (Ma et al., 2011). In the agricultural supply chain finance model, by utilizing the context of the supply chain, financial institutions are able to more effectively monitor the flow of funds to ensure that the funds are used for the designated purpose, thereby reducing the risk of default. Financial institutions' approach to credit rating SMEs has changed at the same time. In the past, they only assessed enterprises in need of capital independently. Now, they assess both these enterprises and their core partners in the supply chain. This shift has helped improve the credit ratings of firms, thereby increasing their chances of obtaining financing (Shao et al., 2021).

Agricultural supply chain finance can increase the market value of service providers, especially non-bank investors, service providers that collaborate in providing supply chain financial services and upgrading existing supply chain financial services have higher market value growth after announcing supply chain finance programs (Lama et al., 2019). Agricultural supply chain finance plays an important role in promoting the development of the agricultural industry chain, improving economic efficiency, and enhancing social benefits. By improving financing efficiency, reducing risks, and promoting industrial upgrading and rural economic development, agricultural supply chain finance has brought tangible benefits to the agricultural industry and farmers, while also making positive contributions to social stability. Therefore, actively promoting the growth of agricultural supply chain finance plays a key role in accelerating the process of agricultural modernization and promoting the implementation of rural revitalization strategy.

2.3 Conceptual Framework

Based on the literature review, an impact model of digital technology on risk management of agricultural supply chain financial has been constructed. In this model, the coverage of digital technology, the depth of digital technology use, and the digitalization are independent variables, while risk management of agricultural supply chain financial is the dependent variable. By constructing the model, the relationship between various variables has been verified. The model framework is shown in Figure 2.2.

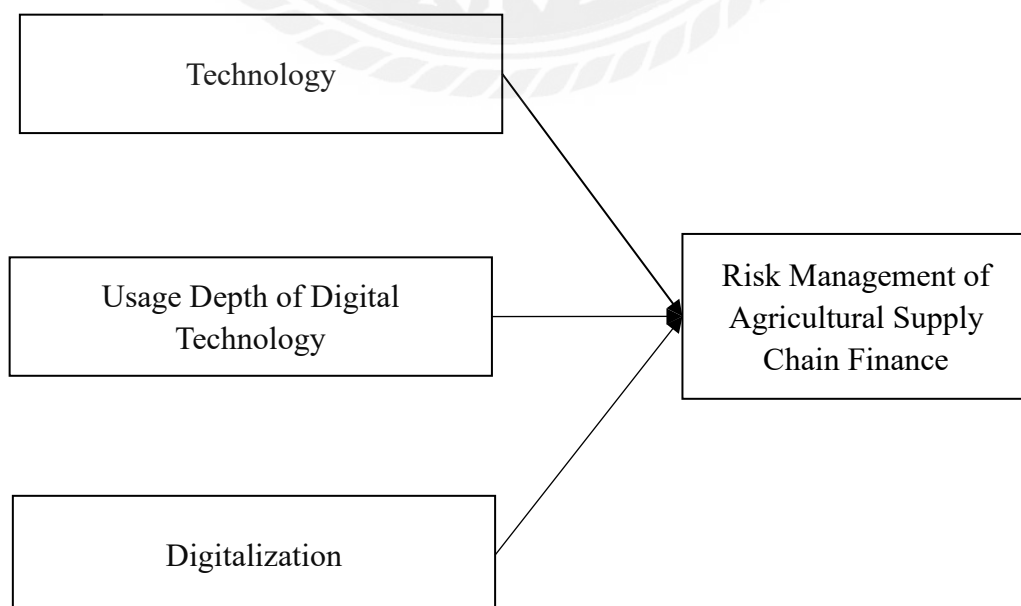


Figure 2.2 Conceptual Framework



Chapter 3 Research Methodology

3.1 Research Design

This study adopted the quantitative research method. This study explored the impact of digital technology on risk management of agricultural supply chain financial. The variables proposed in the study include the breadth of digital technology coverage, the depth of digital technology usage, and the digitalization.

3.2 Questionnaire Design

The first part of the questionnaire provides demographic characteristics of Longping High-Tech's employees, such as gender, age, job position, etc. The second part mainly introduces the measurement items for each variable. The test adopts a Likert five-point scale, with results ranging from 5 to 1, representing "strongly agree," "agree," "neutral," "disagree," and "strongly disagree," respectively. In the questionnaire design, there are 5 measurement items for the breadth of digital technology coverage, covering risk prediction, information transparency, monitoring, and adaptability. There are 5 measurement items for the depth of digital technology usage, encompassing monitoring, accuracy, early warning capabilities, scientific rigor, and the ability to respond to emergencies. Additionally, there are 5 measurement items for the digitalization, including risk management and control capabilities, digitalization, risk identification, and information asymmetry. Lastly, there are 6 measurement items for risk management of agricultural supply chain finance, which involve efficiency, early warning, information asymmetry, security, and response capabilities. In total, the survey questionnaire comprises 21 measurement items, as shown in Table 3.1.

Table 3.1 Questionnaire Structure

Variable	Measurement item	NO.
Coverage of Digital Technology	1.Does the breadth of digital technology application in the supply chain contribute to improving the accuracy of risk prediction?	Q1
	2.Can the expansion of digital technology coverage significantly reduce financial risks in the supply chain?	Q2
	3.Can the widespread application of digital technology in all links of the supply chain enhance information transparency, thereby reducing risks arising from information asymmetry?	Q3
	4.Does the increase in the breadth of digital technology coverage facilitate more efficient monitoring and	Q4

Variable	Measurement item	NO.
	management of credit risks in the supply chain?	
	5.Can the breadth of digital technology application in Longping High-Tech's supply chain finance enhance the resilience and flexibility of the entire supply chain?	Q5
Usage Depth of Digital Technology	1.Can the in-depth use of digital technology improve the real-time and accuracy of supply chain financial risk monitoring?	Q6
	2.Can the deep application of digital technology in supply chain finance effectively reduce risks caused by incomplete or inaccurate data?	Q7
	3.Can the deep application of digital technology significantly enhance the early warning capabilities in supply chain financial risk management?	Q8
	4.Does the in-depth use of digital technology in Longping High-Tech's supply chain contribute to improving the scientificity and precision of risk management decisions?	Q9
	5.Can the deep use of digital technology enhance Longping High-Tech's supply chain finance system's response capabilities to sudden risks?	Q10
Digitalization	1.Does the enhancement of digitalization in Longping High-Tech's supply chain finance system contribute to improving the overall risk management capability?	Q11
	2.Can achieving a high level of digitalization in supply chain finance significantly reduce risks associated with manual operations?	Q12
	3.Can an increase in digitalization better integrate and analyze various types of data within the supply chain, thereby enhancing risk identification capabilities?	Q13
	4.Can a highly digitized supply chain finance system in Longping High-Tech improve the efficiency and accuracy of information transmission, thus reducing risks arising from information asymmetry?	Q14
	5.Does a highly digitized supply chain finance system help Longping High-Tech better respond to market fluctuations and sudden risks?	Q15
Risk Management of Agricultural Supply Chain Finance	1.In Longping High-Tech's supply chain finance system, can the application of digital technology improve the overall efficiency of risk management?	Q16
	2.Can the application of digital technology effectively reduce credit risks in Longping High-Tech's supply chain finance?	Q17
	3.Can the use of digital technology in supply chain finance better monitor and warn against market risks?	Q18

