

Research on Procurement Risk Analysis of Manufacturing Enterprises

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Abstract: Manufacturing industry is the pillar industry of the national economy, and procurement is an important part of the production and operation of manufacturing enterprises. With the fluctuation of the economic situation and the continuous complexity of the manufacturing chain, manufacturing enterprises are facing greater governance problems in the procurement process. Based on the flow chart analysis method, this paper identifies and analyzes the risk points of each key node in the procurement process. In addition, according to the situation of risk identification, this paper puts forward relevant measures such as establishing a supplier full-cycle closed management mechanism, so that manufacturing enterprises can improve their ability to resist procurement risks and promote the stability and reliability of manufacturing supply chain.

Keywords: Manufacturing Enterprises; Purchase Risk; Risk Analysis

1. Introduction

Under the background of global economy, manufacturing industry is the pillar industry of national economy. Purchasing is an important part of the production and operation of manufacturing enterprises. Its efficiency and quality directly affect the production cost and product quality of enterprises. However, in the procurement process, enterprises face a variety of risks, such as market risk, supplier risk, price risk and so on. The existence of these risks not only increases the procurement cost of the enterprise, but also may affect the normal production and operation of the enterprise. Therefore, it is of great significance for manufacturing enterprises to conduct in-depth analysis of procurement risks and formulate corresponding risk control

measures.

The main causes of procurement risk are diverse and intertwined. On the one hand, the instability of the market environment is an important factor leading to procurement risks, including fluctuations in raw material prices, changes in international trade policies, and changes in exchange rates. These factors directly affect procurement costs and supply chain stability. On the other hand, the defects of the internal management mechanism of the enterprise can not be ignored, such as improper selection of suppliers, lax contract management, poor inventory management, etc., which may lead to supply chain disruption, quality problems and cost overruns. In addition, information asymmetry and rapid technological updates are also key factors that increase procurement risks. Enterprises often find it difficult to accurately predict future market demand and technological trends, which increases the difficulty and risk of procurement decisions.

The purpose of this paper is to summarize the basic process of manufacturing procurement, and analyze the risk points of each key node based on the procurement flow chart, and put forward corresponding control measures. Make manufacturing enterprises better cope with the challenges in the procurement process, ensure the stability and reliability of the supply chain, and realize the sustainable development of enterprises while ensuring the economic benefits of enterprises.

2. Theoretical Basis and Literature Review

2.1 Procurement Risk Identification

Smith [1] pointed out that the procurement risk identification of manufacturing enterprises should be considered from multiple dimensions, and the risk of raw material substitution caused by the instability of raw material supply market and technological

change should not be ignored. With the progress of science and technology, new manufacturing materials are constantly emerging, and the existing materials purchased by enterprises may be quickly replaced, resulting in inventory backlog. Johnson [2] emphasized the importance of supplier-related risks in procurement risk identification. The credit status of suppliers has a direct impact on the stability of raw material supply, and their production process and quality control ability are also important risk points. An [3] proposed that the procurement risk identification of state-owned engineering technology enterprises should pay attention to the loopholes in the internal management process, such as unreasonable procurement plan formulation and loose approval process, which may lead to the disconnection between procurement materials and actual demand or out of control of procurement costs. Zhao [4] emphasized that supplier risk is the key identification point in the study of procurement risk of state-owned enterprises. Suppliers' poor reputation may lead to shoddy, delayed delivery or even default. Li [5]'s research on the procurement risk management of overseas oil and gas field development projects of Chinese oil companies found that the risk of cultural differences will also affect the procurement effect. The differences in business culture, communication methods and contract execution habits in different countries and regions may lead to misunderstandings and obstacles to cooperation, affecting the smooth progress of procurement projects. In the study of procurement risk of state-owned geological exploration enterprises, Tao [6] pointed out that technical risks are prominent in procurement. Enterprises need to continue to pay attention to the procurement risks brought about by technological upgrading to avoid losing market competitiveness due to technological lag.

2.2 Procurement Risk Assessment

Brown [7] proposed a procurement risk evaluation model for manufacturing enterprises based on fuzzy comprehensive evaluation method. This method can comprehensively consider the interaction of various risk factors, and the evaluation results have certain ambiguity, which is more in line with the uncertainty in the actual situation.

