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Research Paper

# Identifying and Prioritizing Factors Affecting Financing Performance of The Supply Chain in Food Industry SMEs

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**Abstract**

Chain financing is one of the essential pillars of the supply chain, which plays a critical role in facilitating and accelerating the financing of the working capital of the production company. This research aims to identify and prioritize the factors affecting the financing performance of the supply chain in food industry SMEs of Guilan province in Iran. At first, indicators were selected by browsing the library and academic sources, then releasing Likert Scale questionnaires between experts to find effective scales. Using the Analytic Hierarchy Process (AHP), the importance of 7 categories, such as the cultural index of human resources, infrastructure technical, macro policy, financial, legal, logistics, financial, and information technology, respectively, and a total of 38 sub-factors are prioritized. The results show that the development of accreditation and rating institutions in the discussion of chain financing; Development of chain financing tools and infrastructures in operationalizing it in the country's banking network; Creating electronic invoice infrastructure and store terminals; Emphasizing the regulatory role of the Central Bank and the development of supply chain management companies under the supervision of the industry are the most critical factors. Based on the identified factors, a hierarchical model of chain financing in SME food industries is proposed, with which businesses can formulate action plans for financing problems along their supply chain.

**Keywords** *Supply Chain Financing, Supply Chain Financial Management, Supply Chain, Small And Medium Enterprises*

## INTRODUCTION

The food industry is considered part of a nation's critical infrastructure along with healthcare, energy, and communication sector, among these others; therefore, now food producers are to combat new challenges after the global coronavirus pandemic in their supply chain and its challenges to providing financial resources (Nakat & Bou, 2021) and most of this producer, are SMEs in this industry. The food industry is an essential economic industry that contributes significantly to the GDP and increases employment in Iran. The added value of this sector has reached from 15026308 million Rials in 2009 to 6,1865,724 million Rials in 2020, which shows the dynamism of this industry. Also, the share of this industry in the entire industries and mines sector was around 11% during the years 2009-2020 (Pirfekr et al., 2023). Therefore, this industry has a high share of all the factories in the country (Soheili et al., 2015).

On the other hand, the 21st century is the century of introducing and growing small and medium businesses in different countries, each of which is considered the engine of economic progress of societies (Zhu et al., 2019). There are many similarities in the definition of small and medium enterprises in different countries. However, it is impossible to provide a single and


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identical definition of them, and each country has given different definitions according to its specific financial and economic conditions (Goeij et al., 2021).

According to recent evidence, these companies play a vital role in developing human welfare in any country because they account for 90% of investments and employ about 60% of the workforce worldwide. Therefore, they contribute significantly to reducing poverty and sustainable economic growth in societies, such as the disabled, female heads of households, illiterate people, and rural families. This ultimately leads to inclusive economic growth and reduced inequalities at the general level (Serumaga & van der Poll, 2021). In Iran, at the beginning of 2021, more than 80% of the existing enterprises in the country are SMEs, and in the employment sector, 19.3 million people out of 24 million workers in the country (79% share of the total employment of the country), which is a proof of the importance of small and medium industries in the country (Organization of Small Industries and Industrial Towns of Iran, 2022). Among the characteristics of these companies, we can mention the need for very little capital for the establishment, appropriate efficiency and economic profit, job creation and wide distribution of wealth, allocation of a suitable platform for innovation and inventions, increase in exports, localization of expertise and self-sufficiency (Tsai & Barr, 2021).

SMEs finance their business from a traditional financing structure in working capital, which mainly relies on the facilities received from the banking system, which has many problems and challenges. For example, the time-consuming process of obtaining facilities increases the cost of the finished product, and it takes work to secure bank guarantees. The problems with the traditional method of financing lead to severe consequences for the country, such as the increase in non-current claims of banks and the diversion of resources from the production cycle to non-productive activities (Suri & Adabi, 2022). Most critical issues and problems that small and medium-sized enterprises are dealing with are limited financial resources of members, problems related to maintaining income, increasing costs, obtaining capital to start a business and develop it, the inability of enterprises to identify financial resources, and the potential financing problems and lack of access to suitable working capital (Setyaningsih & Kelle, 2021).