Variable	Measurement item	NO.
	4.Does digital technology help reduce supply chain finance risks arising from information asymmetry?	Q19
	5.Can the introduction of digital technology in Longping High-Tech's supply chain finance improve the transparency and security of fund flows?	Q20
	6.Does the application of digital technology enhance Longping High-Tech's supply chain finance system's response capabilities to emergencies?	Q21

3.3 Hypothesis

The independent variables in this study are coverage of digital technology, usage depth of digital technology usage, digitalization. The dependent variable is risk management of agricultural supply chain finance, and the model is constructed based on the analysis and the relationship between the variables. The relationship between variables is set through hypotheses. Therefore, the following hypotheses are formulated:

H1: The coverage of digital technology has a significant positive effect on risk management of agricultural supply chain finance.

H2: The usage depth of digital technology has a significant positive effect on risk management of agricultural supply chain finance.

H3: The digitalization has a significant positive effect on risk management of agricultural supply chain finance.

Combined with the above analysis, the hypothetical model and the interrelationships among the variables are confirmed, as shown in Figure3.1.

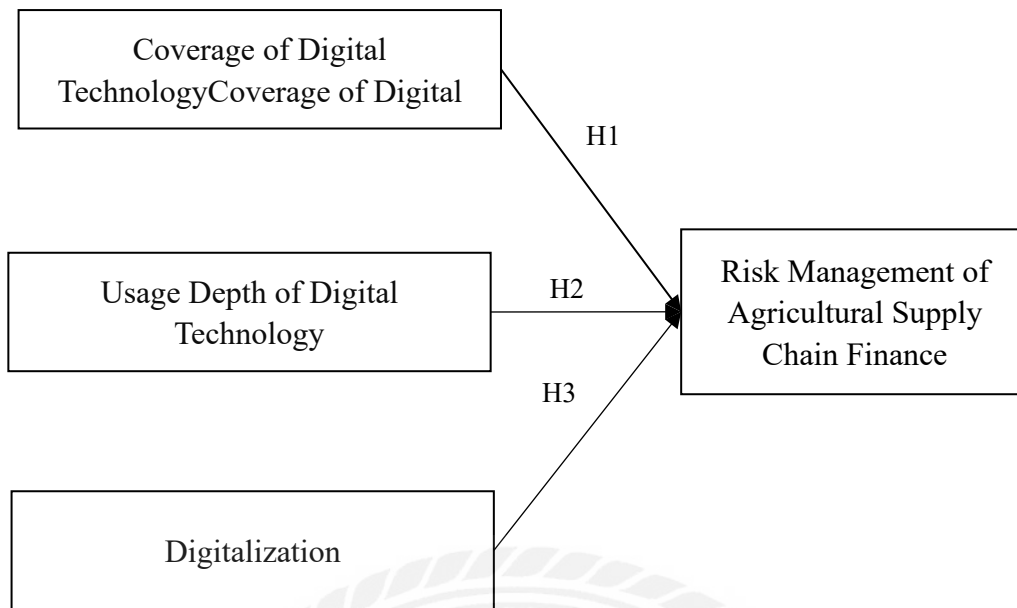


Figure 3.1 Hypotheses

3.4 Population and Sampling

Digital technology is playing an increasingly important role in agricultural supply chains, particularly in financial risk management. As a farming technology enterprise, Longping high-tech has achieved certain results in its supply chain financial risk management through digital technology. The target population of this study includes Longping High-Tech, farmers, suppliers, financial institutions, and internal managers within its related supply chain. Random sampling methods were used to select samples to ensure randomness and representativeness. Combined with the reliability of sample extraction of 99.9%, the sample size was calculated.

$$N = \frac{r^2 * \rho(1 - \rho)}{\beta^2}$$

The calculation gives the sample size for this survey as 399.89, so the number of people to be sampled is 400.

3.5 Data Collection

The data collection targets included farmers, suppliers, financial institutions, and internal managers of Longping High-Tech. The data collection period spanned from

January 2024 to April 2024. A combination of online and offline methods was employed for data collection, with questionnaires being sent via email for online participation and administered by surveyors during in-person visits for offline participation. 400 electronic questionnaires were disseminated, and 349 valid questionnaires were recovered, yielding a recovery rate of 87.25%.

3.6 Data Analysis

3.6.1 Questionnaire Reliability Analysis

The questionnaire in this study is an adaptation of a mature questionnaire, which was partially adapted and integrated into this study, and the questionnaire itself was tested for reliability and validity. Reliability was tested using SPSS reliability analysis, which mainly examined Cronbach's Alpha reliability coefficient. If the distance between Cronbach's Alpha reliability coefficient and 1 is small, it means that the reliability within the data is high, and vice versa, the lower the reliability. The result of the test in this study is shown in 3.2, the Cronbach's Alpha is 0.8 or more, which means that the questionnaire meets the inherent requirements of reliability.

The Cronbach's Alpha coefficient for coverage of digital technology is 0.895, the Cronbach's Alpha coefficient for usage depth of digital technology is 0.869, the Cronbach's Alpha coefficient for digitalization is 0.872, and the Cronbach's Alpha coefficient for risk management of agricultural supply chain finance is 0.872. All of them are in the range of 0.8~0.9, which indicates that the reliability of this paper's questionnaire is better, and then the validity can be further analyzed. This indicates that the reliability of the questionnaire of this survey study is very good, as shown in Table 3.2.

