

Study on Supply Chain Financing Scheme of A Vietnamese Coffee Company in China

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Abstract: This paper takes G7 Coffee, a Vietnamese coffee company, as an example to design a supply chain financing scheme suitable for the company. First of all, on the basis of explaining the concept of supply chain, supply chain financing and other related concepts, supply chain management theory, supply chain financing model, fuzzy comprehensive evaluation model and other theoretical foundations, based on the financing situation of a Vietnamese coffee company G7 coffee in China, combined with the financing problems of the company and the company's capital needs, The feasibility of supply chain financing of G7 Coffee in China for a Vietnamese coffee company is proposed. Secondly, this paper introduces the evaluation method of supply chain financing scheme of G7 Coffee in China of a Vietnamese coffee company. Finally, on the basis of clear objectives and principles of financing scheme design, an evaluation system of supply chain financing mode of a Vietnamese coffee company based on AHP is constructed. The applicability of accounts receivable supply chain financing, inventory supply chain financing and prepayment supply chain financing adopted by the company is further analyzed by fuzzy comprehensive evaluation method. The fuzzy comprehensive evaluation results show that The accounts receivable financing model is the best financing model for the supply chain financing of G7 Coffee in China of a Vietnamese coffee company. In order to ensure the smooth implementation of the supply chain financing plan of a Vietnamese coffee company G7 Coffee in China, this paper proposes to strengthen the guarantee from three aspects: financial system, credit management and risk control.

Keywords: Coffee company; Supply chain financing; Fuzzy comprehensive evaluation.

1. Introduction

This paper selects the supply chain financing scheme of a Vietnamese coffee company in China as the research object for discussion, mainly focusing on the comprehensive analysis of two factors: the enormous potential of the coffee market in China and the already established coffee consumption market. In terms of supply chain financing, it is mainly based on the fact that supply chain financing is a new financing model that has gradually emerged on the basis of supply chain finance research, and it has significant advantages in improving credit levels and obtaining financial support. In order to effectively solve the problem of slow growth in internal financing of a Vietnamese coffee company and the inability to meet the company's capital needs, this paper, based on the actual financing characteristics of G7 Coffee, a Vietnamese coffee company, in China, evaluates three financing schemes including accounts receivable, inventory, and prepayment using the fuzzy comprehensive evaluation method. The aim is to select the best supply chain financing scheme to alleviate the financing difficulties of the Vietnamese coffee company and further expand the development space of G7 Coffee in China.

2. Literature Review and Research Model

Internationally recognized concept of supply chain financing was proposed by scholars like Williams Timme et al. (2000), who argued that supply chain financing should be based on the integration of supply chain logistics, information flow, capital flow, and the business activities of all participating entities, cooperating with external financial institutions to meet the financing needs of various entities in

the supply chain [1]. Furthermore, supply chain finance does not only target a single enterprise but also includes financing activities and financial services for the entire supply chain. Hofmann E (2003) stated that the essence of supply chain finance is financial services and analyzed the architecture of supply chain finance from multiple perspectives, suggesting that supply chain finance is a way to create value and can create value for multiple organizations in the supply chain, including external service providers [2]. Michael Lamoureux (2008) defined supply chain financing as "a process of systematically optimizing the availability and cost of funds within a core-enterprise-led ecosystem." This optimization process requires the collection, integration, and analysis of information flows in the supply chain, combined with cost analysis and management, to utilize various financing methods. This viewpoint highlights the importance of core enterprises in the supply chain and reveals the commercial essence of supply chain financing [3].

In China, Yan Junhong and Xu Xiangqin (2007) proposed that supply chain financing is a financial service targeting the entire supply chain rather than individual small and medium-sized enterprises. Supply chain financing not only provides financing for small and medium-sized enterprises from a supply chain perspective but also is a management measure that transforms individual enterprise risk management into overall supply chain risk management [4]. Hu Yuefei (2009) believed that supply chain financing is a fund-related activity born from the organic combination of the entire supply chain and financial services [5]. Yang Shaohui (2005) discussed the significance of supply chain financing services for enterprises and commercial banks respectively, arguing that supply chain financing is an important means for enterprise cash flow management and also a powerful measure for commercial banks to enhance their core competitiveness [6]. Wang Shu