The term supply chain financing is an interdisciplinary concept that includes supply chain management and financial affairs; this concept is introduced as an effective method to improve the financial performance of the supply chain (Xu et al., 2018). The discussion of supply chain financing became necessary when the financial flow of resources (e.g., payments, interest, Etc.) between supply chain members, both primary members (i.e., sellers and buyers) and supporting members (banks and logistics service providers), was primarily overlooked. The scope of supply chain financing is based on working capital management and covers any financing, risk management, and taxation. The nature of supply chain financing includes physical assets (e.g., inventory) in the supply chain. The dominant role of supply chain financing is to reduce businesses' bankruptcy risk (Huang et al., 2022).

Therefore, the tools of this method help to provide the financing needed to fill the working capital gap (the gap between payers and receivers of customer payments) and to solve the gap between cash flow received from goods or services delivered (for example, income) (Phraknoi, 2022). In other words, chain financing is a method of financing in which financing is based on the actual flow of goods and services along the chain. In this method of financing, all activities and steps are performed based on a series of actual events, such as purchase orders, list issuance, receivable document, or other demands and processes before and after loading (Suri & Adabi, 2022). Supply chain financing arrangements typically involve two or three main actors. The two main parties in supply chain financing relationships are the prominent supply chain members: suppliers (sellers) and buyers; the third actor is a foreign investor, a bank, or a non-bank financial institution (Chiu & Hsieh, 2021). In recent years, platforms have played an essential role in developing supply chain financing. The primary role of technology platforms, commonly known as Fintech, is to provide an online transaction platform for all chain members. A fifth potential actor is the credit insurer, which mitigates credit risk in some chain financing arrangements, such as providing distributor financing (Jia et al., 2020).

Small and medium-sized enterprises face many problems, such as limitations and inability to choose the appropriate method of financing, lack of economic, financial, and managerial knowledge, especially at the time of establishment, increasing costs, obtaining capital to start a business and develop them, these businesses They use the traditional structure of financing in working capital, which is mainly based on the facilities received from the banking system, which has many problems and challenges for them (Lou et al., 2023; Jena et al., 2023; Wuttke et al., 2016). Previous studies have focused more on identifying the problems in the supply chain and their working capital, so in this research, we intend to identify the most critical factors affecting supply chain financing in these companies so that these businesses can better solve their financing problems in the supply chain sector; In the following, with the AHP method, we will prioritize the most critical factors and express practical solutions, this will help financial and supply chain managers to better use the services and appropriate financing methods in their working capital.

## LITERATURE REVIEW

### Types of supply chain financing tools

From the perspective of risk reduction, supply chain financing constitutes a wide range of practical tools and models that enable companies to reduce their working capital needs without harming the health of the supply chain, accordingly; In 2020, according to the report of the European Commission and the Supply Chain Finance Association, supply chain financing tools are divided into two groups based on receivables and the group based on loans (Valdani et al., 2020).

### Based on receivables

Receivables financing is an intermediate category for various techniques in which sellers of goods and services provide financing by selling all or part of their receivables to a financier. Claims will be transferred to the ownership of the financier through the assignment of ownership rights according to the jurisdiction in question. In the event of a change of ownership, the seller receives an advance payment for the receivables, which may include a margin or deduction for the quality of the receivables and a finance charge based on prices agreed between the financier and the customer (Valdani et al., 2020).

**Table 1.** Tools based on receivables

| The name of the tool | Short description | Key Features | References |
|---|---|---|---|
| 1. Discounting accounts receivable (claims) | Personal selling or multiple claims to a financial provider at a discount. | Typically, it is used by large companies. The beneficiary uses the approved invoices as a guarantee for reimbursement. The supplier collects the payment of the underlying claim to reimburse the financier. | Suri & Adabi (2022) Gelsomino et al., (2016) Gomm (2010) |
| 2. Factoring | Selling receivables at a discount to a financial provider (known as an "agent"). | Small and medium enterprises usually use it. The seller uses approved invoices as a guarantee for reimbursement. The agent | Jia, Zhang, & Chen (2020) Pfohl & Gomm (2009) |