Table 3.2 Variate Reliability Test

Variate	Cronbach's Alpha	N of Items
Coverage of Digital Technology	0.897	5
Usage Depth of Digital Technology	0.872	5
Digitalization	0.872	5
Risk Management of Agricultural Supply Chain Finance	0.871	6

3.6.2 Questionnaire Validity Analysis

The questionnaire validity test was done by KMO and Bartlett's Test of Sphericity. According to the test standard of KMO value, if the value of KMO is less than 0.5, it means that the validity of the questionnaire is not good. When the value of KMO is closer to 1, it means that there are more common factors between the items of the questionnaire, and it is more conducive to analyzing and testing each factor. The results of the validity of this questionnaire are shown in Table 3.3, the overall KMO value of the questionnaire reaches 0.934, and Bartlett's Test of Sphericity gets the significance value of 0.000, so this questionnaire has good validity.

The effects were conducted using principal component analysis to examine the rationality of the scale dimensions setting. Factors with Eigen roots greater than 1 were extracted from the analysis and the cumulative total variance explained by the factors was 67.958%. Table 3.4 shows the results of factor analysis after rotation by the maximum variance method. The calculation results by Rotated Component Matrixa show that the question-item differentiation validity of each factor is good, as shown in Table 3.5.

Table 3.3 KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.934
Bartlett's Test of Sphericity	Approx. Chi-Square	2980.872
	df	105
	Sig.	0.000

Table 3.4 Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		Rotation Sums of Squared Loadings	
	Total	% of Variance	Cumulative %	% of Variance	Cumulative %	% of Variance	Cumulative %
1	8.821	42.007	42.007	8.821	42.007	17.872	17.872
2	2.161	10.289	52.295	2.161	52.295	16.628	34.500
3	1.569	7.472	59.768	1.569	59.768	15.872	50.371
4	1.352	6.438	66.206	1.352	66.206	15.834	66.206
5	0.647	3.080	69.285				
6	0.609	2.901	72.186				
7	0.577	2.750	74.936				
8	0.533	2.538	77.474				
9	0.496	2.360	79.834				
10	0.486	2.312	82.146				

11	0.459	2.187	84.333				
12	0.442	2.106	86.438				
13	0.397	1.891	88.329				
14	0.373	1.776	90.106				
15	0.365	1.736	91.842				
16	0.331	1.578	93.420				
17	0.313	1.490	94.910				
18	0.299	1.423	96.334				
19	0.294	1.402	97.736				
20	0.250	1.190	98.926				
21	0.226	1.074	100.000				

The results of the study showed that the rotated principal component matrix revealed that the first factor ranged from Q 1 to Q5; the second factor ranged from Q11 to Q15; the third factor ranged from Q 6 to Q 10. The three influential factors were named coverage of digital technology, usage depth of digital technology, digitalization. Through the results of Table 3.5, it can be learned that a total of three factors were extracted, and each variable has a large loading on only one common factor, while the loadings on the other common factors are small, indicating that each variable has a better but differentiated validity.

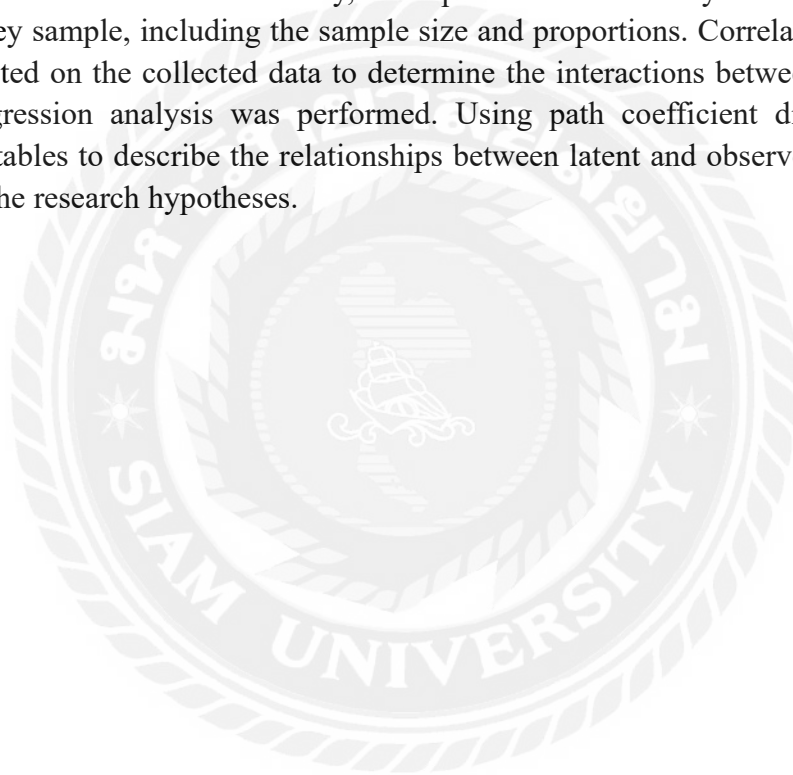
Table 3.5 Rotated Component Matrix

	Component			
	1	2	3	4
Q1	0.190	0.808	0.232	0.226
Q2	0.220	0.717	0.220	0.217
Q3	0.198	0.785	0.202	0.184
Q4	0.170	0.754	0.138	0.248
Q5	0.168	0.743	0.210	0.250
Q6	0.202	0.191	0.204	0.771
Q7	0.143	0.225	0.209	0.716
Q8	0.185	0.225	0.260	0.692
Q9	0.062	0.241	0.215	0.761
Q10	0.189	0.208	0.202	0.738
Q11	0.201	0.139	0.818	0.214
Q12	0.229	0.225	0.708	0.221
Q13	0.152	0.238	0.683	0.231
Q14	0.148	0.179	0.736	0.180
Q15	0.137	0.185	0.757	0.227
Q16	0.786	0.127	0.140	0.178
Q17	0.741	0.073	0.191	0.188

Q18	0.689	0.221	0.186	0.084
Q19	0.762	0.165	0.110	0.214
Q20	0.723	0.218	0.161	0.051
Q21	0.731	0.116	0.082	0.078

3.6.3 Questionnaire Data Analysis

Questionnaire data were analyzed using statistical software, primarily descriptive statistics, correlation analysis, regression analysis, and other methods. The specific process is as follows: Firstly, the collected data were cleaned and inspected, including checking for missing data, outliers, and abnormal values. If there were issues, the data were processed or excluded. Secondly, descriptive statistical analysis was performed on the survey sample, including the sample size and proportions. Correlation analysis was conducted on the collected data to determine the interactions between variables. Finally, regression analysis was performed. Using path coefficient diagrams and coefficient tables to describe the relationships between latent and observed variables, and verify the research hypotheses.