(2013) proposed that supply chain financing is a systemic financing arrangement. Although it is reached through cooperation between core enterprises and banks, it is oriented towards all participants in the supply chain, providing financing solutions for small and medium-sized enterprises [7]. Zhao Yuan (2016) believed that against the backdrop of the rapid development of e-commerce transactions in China, small and micro-enterprises participating in e-commerce are just beginning to emerge. These small and micro-enterprises find it difficult to meet the requirements of bank loans in terms of creditworthiness. However, constrained by the long payment cycles inherent in e-commerce transactions, they have to rely on external financing to solve their own capital problems. In this context, a new type of supply chain financing model based on e-commerce platforms has emerged [8]. Gong Jianhua and Zhou Yuanyi (2018) conducted in-depth research on the financing models of all enterprises in the supply chain, believing that supply chain financing is an innovative financing model that plays an important role in promoting the development of the entire supply chain [9].

3. Research Methodology

(1) Interview Survey Method: Regarding the selection of supply chain financing models for a Vietnamese coffee company, this paper conducts interview surveys with relevant personnel from Wuxi Keyide Company, the general agent of G7 Coffee in China, to obtain relevant financial data for three typical models: accounts receivable, inventory, and prepayment. This further understanding of the financing situation and existing problems of G7 Coffee in China provides a basis for further financing needs, model selection, and application analysis.

(2) Case Study Method: This paper takes a Vietnamese coffee company as a case study object and, combined with the results of fuzzy comprehensive evaluation, selects the most suitable supply chain financing model. By analyzing a small case, this study aims to provide references for the selection of supply chain financing models for other coffee enterprises.

(3) Combination of Qualitative and Quantitative Methods: Based on a review and summary of domestic and international literature related to supply chain financing, this paper analyzes the supply chain financing needs of G7 Coffee in China. Meanwhile, using the fuzzy comprehensive evaluation model, it quantitatively evaluates the three financing schemes. Based on this analysis, the best financing model is selected.

4. Research Results

4.1. Analytic Hierarchy Process

In the hierarchy, the top level is referred to as the "goal level," which represents the ultimate objective to be achieved and serves as the overall purpose for making decisions within the system. At this level, there is only one element, and its characteristics are unique. For example, in the goal level A, it dominates the elements in the standard level, and the elements in both the standard and index levels belong to the corresponding levels. In the central part of the structural network diagram is the standard level, which comes after the goal level and exerts the greatest influence on the object level. Compared to the object level, its factors are more specific and usually consist of multiple components. In practical terms, it directly affects the object level the most.

In the structure, the lowest level is the indicator level. In order to implement specific plans for the standard and goal

levels, it is derived from the factors of the standard level. Compared to the standard level, the factors at the indicator level possess a certain level of usability and can be utilized to address issues at the object level using specific plans. Typically, the indicator level does not require further subdivision. Instead, decisions made at the indicator level can be transferred to the standard level, ultimately affecting the object level.

In the Analytic Hierarchy Process (AHP), the first step is to establish a hierarchical structure, during which factors for the goal, standard, and indicator levels are defined. According to the characteristics of the hierarchical structure, the more factors included in the standard and indicator levels, the better they can reflect their impact on project objectives and accurately reflect the importance of these factors. However, including too many factors may lead to the dilution of each factor's influence and pose significant challenges for the consistency check of matrices. Through investigation, it is found that it is best not to have more than 9 factors at each level to prevent a surge in computational complexity and potential distortions in calculations due to the excessive number of factors.

4.2. Expert Scoring Method

After establishing the hierarchical structure, a comprehensive evaluation of the elements at each level is conducted, usually through questionnaires assessing various types of elements. Based on its construction principle, the standard level is divided into an index level. However, within the index level, each factor's influence on the criterion level varies. To simplify the analysis, the pairwise comparison method is employed to determine the relative importance of factors within the same level. For example, weighting the impact of factors from the index level on the criterion level to compare their importance.