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| | | is responsible for collecting payment of essential claims. | Hofmann (2005) |
| 3. Buying debt (forfeiting) | Sale at a discount or face value of future payment obligations received, represented by financial or payment instruments Obligations (usually in negotiable or transferable form). | Large companies usually use it. Similar to factoring, but for substantial transaction volumes and in the long term. | Chiu & Hsieh (2021) Chen & Hu (2011) Gupta & Dutta (2011) |
| 4. Payable financial affairs (payable financing) | Suppliers gain access to initial financing by selling invoices approved by the buyer. The financier receives the invoice amounts from the buyer at the due date. | It is usually used by small and medium enterprise suppliers selected by the buyer. The financier arranges the program directly with the suppliers and becomes responsible for collecting payment for the underlying claims. | Valdani et al., (2020) Caniato et al., (2019) Hofmann (2005) |
| 5. Dynamic discount (dynamic discount) | A type of financial affairs payable | The buyer may use its funds to pay an invoice or account payable before the original due date. Early payment discounts are offered to sellers on pending invoices and are funded by the buyer. The earlier the payment, the greater the discount. There are no financiers as intermediaries. | Du et al. (2020) Zhao et al. (2018) Mentzer et al., (2001) |

**Loan based**

The second category of supply chain financing instruments is called loan-based instruments. These include loans and advances made against receivables, instead of purchases, as in the previous group of techniques, and include the following methods and tools (Valdani et al., 2020).

**Table 2**.Loan based supply chain financing tools

| The name of the tool | Short description | Key Features | References |
|---|---|---|---|
| 1. Loan with advance payment against receivable documents | Financing is available to a party involved in the supply chain with the expectation of repayment from funds generated from current or future trade receivables. | Loans or advances are usually made against the collateral of such claims. The beneficiary repays the loan by collecting the payment of the essential claims. | Huang et al. (2022) Fathullah & Najafi (2016) Gupta & Dutta (2011) |

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| 2. Distribution financing | Financing a distributor of a large manufacturer to cover holding goods for resale. | The beneficiary repays the loan after selling the goods to the retailer or end customer. | Phraknoi (2022) Marak & Pillai (2018) Hofmann (2005) Pfohl & Gomm (2009) |
| 3. Advance payment loan against inventory | Financing for the storage or warehouse of goods | The financier considers the security interest or assignment of rights in the inventory and exercises control. The beneficiary repays the loan after selling the goods in inventory. | Moradi et al., (2020) Chen & Hu (2011) Gomm (2010). |
| 4. Pre-shipment finance | A loan from a financier using a beneficiary purchase order as payment security. | A purchase order from an acceptable buyer in favor of the seller (beneficiary of the loan) is often a key element in motivating the financier. | Vousinas (2018) Hofmann (2005) Mentzer et al., (2001) |

## RESEARCH METHOD

### Introducing The Model and Data Analysis

The studied community in this research includes faculty members of Guilan State universities with doctoral expertise in economics, financial management, supply chain management, and business management, as well as managing directors, supply chain, and financial managers of industrial food units in Guilan province in Iran. To obtain and collect data and factors affecting the performance of supply chain financing, as well as collecting information related to research literature and theoretical foundations in the first stage to library and university sources, including books, domestic and foreign articles, theses, as well as national and provincial documents and reports used in the second stage and the quantitative part, to identify influential factors and remove repetitive and worthless factors from the fuzzy Delphi technique, as well as a semi-structured questionnaire in a five-point Likert scale (items very little = 1, little = 2, moderate = 3, high = 4) and very much=5) was sent to 10 experts and Excel software was used to extract the results. Only 38 influential factors were selected from the 58 identified factors in this step. In the third stage, to identify the weight of 38 influential factors, a pairwise comparison questionnaire was distributed among 15 experts. The results were used to prioritize the factors using the Analytical Hierarchy Method (AHP) and Expert Choice software.

## FINDINGS AND DISCUSSION

In the current research, an attempt has been made to consider most of the criteria in the theoretical literature in identifying and collecting facilitating factors on the chain financing performance of small and medium-sized food industries with a suitable and comprehensive classification and finally examined.