Chapter 4 Findings

4.1 Introduction

A total of 349 valid questionnaires were collected in the study, and the validity rate of the questionnaires was 82.75%. The collected data were analyzed by using descriptive statistics, and the data conformed to normal distribution. Correlation was verified based on the hypothesized relationship between the variables. Pearson correlation analysis was used to determine the correlation and significance between variables. Finally, the results of the study were drawn based on the analysis.

4.2 Demographic Characteristics of Participants

The survey results show that the gender and age distribution of participants is 185 males, accounting for 53.0% of the total, and 164 females, accounting for 47.0%. It is that the number of male participants is slightly higher than that of females, and the proportion of the two is relatively close. The age distribution is 53 people aged 18–25, accounting for 15.2% of the total; 41 people aged 26–30, accounting for 11.7% of the total; 58 people aged 31–35, accounting for 16.6% of the total; 72 people aged 36 – 40, accounting for 20.6% of the total; and 125 people over 40 years old, accounting for 35.8% of the total. The age distribution shows that the largest group of participants is over 40, accounting for 35.8%. The second-largest group is 36–40 years old, accounting for 20.6%. The groups aged 18–25, 26–30, and 31–35 account for a relatively small proportion, which are 15.2%, 11.7%, and 16.6%, respectively. The gender distribution of the survey is relatively balanced, with males slightly outnumbering females. This distribution helps to ensure that the survey results reflect balanced views and attitudes of both genders. Age distribution, participants over 40 account for the largest proportion, indicating that more middle-aged and elderly participated in the survey. This is consistent with the current age distribution of employees engaged in agricultural work in China. As shown in Table 4.1, the sample as a whole met the statistical requirements.

The survey results also reveal the educational background distribution of participants, with 218 holding bachelor's degrees, accounting for 62.5% of the total; 117 holding master's degrees, constituting 33.5% of the total; and 14 holding degrees higher than master's, making up 4.0% of the total. The data indicates that participants possess bachelor's degrees, followed by master's degrees, while those with degrees beyond master's are fewer.

Regarding job positions, the distribution is as follows: 156 participants in operational roles, accounting for 44.7% of the total; 66 in manager/senior positions, representing 18.9%; 40 as instructors, constituting 11.5%; and 87 in other positions, comprising 24.9% of the total. The job position distribution shows that nearly half of the participants work in operational roles, while those in other positions also occupy a considerable proportion. The distribution of years of work experience indicates that over half of the participants have 6-15 years of experience, with the highest number having 11-15 years of experience. In contrast, participants with 5 years or less and 16 years or more of work experience have relatively lower proportions.

Table 4.1 Distribution of Gender-Age of Samples (N = 349)

Item	Options	Frequency	Percent%
Gender	Male	185	53.0
	Female	164	47.0
Age	18-25	53	15.2
	26-30	41	11.7
	31-35	58	16.6
	36-40	72	20.6
	Over 40	125	35.8
Total		349	100.0

Table 4.2 Distribution of Education-Position-Tenure of Samples (N = 349)

Item	Options	Frequency	Percent%
Education	Bachelor's degree	218	62.5
	Master degree	117	33.5
	Higher than the Master's degree	14	4.0
Position	Operation	156	44.7
	Manager/senior	66	18.9
	Lecturer/instructor	40	11.5
	Other	87	24.9
Tenure	Less than/or equal to 5	48	13.8
	Between 6-10	129	37.0
	Between 11-15	161	46.1
	16 and over	11	3.2
Total		349	100.0

The educational background distribution of the survey demonstrates that most participants have received higher education, primarily at the bachelor's level, followed by master's degrees. The scarcity of participants with degrees higher than master's may

reflect a population composed of individuals with higher education but not necessarily top-tier academic backgrounds. job positions, the largest number of participants are in operational roles, indicating high engagement from this sector in the survey. Although the proportions of managers/seniors and instructors/guides are lower, they still provide a degree of representation. The diversity in job position distribution helps reflect viewpoints from different hierarchical levels. The distribution of years of work experience shows that most participants have medium-term work experience (6-15 years), falling into the mid-career stage with substantial professional experience and job stability. The lower proportions of participants with shorter and longer years of experience may lead to insufficient representation of these groups in the survey results. While the survey sample exhibits a certain degree of representativeness in terms of educational background, job position, and years of work experience, future surveys could consider including participants with a more balanced mix of backgrounds and years of experience to further enhance the representativeness of the results, as shown in Table 4.2.

Table 4.3 Descriptive Statistics

Various	N	Minimum	Maximum	Mean	Std. Error
Q1	349	1	5	3.46	0.064
Q2	349	1	5	3.52	0.063
Q3	349	1	5	3.52	0.063
Q4	349	1	5	3.35	0.058
Q5	349	1	5	3.47	0.059
Q6	349	1	5	3.47	0.061
Q7	349	1	5	3.58	0.057
Q8	349	1	5	3.58	0.062
Q9	349	1	5	3.66	0.064
Q10	349	1	5	3.48	0.064
Q11	349	1	5	3.61	0.073
Q12	349	1	5	3.58	0.064
Q13	349	1	5	3.38	0.058
Q14	349	1	5	3.55	0.055
Q15	349	1	5	3.67	0.059
Q16	349	1	5	3.83	0.059
Q17	349	1	5	3.72	0.057
Q18	349	1	5	3.77	0.061
Q19	349	1	5	3.7	0.061
Q20	349	1	5	3.81	0.059
Q21	349	1	5	3.83	0.056

In the dataset, the research findings analyzed feedback on 21 questions (Q1 to Q21). Each item had a response range of 1 to 5, and there were 349 respondents for each question. The following are statistical data for each question, including the

minimum score, maximum score, average score, and standard error. All questions received responses covering the entire scoring range from 1 to 5, indicating a significant diversity in respondents' ratings for each question. The average scores for all questions ranged from 3.35 to 3.83, suggesting overall positive feedback, tending towards neutral or slightly positive. The standard errors for all questions were relatively small, ranging from 0.055 to 0.073. This indicates that the average scores of the sample are reliable, meaning that despite individual differences, the overall trend is relatively consistent. Overall, these data demonstrate that respondents generally held a positive attitude towards the questions asked, with high consistency in their responses. The minimum and maximum scores covered the entire scoring range, revealing significant differences in individual perspectives, yet the overall trend remained positive, as shown in Table 4.3.