Once the hierarchical structure is determined, based on the goal level, standard level, and indicator level, comparisons are made pairwise between each factor at each level from top to bottom. This process establishes a judgment matrix for each level. For example, the weights of m indicator levels relative to the criterion level B1, denoted as ω_i (where $i = 1, 2, \dots, m$ and $\sum \omega_i = 1$), are represented by the judgment matrix as shown in Equation 4.1:

$$A = A(a_{ij}) = \begin{bmatrix} \omega_1 & \omega_1 & \dots & \omega_1 \\ \omega_1 & \omega_2 & & \omega_m \\ \omega_2 & \omega_2 & \dots & \omega_2 \\ \omega_1 & \omega_2 & \dots & \omega_m \\ \vdots & \vdots & \ddots & \vdots \\ \omega_m & \omega_m & \dots & \omega_m \\ \omega_1 & \omega_2 & & \omega_m \end{bmatrix} \quad (4.1)$$

a_{ij} refers to the ratio of relative importance between the i -th and j -th elements, using Saaty's proposed 1-9 scale method as the judgment criterion. Experts rate the relative importance of various elements in the judgment matrix, and then these data are summarized to form a judgment matrix. Subsequently, calculations are performed on these elements to obtain the weight ω_i of each element. This weight represents the weighting of standard i with respect to the criterion level B1. The vector $\omega = (\omega_1, \omega_2, \omega_3)^T$ serves as a ranked weighted vector.

4.3. Fuzzy Comprehensive Evaluation Method

During the process of conducting Analytic Hierarchy Process (AHP), a strong assumption of consistency is employed, which includes the fundamental consistency or strong consistency. This assumption imposes certain requirements on the judgment matrices. Not only do they need to satisfy the property of positive reciprocal, but also the consistency in the numerical relationships between the pairwise scale values of the relative importance of each factor. However, due to the limitations of human judgment capabilities, it is assumed that the judgment matrices are consistent when applying the AHP method. A matrix A is considered consistent if it satisfies the condition $a_{ij} * a_{jk} = a_{ik}$ for all $i, j, k = 1, 2, \dots, n$. Since judgment criteria are based on subjective knowledge and personal judgments, they inherently possess certain flaws in terms of subjective judgments. As the number of influencing factors increases, these flaws become more pronounced. Based on the level of the judgment matrix, if the number of elements in the matrix is greater, it implies that there are more influencing factors at the same level. Consequently, when performing pairwise comparisons of these influencing factors, it is possible to observe conflicts among factors in a system with multiple elements. To better understand the internal logical relationships between these matrix factors, it is necessary to test the consistency of these judgment matrices A.

Starting from the characteristics of the maximum eigenvalue of the judgment matrix, assume λ_{max} is the maximum eigenvalue of an m-order matrix A. When matrix A is a consistency matrix, $\lambda_{max} = m$. However, achieving consistency in practical applications is challenging. If there is a significant deviation between λ_{max} and m, it indicates a higher degree of inconsistency in the matrix. By using the formula for calculating the consistency index, CI can be obtained:

$$CI = \frac{\lambda_{max} - m}{m - 1} \quad (4.2)$$

In formula (4.2), the maximum eigenvalue of the judgment matrix is denoted as λ_{max} , and the order of the judgment matrix is denoted as m. Additionally, to scientifically validate the consistency of the matrix, it is necessary to consider the orders of different matrices. The smaller the order, the better the consistency. However, as the order increases, the difficulty of achieving consistency no longer changes linearly, and achieving consistency becomes increasingly challenging with higher orders. To optimize the consistency of the matrix, the ratio of the consistency index of the judgment matrix A to the average random (same order) consistency index RI is transformed into the consistency ratio CR for consistency testing:

$$CR = CI / RI \quad (4.3)$$

The consistency criterion is applied to check the judgment matrix, and the value of CR for the matrix is calculated using Equation (4.3). If $CR \leq 0.1$, the judgment matrix has passed the consistency check. If the test fails, adjustments must be made within a certain range, followed by iterative testing until the test passes.

In the overall structure, consistency checks should be

performed on judgment matrices at each level. In the standard level, if there is a goal level, a single consistency check can be conducted for the judgment matrix. However, in the indicator level, consistency checks must be performed for the matrices constructed from the factors of the index level (U) according to different factors of the standard level (B). The calculation formula is as follows:

$$CI^U = \sum_{i=1}^m \omega_i CI_i \quad (4.4)$$

$$RI^U = \sum_{i=1}^m \omega_i RI_i \quad (4.5)$$

$$CR^U = CI^U / RI^U \quad (4.6)$$

If $CR^U \leq 0.1$, all judgment matrices in the index level (U) are considered to meet the consistency criterion.