**Table 3**. Factors affecting the performance of chain financing

| Main factors | Secondary factors | Symbol | Source |
|---|---|---|---|
| C= economic | 1-Stability of macroeconomic conditions | C1 | Suri & Adabi (2022) |
| | 2- Cooperation of banks with producers | C2 | |

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| | 3- Preparation of a comprehensive business model by selected banks and agreement with companies | C3 | Strategic Report of the strategic office of product development studies of Imam Sadiqh University (2021) Xinhan et al., (2018) Vousinas (2018) Gelsomino et al., (2016) |
| | 4- Emphasis on the regulatory role of the central bank and the development of supply chain management companies under the supervision of the Ministry of Industry | C4 | |
| | 5- Coordination with the commodity exchange Iranian in order to accept accrual instruments in the settlement of credit transactions in the physical market of companies | C5 | |
| S= Macro policy | 1- Compilation of comprehensive rules, regulations, and infrastructure for monitoring and supervising the implementation of chain financing in companies by the Ministry of Industry and Central Bank | S1 | Suri & Adabi (2022) Strategic Report of the strategic office of product development studies of Imam Sadiqh University (2021) Caniato et al., (2019) Xu et al., (2018) Gelsomino et al., (2016) |
| | 2- Encouraging key companies as drivers in using chain financing | S2 | |
| | 3- Encouraging smaller companies to use chain financing with support Government and banks | S3 | |
| | 4- Persuasion of enterprises and negotiation with related organizations and associations by the Ministry of Industry | S4 | |
| | 5- Development of chain financing tools and infrastructures in operationalizing it in the banking network of the country | S5 | |
| P= Financial and legal | 1- Credit insurance assistance for companies using chain financing services | P1 | Suri & Adabi (2022) Huang et al. (2022) Phraknoi (2022) Chiu & Hsieh (2021) Caniato et al., (2019) Hofmann (2005) |
| | 2- Definition of chain financing tools according to the small or large size of the industries | P2 | |
| | 3- Legal and necessary legal protection of the nascent space of chain financing by the judiciary | P3 | |
| | 4- Accounts risk acceptance Receivables by the employer | P4 | |
| | 5- Creating a balance in the financial flow along the chain and preventing the elements of the chain from facing a deficit or surplus of liquidity | P5 | |
| | 6- Paying a percentage of assigned claims (discounting claims) to companies | P6 | |
| DS= Technical and infrastructure | 1- Taking advantage of the appropriate methods and techniques of chain financing throughout the company | DS1 | Suri & Adabi (2022) Chiu & Hsieh (2021) Xinhan et al. (2018) Vousinas (2018) Xu et al. (2018) Gelsomino et al., (2016) |
| | 2- The necessity of measuring the performance of financial flows along the supply chain | DS2 | |
| | 3- Existence of chain financing infrastructure in banks and capital market | DS3 | |
| | 4- Creation of the necessary infrastructure by the Ministry of Industry and the Central Bank, the Stock Exchange Organization, and... | DS4 | |
| | 5- helping to identify the leading chains, production planning, and estimating the required financing by the Ministry of Industry | DS5 | |