4.3 Results of the Study

Correlation analysis is the process of examining two or more correlated elements of a variable to determine how tight the correlation is between the two elements. Correlation analysis requires a link or probability between the associated elements. To investigate the relationship between various groupings. Correlation analysis has unquestionably become the greatest approach to statistical analysis. Pearson correlation coefficient: It works best for two groups of continuous variables that have an approximately normal distribution and are linearly connected. The value of Pearson's correlation coefficient is a statistical measure that indicates the degree of linear association between two variables. The value of the correlation coefficient is denoted by r , where n is the sample size and n represents the observed and mean values of both variables. r denotes the degree of linear correlation across the two values; the greater the absolute value of r , the more powerful the correlation. The results of the above analysis show that the variables have a 99% significant association. And since the correlation coefficient is greater than zero, they are positively associated.

Table 4.4 Correlation Between Variables (Pearson Correlation Matrix)

	Coverage of Digital Technology	Usage Depth of Digital Technology	Digitalization	Risk Management of Agricultural Supply Chain Finance
Coverage of Digital Technology	1			
Usage Depth of Digital Technology	.589**	1		
Digitalization	.547**	.584**	1	
Risk Management of Agricultural Supply Chain Finance	.481**	.438**	.463**	1

NOTE: *. Correlation is significant at the 0.05 level (2-tailed). **. Correlation is significant at the 0.01 level (2-tailed).

The research analyzed the Pearson correlation coefficient matrix among four variables: digital technology coverage, usage depth, digitalization level, and risk management of agricultural supply chain financial.

The results showed that the correlation coefficient between digital technology coverage and usage depth was 0.589, indicating a significant positive correlation. This suggests that as the coverage of digital technology increases, its usage depth also correspondingly increases, reflecting that broader technology coverage can facilitate deeper application.

The correlation coefficient between digital technology coverage and digitalization level was 0.547, demonstrating a significant positive correlation. This indicates that higher coverage of digital technology leads to a higher overall digitalization level, highlighting the pivotal role of coverage in driving the digitalization process.

The correlation coefficient between digital technology coverage and risk management of agricultural supply chain financial was 0.481, which, although slightly weaker than the previous two correlations, still shows a significant positive relationship. This result indicates that extensive digital technology coverage can effectively improve risk management of agricultural supply chain finance, potentially due to more data and

tools available for managing and mitigating risks.

The correlation coefficient between digital technology usage depth and digitalization level was 0.584, indicating a significant positive correlation. This reveals the crucial role of in-depth digital technology usage in driving the overall digitalization level.

The correlation coefficient between digital technology usage depth and risk management of agricultural supply chain finance was 0.438, which, though slightly weaker, remained significant. This suggests that deeper usage of digital technology can enhance risk management of agricultural supply chain finance.

The correlation coefficient between digitalization and risk management of agricultural supply chain finance was 0.463, which, though slightly weaker, remained significant.

These correlation coefficients underscore the importance of digital technology in agricultural supply chain finance. Enhancing the coverage and usage depth of digital technology not only elevates the overall digitalization level but also effectively improves risk management.

Therefore, according to the results of the data analysis, the coverage of digital technology has a significant positive effect on risk management of agricultural supply chain finance. Hypothesis H1 holds. The usage depth of digital technology has a significant positive effect on risk management of agricultural supply chain finance. Hypothesis H2 holds. The digitalization has a significant positive effect on risk management of agricultural supply chain finance. Hypothesis H3 holds.

Chapter 5 Conclusion and Recommendation

5.1 Conclusion

This study analyzed the impact of digital technology on risk management in agricultural supply chain finance. Theoretically, the widespread coverage, deep application, and comprehensive digital transformation of digital technology are summarized as important factors influencing risk management in agricultural supply chain finance. The study elaborates on how these factors affect risk management of agricultural supply chain finance. Then, through correlation analysis, the degree of influence of the above factors on risk management in agricultural supply chain finance is analyzed. The results show that the widespread coverage, deep application, and comprehensive digital transformation of digital technology are the key factors in improving the risk management capability of agricultural supply chain finance. These digital means comprehensively enhance the robustness and risk resistance of the agricultural supply chain finance system by improving information transparency, optimizing resource allocation, and enhancing decision support.

5.1.1 The Coverage of Digital Technology Has a Significant Positive Effect on Risk Management of Agricultural Supply Chain Finance

This research finding indicates that there is a significant positive correlation between digital technology coverage and risk management of agricultural supply chain finance, with a correlation coefficient of 0.481 and a P-value less than 0.01, indicating that this correlation is statistically significant. Although this correlation is slightly weaker than the other two correlations found in previous studies, it still demonstrates that digital technology coverage has a significant positive impact on risk management. The higher the coverage of digital technology, the more links and participants in the agricultural supply chain adopt digital technology, thereby enhancing information transparency and collaboration capabilities throughout the supply chain. This extensive application of technology helps to more effectively identify and assess potential risks, formulate corresponding response strategies, reduce information asymmetry and communication barriers, and ultimately enhance the effectiveness of risk management. Despite the slightly weaker correlation compared to previous research results, it still indicates that the widespread application of digital technology is an important factor in improving risk management capabilities in agricultural supply chain finance. The significance of the research results further confirms the positive impact of digital technology coverage on risk management, emphasizing the importance of widely

promoting digital technology in agricultural supply chains.

5.1.2 The Usage Depth of Digital Technology Has a Significant Positive Effect on Risk Management of Agricultural Supply Chain Finance

The research results show a significant positive correlation between the depth of digital technology usage and risk management of agricultural supply chain finance, with a correlation coefficient of 0.438 and a P-value less than 0.01. This indicates that although the correlation is slightly weaker, it is still statistically significant, proving that the depth of digital technology usage has a positive impact on risk management. The depth of digital technology usage refers to various links and participants in the agricultural supply chain deeply apply digital tools in their daily operations and decision-making. Despite the correlation coefficient being slightly lower than expected, it still demonstrates that the in-depth use of digital technology can help participants in the supply chain to more accurately identify and assess risks, leverage advanced tools such as data analysis, intelligent monitoring, and predictive models to improve risk early warning and response capabilities, thereby enhancing the overall effectiveness of risk management. This finding emphasizes the importance of not only expanding the coverage of digital technology but also focusing on its deep application in actual operations to achieve more effective risk management. Even with a slightly weaker correlation, the statistical significance still supports the positive role of in-depth usage of digital technology in improving risk management in agricultural supply chain finance.