4.4. Application of Evaluation Method for Supply Chain Financing Schemes of G7 Coffee Company in China

4.4.1. Objectives and Principles of Financing Scheme Design

The final determination of the financing scheme requires comprehensive consideration of various factors such as policies, the intentions of financing entities, financing efficiency, financing channels, and other factors. Different conditions may lead to different financing schemes. Although there are various financing schemes, common objectives and principles must be followed when making choices.

4.4.1.1 Objectives of Financing Scheme Design

(1) Achieving the Required Financing Scale

Currently, funding issues pose the greatest obstacle to the development of G7 Coffee, a Vietnamese coffee company, in China. The company's funding primarily relies on short-term loans, self-financing, and interest income. The company has a relatively single financing channel, which not only leads to financial pressure but also results in low operational efficiency. Regardless of the chosen financing scheme, achieving a certain financing scale is a fundamental requirement.

(2) Lower Financing Costs

During the financing process, cost expenses are unavoidable, including the costs of the financing process itself, loan interest, and subsequent operating expenses. Therefore, the choice of financing scheme needs to be analyzed based on specific circumstances.

(3) Minimizing Risks

All financing processes and operations encounter risks, such as policy risks, financial risks, and mismanagement risks, which can affect the financing process and operations. Comprehensive consideration of factors such as financing entities, financing channels, and financing methods helps minimize risks.

(4) Higher Operational Efficiency

In the process of G7 Coffee's development in China, although financing is the most critical issue, operational

efficiency still largely determines the success or failure of development. Choosing a suitable financing scheme can effectively improve the company's operational efficiency.

4.4.1.2 Principles of Financing Scheme Design

When designing supply chain financing schemes, the following principles should be followed:

1. Principle of Operability: The selection of supply chain financing models must be combined with the specific circumstances of G7 Coffee, a Vietnamese company operating in China, to ensure that the final scheme can be truly applied to the financing process of G7 Coffee, effectively alleviating the company's financing pressure.

2. Principle of Scientificity: The design of the scheme operation process must adhere to standard financing procedures. Additionally, in the process of evaluating the scheme's implementation effectiveness, the selection of evaluation indicators should also adhere to scientific principles to ensure the overall effectiveness of the scheme design.

3. Principle of Economy: Adopting supply chain financing methods helps G7 Coffee obtain funds. However, attention should be paid to ensuring that the scheme's design meets economic requirements, truly enhancing the company's financing efficiency.

4. Principle of Qualitative and Quantitative Integration: When evaluating the supply chain financing model of G7 Coffee in China, there are many influencing factors, including both qualitative and quantitative aspects. For issues that cannot be quantified, methods such as expert scoring can be used to convert qualitative issues into quantitative ones for analysis. This approach can provide a clearer and more intuitive understanding of the strengths and weaknesses of the financing model.

4.4.2. Evaluation of Supply Chain Financing Schemes

4.4.2.1 Establishment of Evaluation System for Supply Chain Financing Models of a Vietnamese Coffee Company Based on AHP

Building upon previous research, this paper adopts scientific and rational analytical methods and conducts extensive literature review and compilation. This approach ensures that the selected indicators can comprehensively reflect various aspects of the evaluated object. In the process of indicator selection, comprehensive consideration is given to various factors of the Vietnamese coffee company G7 Coffee's development in China, allowing for a multi-angle and comprehensive evaluation. Consequently, a well-structured evaluation index system for the supply chain financing model of the Vietnamese coffee company is effectively constructed.

The fuzzy judgment matrix S of the objective layer is obtained by multiplying the weight vector of the criteria layer by the fuzzy judgment vector of the criteria layer, according to the formula: $S = B_i \times Y_{ij}$

According to the formula $S = B_i \times Y_{ij}$, a fuzzy evaluation of the objective layer is conducted:

$$S = [0.215 \quad 0.317 \quad 0.368]$$

Through calculation, it is found that the fuzzy comprehensive evaluation score for accounts receivable financing mode is the highest, at 0.368. This indicates that the optimal financing mode for the supply chain financing of Vietnam's G7 Coffee Company within China is the accounts receivable financing mode. Under this mode, the company's funding needs can be effectively met, eliminating the mismatch between short-term borrowing and long-term

lending, alleviating repayment pressure, and reducing financial risks for the company.