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| | 6- creating financial automation in the payment process to prevent delays in invoices, delays in payment, and reducing the collection of claims | DS6 | |
| M= Information technology | 1- Creation of electronic invoice infrastructure, store terminals, and electronic bill of lading banks | M1 | Huang et al. (2022)<br>Phraknoi (2022(<br>Suri & Adabi (2022)<br>Strategic Report of the strategic office of product development studies of Imam Sadiqh University (2021)<br>Xinhan et al., (2018) |
| | 2- Design and creation of platforms for providing chain financing services by operating | M2 | |
| | 3- Creation of technological infrastructure and information technology for exchanging information and processing financial transactions between buyers, sellers, and financial institutions | M3 | |
| | 4 - The development of the information system and the expansion of the infrastructure for the creation of chain financing platforms | M4 | |
| | 5- The necessity of using appropriate technology to ensure the transfer of information and financial documents from the buyer to the bank and from the bank to the supplier along the chain | M5 | |
| G= cultural and human resources (Structural) | 1- Necessary training and provision of sufficient knowledge and information to human resources and active managers in production companies in the application of chain financing | G1 | Huang et al. (2022)<br>Phraknoi (2022)<br>Chiu & Hsieh (2021)<br>Xinhan et al., (2018)<br>Vousinas (2018) |
| | 2- Creation of a specialized institution of chain financial management in companies | G2 | |
| | 3- Creation of coordination, cooperation, alliance, and effective planning based on shared information and trust between partners | G3 | |
| | 4- The development of accreditation and rating institutions in the discussion of chain financing | G4 | |
| | 5- Changing the attitude and perspective of business managers and financial service providers in connection and interaction with banks and financial institutions that provide chain financing | G5 | |
| H= Logistics (Physical chain management) | 1- Creating coordination and agreement between small and large companies and supply chain companies | H1 | Suri & Adabi (2022)<br>Caniato et al., (2019)<br>Vousinas (2018)<br>Xu et al. (2018)<br>Gelsomino et al., (2016)<br>Hofmann (2005) |
| | 2- The existence of a critical company (the largest and most influential company along the chain) | H2 | |
| | 3- The need to improve communication and financial interactions between members of the supply chain | H3 | |
| | 4- Integration and coordination of systems, methods, procedures, and structures of financial flow along the supply chain | H4 | |
| | 5- The effect of logistics service providers, information service providers, and financial service providers in creating coordination and integration of the implementation of chain financing tools along the chain | H5 | |

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| | 6- Regulating the relationship between the contractor, the financing institution, and the employer. As the three main parties along the chain | H6 |

**The results of the initial questionnaire**

This study is causal-exploratory research and was conducted from early April 2022 to the end of August, about five months, in Guilan province in Iran. Two questionnaire models, "Likert scale and best and worst method," were published in the physical platform between the experts. At first, the prepared fuzzy Delphi questionnaire was distributed and collected among the experts to identify the factors. The table below shows the factors affecting supply chain financing based on the opinion of 10 experts. The professors accepted the validity of the questionnaire, and its reliability was accepted because the sum of di fuzzy numbers of 38 factors was equal to 0.8, which is near 1, an acceptable number.

**Table 4.** Fuzzy spectrum of verbal terms

| Verbal Corrections | Very Much | Much | Medium | Low | Very Little |
|---|---|---|---|---|---|
| Verbal values | (0.75, 1, 1) | (0.5, 0.75, 1) | (0.25, 0.5, 0.75) | (0, 0.25, 0.5) | (0, 0, 0.25) |

**Table 5.** Identification of effective factors

| No | Agents as symbols | Diffuse weight | No | Agents as symbols | Diffuse weight |
|---|---|---|---|---|---|
| 1 | C1 | 0.88 | 2 | C2 | 0.79 |
| 3 | C2 | 0.70 | 4 | C4 | 0.79 |
| 5 | C5 | 0.71 | 6 | S1 | 0.79 |
| 7 | S2 | 0.72 | 8 | S3 | 0.72 |
| 9 | S4 | 0.72 | 10 | S5 | 0.86 |
| 11 | P1 | 0.75 | 12 | P2 | 0.73 |
| 13 | P3 | 0.81 | 14 | P4 | 0.76 |
| 15 | P5 | 0.91 | 16 | P6 | 0.75 |
| 17 | DS1 | 0.78 | 18 | DS2 | 0.77 |
| 19 | DS3 | 0.86 | 20 | DS4 | 0.82 |
| 21 | DS5 | 0.79 | 22 | DS6 | 0.77 |
| 23 | M1 | 0.79 | 24 | M2 | 0.82 |
| 25 | M3 | 0.86 | 26 | M4 | 0.79 |
| 27 | M5 | 0.79 | 28 | G1 | 0.72 |
| 29 | G2 | 0.73 | 30 | G3 | 0.70 |
| 31 | G4 | 0.78 | 32 | G5 | 0.71 |
| 33 | H1 | 0.72 | 34 | H2 | 0.70 |
| 35 | H3 | 0.72 | 36 | H4 | 0.72 |
| 37 | H5 | 0.71 | 38 | H6 | 0.75 |