5.1.3 The Digitalization Has a Significant Positive Effect on Risk Management of Agricultural Supply Chain Finance

The research results indicate a significant positive correlation between the digitalization and risk management of agricultural supply chain finance, with a correlation coefficient of 0.463 and a P-value less than 0.01. This demonstrates that, despite the slight weakness in the correlation, it remains statistically significant, revealing the positive impact of the digitalization on risk management. The digitalization refers to the extent of the overall transformation of the agricultural supply chain from traditional operations to comprehensive digitalization. Although the correlation coefficient is slightly low, it still shows that with digitalization, the information flow, logistics, and capital flow within the chain can all be monitored and managed in real time. This enhanced the response speed and decision-making accuracy

and reduced the possibility of human errors and operational mistakes, thereby strengthening the efficiency and effectiveness of risk management. This finding underscores the importance of promoting comprehensive digital transformation within the agricultural supply chain. Even with a slightly weaker correlation, the statistical significance still supports the positive role of the digitalization in improving risk management in agricultural supply chain finance. Comprehensive digital transformation can elevate information transparency, optimize resource allocation, and enhance decision support, thereby bolstering the robustness and risk resilience of the entire supply chain.

Table 5.1 Hypothesis Test Results

NO.	Hypothesis	Result
H1	The coverage of digital technology has a significant positive effect on risk management of agricultural supply chain finance.	Established
H2	The usage depth of digital technology has a significant positive effect on risk management of agricultural supply chain finance.	Established
H3	The digitalization has a significant positive effect on risk management of agricultural supply chain finance.	Established

5.2 Recommendation

5.2.1 Enhancing Digital Technology Coverage

Taking Longping High-Tech as a case study, this study found that there exists a significant positive correlation between digital technology coverage and risk management in agricultural supply chain finance. To further enhance digital technology coverage, Longping High-Tech can adopt a series of measures. Firstly, Longping High-Tech should strengthen digital infrastructure construction to ensure that all links within the company have access to and can utilize advanced digital technology. This includes upgrading network equipment, enhancing data storage and processing capabilities, and introducing advanced agricultural devices. Secondly, Longping High-Tech needs to promote informationization in all links of the supply chain to ensure that the entire process from planting, and production to sales can be managed digitally. This can be achieved by deploying smart sensors, using drones and satellite remote sensing technology to monitor crop growth and environmental conditions, and improving data timeliness and accuracy. Longping High-Tech should focus on data standardization and integration, establishing a unified data platform to enable data sharing and

interoperability. This will help enhance information transparency and coordination capabilities throughout the supply chain, reducing information asymmetry and communication barriers. To promote the widespread application of digital technology, Longping High-Tech should also strengthen employee training, improving digital skills and awareness of digital technology. Simultaneously, the company should collaborate with technology providers and research institutions to introduce the latest digital technology and solutions, continuously optimizing and upgrading its digitalization level. By doing so, Longping High-Tech can effectively enhance digital technology coverage, strengthen its capabilities in managing risks in agricultural supply chain finance, and ensure that the company can respond flexibly and efficiently to various risks, ultimately achieving more robust development.

5.2.2 Deepening the Utilization of Digital Technology

Taking Longping High-Tech as a case study, this study found a significant positive correlation between the depth of digital technology utilization and risk management of agricultural supply chain finance. To further deepen the utilization of digital technology, Longping High-Tech can adopt a series of measures. Longping High-Tech should apply advanced digital technology extensively to all aspects of the agricultural supply chain. This includes introducing big data analytics, artificial intelligence, and block chain technology to optimize supply chain management and risk prediction. For instance, through big data analytics, Longping High-Tech can more accurately predict market demand and crop yields, thereby reducing inventory and market fluctuation risks.

The company should enhance the deployment of Internet of Things devices to monitor key indicators in agricultural production, such as soil moisture, meteorological conditions, and crop health status. With these real-time data, the company can promptly adjust production strategies to mitigate risks from environmental changes or pests and diseases. Meanwhile, by leveraging unmanned aerial vehicles (UAVs) and satellite remote sensing technology, Longping High-Tech can achieve monitoring of vast farmland areas, enhancing the precision and efficiency of production management. Longping High-Tech should promote the digital management platform to achieve information integration and data sharing across all supply chain segments. This not only improves information transparency but also enables more scientific decision-making through data analysis and visualization tools for management. The company should develop and apply smart contracts, ensuring the transparency and security of transactions through block chain technology, thereby mitigating financial risks. Longping High-Tech must prioritize professional talent and upgrading employees'

digital skills. Regular training and exchange activities should enable employees to use technologies. By collaborating with technology companies and research institutions, Longping High-Tech can introduce the latest technological solutions and continuously optimize the depth of digital technology applications. In conclusion, by significantly deepening the application of digital technology in the agricultural supply chain, Longping High-Tech can enhance its capability in supply chain finance risk management. This will enable the company to respond more flexibly and efficiently to various risks in the complex market environment, ultimately achieving sustainable development.

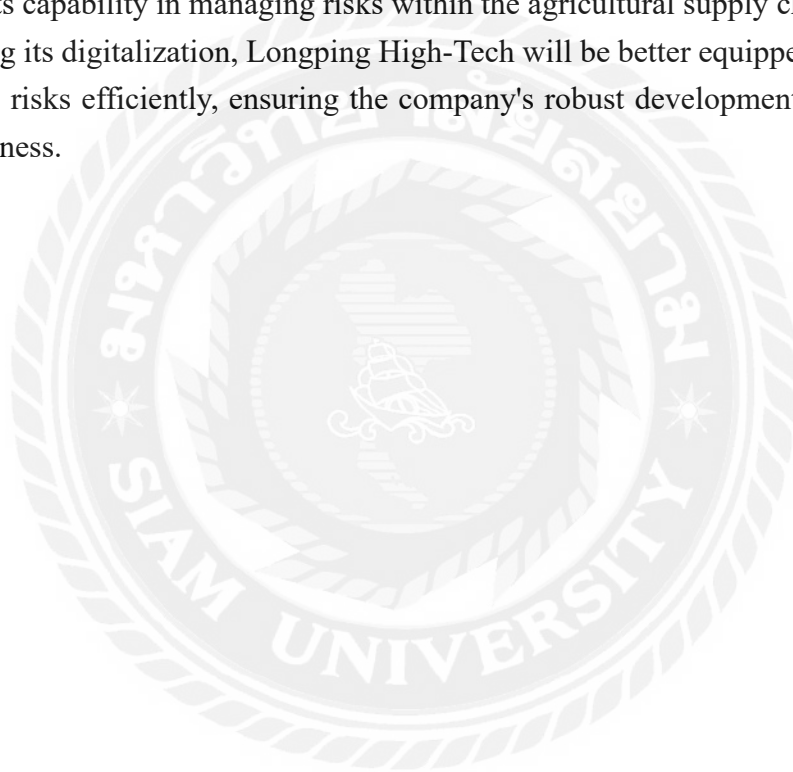
5.2.3 Enhancing Digitalization

Using Longping High-Tech as a case study, this study discovered a notable positive correlation between the level of digitalization and the risk management of agricultural supply chain finance. To elevate digitalization, Longping High-Tech can adopt a series of measures.