5. Conclusions and Management Implications

5.1. Research Conclusion

This paper, based on a review of foundational theories and relevant literature, analyzes the financing status and funding needs of Vietnam's G7 Coffee Company's operations in China. Addressing the company's current situation, a supply chain financing model is proposed, and a fuzzy comprehensive evaluation analysis is conducted on three supply chain financing models: accounts receivable financing, inventory financing, and prepayment financing, ultimately selecting the most suitable financing model for the company. Finally, to ensure the smooth implementation of the company's supply chain financing, corresponding safeguard measures are proposed. The main conclusions of this paper are as follows:

Firstly, Vietnam's G7 Coffee Company's operations in China face certain financing issues, primarily concentrated in two areas: insufficient internal financing sources and low credit financing capabilities. On one hand, internal financing, primarily relying on own funds and retained earnings, falls short due to the company's rapid expansion requiring substantial capital, thus unable to meet the rapid capital demands for the company's swift growth. On the other hand, the company's credit financing capacity is low, with most investment funds sourced from short-term bank loans, resulting in a mismatch between short-term borrowing and long-term investments, leading to frequent repayment pressures and increased financial risks. Additionally, rising financing interest rates and high guarantee costs further exacerbate the company's low financing capacity.

Secondly, the selection of the supply chain financing model for Vietnam's G7 Coffee Company's operations in China. Considering the company's development characteristics, supply chain financing models are found to be feasible. Among accounts receivable financing, inventory financing, and prepayment financing, the accounts receivable financing model is chosen through a fuzzy comprehensive evaluation analysis, effectively meeting the company's funding needs, eliminating mismatches between short-term borrowing and long-term investments, alleviating repayment pressures, and reducing financial risks.

Thirdly, the implementation safeguards for Vietnam's G7 Coffee Company's operations in China's supply chain financing scheme. To ensure the smooth implementation of the supply chain financing scheme, this paper proposes enhancing safeguards in financial systems, credit management, and risk control.

5.2. Shortcomings and Prospects

The supply chain financing model is a new type of financing model developed on the basis of traditional financing models, with broad development prospects. However, research on the supply chain financing model is still in its early stages, with few research results, and its practical application still requires some time and space. Since understanding is always incomplete, this study focuses only on a part of the supply chain financing in an attempt to identify its practical value. During the research process, many areas needing further improvement and study were discovered, mainly in the following three aspects: Firstly,

financial institutions consider the entire supply chain perspective, focusing on the credit status and transaction situations of core enterprises to determine the credit levels of small and medium-sized enterprises in the supply chain. Although this addresses the financing difficulties of small and medium-sized enterprises, the overall risk situation in the supply chain cannot be ignored. However, this study mainly focuses on how a certain coffee company, G7 Coffee in Vietnam, selects the supply chain financing model within China, without delving into risk prevention, which needs further improvement in the future. Secondly, when evaluating the supply chain financing model of G7 Coffee within China, the main method used is fuzzy comprehensive evaluation analysis. Although this method has advantages such as easy access to data and relatively scientific indicator design, determining the weights of its indicators may inevitably be influenced by subjective factors. Therefore, this method also has its limitations, and it may be considered to use more sophisticated evaluation methods in the future. Thirdly, the research content of this paper mainly focuses on the domestic supply chain financing scheme of G7 Coffee in China. However, financing schemes are only a small part of corporate financial strategy. Considering the overall financial strategy of the enterprise, the scope of the research in this paper is somewhat narrow. In the future, it can be appropriately expanded in the research field, starting from the overall financial strategy, and better combining with the actual situation of the enterprise, attempting to make research with more practical application value.

The financing scheme of G7 Coffee in China is not static; it is dynamically adjusted in combination with the company's current and future strategic goals. The internal and external environments faced by the enterprise are constantly changing, and the financing needs in different periods are also different. Therefore, the enterprise must dynamically adjust its financing scheme according to its development strategy, combined with its development advantages and shortcomings, to adapt to the constantly changing environment and the financing needs of different periods. At the same time, it also needs to pay close attention to the risks faced during the financing process and take measures for risk prevention, in order to better promote the long-term sustainable

development of the company.

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