**Secondary questionnaire results**

After identifying the factors affecting the supply chain financing of small and medium-sized enterprises, another AHP pairwise comparison questionnaire is distributed among 15 experts to identify the weight and prioritize the factors. Therefore, the weight of the criteria is calculated using Expert Choice software. In the first step, the hierarchical tree of the problem should be drawn to implement the hierarchical analysis process, which has a goal, criteria, and sub-criteria. The inconsistency rate of pairwise comparisons of the seven main factors has been obtained as 0.03, which is less than 0.1, so the consistency is acceptable; Also, the compatibility rate of all 38 sub-factors is less than 0.1 is acceptable. The weights of the criteria were calculated using the Expert Choice software, so the results are as described in the following table.

**Table 6.** Calculating the prioritization and weight of the factors affecting the financial performance of the supply chain

| **Overall priority over other sub-criteria** | **Sub-criteria** | **The weight of sub-criteria of the main criterion** | **The priority of sub-criteria of the main criterion** | **Incompatibility rate** | **Introducing the main factor along with its weighted average** |
|---|---|---|---|---|---|
| 1 | The development of accreditation and rating institutions in the discussion of chain financing | 0.495 | 1 | 0.01 | Cultural human resources (Weight = 0.355) **first priority** |
| 12 | Creating coordination, cooperation, alliance, and effective planning based on shared information and trust among partners | 0.210 | 2 | | |
| 22 | Creating a specialized institution of chain financial management in companies | 0.119 | 3 | | |
| 28 | Necessary training and provision of sufficient knowledge and information to human resources and active managers in production companies in the use of chain financing | 0.104 | 4 | | |
| 34 | Changing the attitude and perspective of business managers and providers of financial services in connection and interaction with banks and financial institutions that | 0.072 | 5 | | |

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| | provide chain financing | | | | |
| 7 | Using appropriate methods and techniques of chain financing throughout the company | 0.269 | 1 | 0.02 | Technical infrastructure<br>(weight = 0.254)<br>**second priority** |
| 8 | Helping to identify the leading chains, production planning, and estimation of financing required by the Ministry of Industry | 0.257 | 2 | | |
| 11 | The necessity of measuring the performance of financial flows along the supply chain | 0.212 | 3 | | |
| 26 | Creation of the necessary infrastructure by the Ministry of Industry, Mining, and Trade, the Central Bank, the Stock Exchange Organization | 0.112 | 4 | | |
| 31 | Creating financial automation in the payment process to prevent delays in invoices, delays in payment, and reduction of receivables | 0.076 | 5 | | |
| 32 | The existence of chain financing infrastructure in banks, capital market | 0.074 | 6 | | |
| 2 | Development of chain financing tools and infrastructures in operationalizing it in the country's banking | 0.494 | 1 | 0.02 | Heavyweight politics<br>(Weight = 0.158)<br>**Third priority** |
| 13 | Encouraging key companies as drivers | 0.209 | 2 | | |

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| | in the use of chain financing | | | | |
| 20 | Encouraging smaller enterprises to use chain financing with the support of the government and banks | 0.136 | 3 | | |
| 26 | Compilation of comprehensive rules, regulations, and infrastructures for monitoring and supervising the implementation of chain financing in companies by the Ministry of Industry and the Central Bank | 0.112 | 4 | | |
| 36 | Encouraging companies and negotiating with related organizations and associations by the Ministry of Industry | 0.049 | 5 | | |
| 6 | Credit insurance assistance for companies using chain financing services | 0.296 | 1 | 0.009 | Financial and Legal (weight = 0.098) **Fourth priority** |
| 9 | Legal and necessary legal protection of the nascent atmosphere of chain financing by the judiciary | 0.246 | 2 | | |
| 21 | Paying a percentage of assigned claims (discounting claims) to companies | 0.133 | 3 | | |
| 23 | Creating a balance in the financial flow along the chain and preventing the elements of the chain from facing deficit or excess liquidity | 0.118 | 4 | | |