Firstly, the company should comprehensively drive the digital transformation of its business processes, ensuring that every aspect, from production to processing and sales, is managed digitally. This includes introducing advanced Enterprise Resource Planning (ERP) and Supply Chain Management (SCM) systems. Secondly, Longping High-Tech should strengthen data collection and management by establishing a unified data platform. This platform should ensure real-time data collection, centralized storage, and comprehensive analysis across all business segments. The company can improve data accuracy and consistency, providing a solid foundation for decision-making. Additionally, the data platform should possess robust analytical capabilities, leveraging artificial intelligence and machine learning technologies to delve deeply into and analyze data, thereby identifying potential risks and opportunities. Thirdly, during the digital transformation process, Longping High-Tech must prioritize the security and stability of its information systems. The company should establish a comprehensive information security management system, implementing multi-layered security measures to mitigate risks associated with data breaches and system failures. Regular system maintenance and upgrades are also crucial to ensure the efficient operation of information systems.

Furthermore, Longping High-Tech should strengthen its collaboration with technology providers and research institutions, actively introducing and applying cutting-edge digital technology. Through these, the company can stay abreast of the

latest technological trends and solutions, continually optimizing its digital capabilities. Additionally, the company should foster internal innovation by establishing special funds and incentive mechanisms to support employees in exploring and applying new technologies, thereby enhancing overall digital competence. Longping High-Tech should conduct extensive digital skills training to elevate digital literacy and technical application abilities. Regular training and learning sessions will ensure that employees are proficient in operating digital systems and tools, improving work efficiency and decision-making capabilities. By comprehensively driving the digital transformation of business processes, strengthening data collection and management, ensuring information system security, introducing advanced technologies, and enhancing employee training, Longping High-Tech can significantly elevate its digitalization level, bolstering its capability in managing risks within the agricultural supply chain finance. In improving its digitalization, Longping High-Tech will be better equipped to identify and address risks efficiently, ensuring the company's robust development and market competitiveness.



References

- Ackert, L. (1970). The Market for Lemons: Quality Uncertainty and The Market Mechanism. *The Quarterly Journal of Economics, President and Fellows of Harvard College*, 84(3), 488-500.
- Beard, C. Z. (1997). Information asymmetry theory and its economic significance. *Dynamics of Economics*, 1, 66-69
- Bose, P. (1998). Formal–informal sector interaction in rural credit markets. *Journal of Development Economics*, 56(2), 265-280.
- Chen, H., & Xie, J. (2021). Trust system enabling supply chain finance: Based on transaction cost theory. *Hainan Finance*, 6, 40-48.
- Coase, R. H. (1937). The nature of the firm. *The Economic Journal*, 47(193), 386-405.
- Coase, R. H. (1960). The problem of social cost. *Journal of Law and Economics*, 3, 1-44.
- Dong, C., & Feng, X. (2020). Supply chain financial service problems and solution paths of agricultural modernization. *Academia*, 12, 130-139.
- Guo, J., & Gu, L. (2022). Can agricultural supply chain finance effectively alleviate the financing constraints of enterprises? An empirical study on the participation of agriculture-related enterprises in precision poverty alleviation. *Operations Research and Management*, 31(3), 112-118.
- He, J., & Lei, M. (2019). Characteristics and mode analysis of agricultural supply chain finance development in the era of digital technology. *Rural Finance Research*, 7, 33-37.
- He, X., Chen, J., & Lin, F. (2023). Research on an agricultural supply chain finance credit service system based on block chain credit score. *Shanxi Agricultural Economics*, 24, 186-189.
- Hoff, K., & Stiglitz, J. E. (1998). Moneylenders and bankers: Price-increasing subsidies in a monopolistically competitive market. *Journal of Development Economics*, 55(2), 429-462.
- Hofmann, E., & Belin, O. (2011). *Supply chain finance solutions: Relevance - propositions - market value*. Springer.
- Hua, Y., & Bai, X. (2024). Research review on agricultural supply chain finance in China. *Modern Business*, 2, 131-134.
- Huang, J. (2023). How digital technology promotes rural revitalization: An introduction to rural digital finance. *Rural Finance Research*, 12, 3-10.

- Jiang, Y., & Ma, J. (2014). Industrial organization, commercial credit and the alleviation of farmers' financing difficulties: Three typical cases based on the pig industry in Sichuan Province. *Dongyue Lecture Series*, 35(1), 159-167.
- Klapper, L. (2005). The role of factoring for financing small and medium enterprises. *Policy Research Working Paper Series*, 3958, 3111-3130.
- Lam, H. K. S., Zhan, Y., Zhang, M., & Yeung, A. C. L. (2019). The effect of supply chain finance initiatives on the market value of service providers. *International Journal of Production Economics*, 216, 1-12.
- Li, C., & Hu, Y. (2023). Research on the innovation and development of agricultural supply chain finance in the context of rural revitalization. *China Logistics and Purchasing*, 24, 43-44.
- Li, M. (2022). Research on the innovation and development of rural digital supply chain finance model under the background of rural revitalization. *Agricultural Economy*, 8, 120-122.
- Li, Z. (2023). Application and prospect of supply chain finance in China's agricultural industry chain. *Shanghai Business*, 12, 73-75.
- Liang, J. (2023). Exploring the path of sustainable agricultural supply chain financial service model. *China Accountant General*, 11, 80-82.
- Lin, Y., & Pan, S. (2006). Information asymmetry, adverse selection and economic development. *World Economy*, 1, 3-11.
- Ma, E. (2024). Optimization of government functions to achieve the development of agricultural supply chain finance. *China Storage and Transportation*, 1, 174.
- Ma, J., Zhang, Y., & She, C. (2011). Agricultural value chain financial innovation strategy and case analysis based on the development of contract farming. *Rural Finance Research*, 7, 11-17.
- McKinnon, R. L. (1997). *Money and capital in economic development*. Shanghai People's Publishing House.
- Ministry of Agriculture and Rural Development. (2020). *Digital agriculture rural development plan (2019-2025)*. <http://www.cnstandards.net/index.php/digital-agriculture-rural-development-plan-2019-2025/>
- People's Bank of China Inclusive Finance Working Group. (2023). Analysis report on China's inclusive finance indicators (2022). *Financial Times*, 005.
- Pfohl, H. C., & Gomm, M. (2009). Supply chain finance: Optimizing financial flows in supply chains. *Logistics Research*, 1(3-4), 149-161.