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| 24 | Accounts receivable risk acceptance by the employer | 0.117 | 5 | | |
| 30 | Defining chain financing tools according to small or large industries | 0.090 | 6 | | |
| 5 | The effect of logistics service providers, information services, and financial services in creating coordination and integration of the implementation of chain financing tools along the chain | 0.351 | 1 | 0/01 | Logistics (physical chain management) (weight = 0.047) **Fifth priority** |
| 14 | Regulating the relationship between the contractor, the financing institution, and the employer as the three main parties along the chain | 0.208 | 2 | | |
| 15 | Integration and coordination of financial flow systems, methods, procedures, and structures throughout the supply chain | 0.201 | 3 | | |
| 29 | Creating coordination and agreement between small and large enterprises and supply chain companies | 0.093 | 4 | | |
| 32 | The need to improve communication and financial interactions between members of the supply chain | 0.074 | 5 | | |
| 33 | The existence of a critical company (the largest and most | 0.073 | 6 | | |

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| | influential company along the chain) | | | | |
| 4 | Emphasizing the regulatory role of the Central Bank and the development of supply chain management companies under the supervision of the Ministry of Industry | 0.374 | 1 | 0.03 | Economic<br>(weight = 0.046)<br>**Sixth priority** |
| 10 | Preparation of a comprehensive business model by selected banks and agreement with companies | 0.213 | 2 | | |
| 16 | Coordination with the stock exchange in order to accept accrual instruments in the settlement of credit transactions of the physical market of companies | 0.182 | 3 | | |
| 25 | Stability of macroeconomic conditions | 0.115 | 4 | | |
| 27 | Cooperation of banks with the producer | 0.111 | 5 | | |
| 3 | Creation of electronic invoice infrastructure, store terminals, and electronic bill of lading | 0.453 | 1 | 0.0094 | Information Technology<br>(weight = 0.043)<br>**The seventh priority** |
| 17 | The necessity of using appropriate technology to ensure the transfer of information and financial documents from the buyer to the bank and from the bank to the supplier along the chain | 0.172 | 2 | | |
| 18 | Creating technological infrastructure and information | 0.166 | 3 | | |

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| | technology for exchanging information and processing financial transactions between buyers, sellers, and financial institutions | | |
| 19 | Development of the information system and expansion of the infrastructure of creating chain financing platforms | 0.141 | 4 |
| 35 | Designing and creating platforms for providing chain financing services by operating banks | 0.068 | 5 |

**CONCLUSIONS**

The results obtained after analyzing the AHP method between the seven main influential factors in supply chain financing are as follows; The main factor of human cultural resources is the most critical, the infrastructural technology factor is the second factor, the macro policy factor is the third place, the legal, financial factor in the fourth place, the logistics factor in the fifth priority, the economic factor in the seventh place and the technology factor Information is the last of the seven main identified factors. In the following, seven important sub-factors were identified, namely, the sub-factor of development of crediting institutions and ranking in the discussion of chain financing in the first rank and the most important sub-factor, Sub-factor of development of chain financing tools and infrastructures in its operationalization in the banking network in the second order; The sub-factor of creating electronic invoicing infrastructure, store terminals and electronic bill of lading in the third place; Sub-factor of emphasizing the supervisory role of the central bank and the development of supply chain management companies under the supervision of the Ministry of Industry in the fourth order; The sub-factor of the influence of logistics service providers, information services and financial services in creating coordination and integration of the implementation of chain financing tools along the chain in the fifth place; The sub-factor of credit insurance assistance for companies using chain financing services ranks sixth, and finally, the sub-factor of using appropriate methods and techniques of chain financing between economic enterprises is the seventh important sub-factor of the seven priorities in obtained between sub-factors.

Chain financing is a part of supply chain management, so for the correct implementation of this type of financing structure, according to the identified factors, consider the following suggestions. It is necessary to pay attention to the three elements of supply chain management (flow of goods, information, and finance). Providing logistics infrastructure and information exchange is necessary to develop financing chains. First, different buyer and seller rings in a supply chain should be identified in more precise terms. After the complete coordination of the rings and the details of the cash and goods flow process, our electronic invoice transactions have been registered in the comprehensive trade system. Finally, after reviewing the claim documents and validation, the platform or financial institution proceeds with the financing of the chains through one of the existing tools (Lekkakos & Serrano, 2016).

An essential part of the operational requirements of the financing of the production chain is related to the existence of infrastructures that can prepare the companies in a chain for cooperative financing. In practice, it is necessary to verify companies' identity to collect information related to their exchanges, including electronic invoices and their contracts, to verify the authenticity of the exchanges and transferred resources. At the same time, it is necessary to introduce a payment tool that can transfer purchasing power between the chain links (Suri & Adabi, 2022). Usually, the most important issue in the financing of the production chain is that the big company, which guarantees the entire supply chain, is resistant to changing the way and entering this space. Therefore, it will be helpful to offer substantial incentives to companies to enter SCF.

As a suitable example, the central bank should consider a higher credit limit for companies that act in the financing chain, or the non-current debt of companies should be seen with more flexibility (Lu et al., 2022). It is possible to inform them about the change and the benefits obtained by expanding educational and promotion programs (such as organizing seminars and workshops) for selected companies, bank managers, and experts. In addition, SCF collateral rules are more relaxed than the traditional method because the credit of a valid member of the chain plays the role of collateral. The necessary motivation for accepting this method can be created through this change in the amount of collateral of companies or adjusting the weight of items in the calculation of capital adequacy of banks. The design of this system should be done in interaction with the private sector (Zulqurnain et al., 2022).

From the point of view of the trial implementation of the project, the selection of pilot industries is also essential; for example, if the industries in which the government's intervention is more pronounced are selected, the probability of the success of the project will be lower than the selection of industries that have the freedom of the general public (Bals, 2019). Another requirement for entering SCF is the use of information available in various banking systems to more accurately identify the chains, components of this chain, and their roles. In addition, by expanding and updating the platforms, resource planning systems and accounts receivable and payable systems can be integrated (Garg & Kashav, 2022). In general, in addition to the fact that accreditation and rating companies should develop and the banking system uses the information collected by them, the information of individuals present in the supply chain can also be used for the accreditation of applicants for financial resources (Vu et al., 2022). Clarifying the role of the central bank as a regulator of entering the SCF so that the central bank can play a role as a player in financing the production chain in the preparation of appropriate infrastructures and rules. At the same time, incentive plans by the central bank for involved banks, Expediting the compilation and notification of the executive order of the agency, reverse agency and financing of the distribution network to banks; completion of information technology infrastructures; Development of chain financing management dashboard; The development of supply chain management companies under the supervision and guidance of the Ministry of Industry can accelerate the implementation of this financing method (Kaur et al., 2023). Finally, the suggestion of reviewing all financial flows in the entire payment chain is possible by setting up national systems such as electronic bills of exchange and platforms that integrate resource planning systems and accounts receivable and accounts payable systems (Lu et al., 2022).

## LIMITATION & FURTHER RESEARCH

Among the challenges in this research is the lack of knowledgeable and familiar experts and financial managers in the chain financing sector in small businesses, the lack of abundance of these companies compared to larger businesses, and the lack of cooperation of government organizations under the aim is to provide structured information that will help the research to identify the financial challenges of these companies better.

In this regard, suggestions for further research are as follows: identifying and reducing non-standard criteria evaluated using the fuzzy Delphi technique; Investigating failure factors in the supply chain of small and medium-sized companies based on EFQM organizational excellence and determining strengths and improvement points; Applying the integrated model proposed in the current research in the fuzzy environment; Determining relationships between criteria and sub-criteria using the DEMATEL or ISM technique; Comparison of hesitant decision-making techniques such as hesitant Fuzzy Topsis and hesitant line map to identify investment barriers in the supply chain of small and medium enterprises; Identifying and ranking appropriate supply chain financing methods in small, medium and large enterprises; Identifying and ranking the obstacles and challenges of implementing supply chain financing for small to large enterprises. It is better for this type of research to be carried out in small and home businesses in East Asia and developing countries, under the condition of accompanying and consulting experienced experts in finance and financing.

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