- Rothschild, M., & Stiglitz, J. E. (1976). Equilibrium in competitive insurance market: An essay on the economics of imperfect information. *Quarterly Journal of Economics*, 90(4), 629-650.
- Ruan, D., Shi, R., & Ge, L. (2023). Agricultural supply chain finance helps rural revitalization in ethnic areas. *Strait Science and Industry*, 36(11), 53-56.
- Shao, L., Zhang, M., & Cheng, X. (2021). Research on financing mode of agricultural production enterprises in China: Based on the perspective of supply chain finance. *China Agricultural Machinery & Chemical Journal*, 42(3), 227-236.
- Stiglitz, J. E., & Weiss, A. (1981). Credit rationing in markets with imperfect information. *The American Economic Review*, 71(3), 393-410.
- Su, Y. L., & Zhong, B. Y. (2017). The credit risk assessment model of internet supply chain finance: Multi-criteria decision-making model with the principle of variable weight. *Journal of Computer and Communications*, 5(04), 20-30.
- Tang, F. (1992). A review of transaction costs and new institutional economic theory. *Economics Dynamics*, 12, 58-63.
- The People's Bank of China Baishan Branch Research Group. (2023). Research on the problems of China's inclusive finance in support of rural economic development. *Jilin Financial Research*, 10, 49-52.
- Tong, X., Chu, B., & Yang, X. (2011). An empirical study on the impact of social capital on the borrowing behavior of farm households: Based on the survey data of 1003 farm households in eight provinces. *Financial Research*, 12, 177-191.
- Wang, C., Hu, C., Zhang, Y., Wu, H., & Chen, X. (2019). Supply chain control tower empowers enterprise digital transformation. *Intelligence Theory and Practice*, 42(9), 28-34.
- Williamson, O. E. (1985). *The capitalist economic system*. Economic Science Press.
- Xiao, Y. (1988). *Financial deepening in economic development*. Sanlian Bookstore, Shanghai Branch.
- Xiao, Y. (2006). Research on Bank A's internal credit rating system based on self-reimbursable trade finance (Unpublished master's thesis). University of Electronic Science and Technology, Chengdu, China.
- Zhang, X. (2022). Transaction cost theory and its extension. *Cooperative Economy and Technology*, 19, 134-135.
- Zhong, J. (2011). Solving SME financing: A perspective analysis based on self-reimbursable trade finance. *Financial Economy*, 18, 84-85.

Appendix

Dear Sir/Madam,

Thank you for your participation in this questionnaire survey. The survey will be conducted anonymously, and your relevant information will be kept confidential. Thank you again for your cooperation.

Part I

1. Gender Male Female
2. Age A 18-34 B35-44 C45-54 D above 54
3. Education 1. Bachelor's degree 2. Master degree
 3. Higher than the Master's degree 4. Other
4. Position 1. Operation 2. Manager/senior
 3. Lecturer/instructor 4. Other.....
5. Tenure in current position (year)
 1. Less than/or equal to 5 2. Between 6-10
 3. Between 11–15 4. 16 and over

Part II : Please judge to what extent you agree with the following statement, please choose the most appropriate option, and mark the corresponding number "√". The questionnaire used Likert scale, ranging from 1 to 5 in which 1 indicates strongly disagree (or strongly disagree), 2 indicates relatively disagree (or relatively disagree), 3 indicates neutral, 4 indicates relatively agree (or relatively agree), and 5 indicates strongly agree (or strongly agree)

Measuring item	Strongly disagree	Disagree	General	Agree	Strongly agree
Coverage of Digital Technology					
1.Does the breadth of digital technology application in the					

supply chain contribute to improving the accuracy of risk prediction?					
2.Can the expansion of digital technology coverage significantly reduce financial risks in the supply chain?					
3.Can the widespread application of digital technology in all links of the supply chain enhance information transparency, thereby reducing risks arising from information asymmetry?					
4.Does the increase in the breadth of digital technology coverage facilitate more efficient monitoring and management of credit risks in the supply chain?					
5.Can the breadth of digital technology application in Longping High-Tech's supply chain finance enhance the resilience and flexibility of the entire supply chain?					
Usage Depth of Digital Technology					
1.Can the in-depth use of digital technology improve the real-time and accuracy of supply chain financial risk monitoring?					
2.Can the deep application of digital technology in supply chain finance effectively reduce risks caused by incomplete or inaccurate data?					
3.Can the deep application of digital technology significantly enhance the early warning capabilities in supply chain financial risk management?					
4.Does the in-depth use of digital technology in Longping High-Tech's supply chain contribute to					

improving the scientificity and precision of risk management decisions?					
5.Can the deep use of digital technology enhance Longping High-Tech's supply chain finance system's response capabilities to sudden risks?					
Digitalization					
1.Does the enhancement of digitalization in Longping High-Tech's supply chain finance system contribute to improving the overall risk management capability?					
2.Can achieving a high level of digitalization in supply chain finance significantly reduce risks associated with manual operations?					
3.Can an increase in digitalization better integrate and analyze various types of data within the supply chain, thereby enhancing risk identification capabilities?					
4.Can a highly digitized supply chain finance system in Longping High-Tech improve the efficiency and accuracy of information transmission, thus reducing risks arising from information asymmetry?					
5.Does a highly digitized supply chain finance system help Longping High-Tech better respond to market fluctuations and sudden risks?					
Risk Management of Agricultural Supply Chain Finance					
1.In Longping High-Tech's supply chain finance system, can the application of digital					

technology improve the overall efficiency of risk management?					
2.Can the application of digital technology effectively reduce credit risks in Longping High-Tech's supply chain finance?					
3.Can the use of digital technology in supply chain finance better monitor and warn against market risks?					
4.Does digital technology help reduce supply chain finance risks arising from information asymmetry?					
5.Can the introduction of digital technology in Longping High-Tech's supply chain finance improve the transparency and security of fund flows?					
6.Does the application of digital technology enhance Longping High-Tech's supply chain finance system's response capabilities to emergencies?					