Davis [8] used the analytic hierarchy process (AHP) to evaluate the procurement risk. He divides procurement risk into target layer, criterion layer and index layer. The criterion layer covers internal risks (such as imperfect enterprise procurement management process) and external risks (such as changes in the market environment). The index layer further refines the specific risk indicators under each criterion, such as market price fluctuation range, supplier delivery delay rate, etc. By constructing the judgment matrix and carrying out the consistency test, the relative weight of each level index is determined, and the comprehensive score of procurement risk is finally calculated. Jiang [9] evaluated the procurement risk of power battery enterprises based on projection pursuit model. The model projects high-dimensional data into low-dimensional subspace, and finds the optimal projection direction according to the projection index function, so as to comprehensively evaluate multiple indicators of procurement risk. Huang [10] used the analytic hierarchy process (AHP) to evaluate the procurement risk management of communication enterprises. This method makes the evaluation process clear, which helps enterprises to clarify the importance of different risk factors, formulate risk management strategies in a targeted manner, and ensure the stability and efficiency of procurement activities of communication enterprises. Shen [11] used the grey correlation analysis method in the evaluation and control of procurement risk of BN manufacturing enterprises. This method determines the influence degree of each factor on procurement risk by analyzing the grey correlation degree between each risk factor and the reference sequence (such as the ideal state sequence of procurement risk).

2.3 Purchasing Risk Response Path

Miller [12] proposed that manufacturing enterprises can adopt diversified procurement strategies. That is, enterprises should not rely too much on a single supplier or a single source of raw materials, but should establish cooperative relations with multiple suppliers and open up supply sources in different regions. Wilson [13] believes that enterprises should strengthen the management of cooperative relations with suppliers to deal

with procurement risks. By signing a long-term cooperation agreement with suppliers and establishing an information sharing platform, enterprises can jointly cope with market changes with suppliers. Zhuo [14] believes that procurement risk management in enterprise material management should focus on optimizing the procurement process. Through the establishment of standardized and standardized procurement process, strengthen the management of procurement planning, approval, implementation and supervision, reduce the risk of human error and internal corruption. Wang and Chen [15] proposed to establish a risk early warning mechanism in the research on the construction strategy of procurement risk prevention and control mode of state-owned enterprises. The threshold of risk early warning index is set. When the risk index is close to or exceeds the threshold, the early warning signal is issued in time, so that the enterprise can take countermeasures in advance and effectively reduce the loss of procurement risk. Cao [16] emphasized procurement diversification strategy in the practical application research of avoiding enterprise procurement risk. Enterprises should not rely too much on a single supplier or a single regional supply source, and should actively explore multiple supply channels at home and abroad to purchase similar products of different brands and specifications. Zhang and Zhou [17] took a cosmetics manufacturing company as an example to put forward the internal control risk assessment and coping strategies of procurement and payment cycle. Enterprises should strengthen internal control and establish and improve the audit system of procurement and payment cycle. For the internal control risk points found, timely formulate corrective measures, improve the internal control system, and ensure the safe and rational use of enterprise procurement funds.

3. Manufacturing Enterprise Procurement Process

3.1 Purchasing Organization

Manufacturing enterprise procurement organization is a complex system composed of multiple departments and positions. The purchasing department of manufacturing enterprises generally consists of four key

departments. The first is the purchasing plan and strategy formulation department, which is responsible for formulating the purchasing plan and strategy of the enterprise, and budgets and controls the market demand forecast and purchasing cost. The second is the supplier management department, which is responsible for the selection, evaluation, negotiation and contract signing of suppliers, and needs to establish and maintain good cooperative relations with suppliers ; the third is the order processing department, which is responsible for receiving and processing the procurement needs of various departments, including order confirmation, delivery schedule, order tracking and feedback. The fourth is the quality control department, which is responsible for the quality inspection and control of the goods or services purchased by the enterprise to ensure that they meet the quality requirements of the enterprise. At the same time, it also has four important positions: procurement manager, procurement specialist, supplier developer and procurement assistant. Clear responsibilities and close collaboration between departments and positions to ensure the smooth progress of procurement activities and the normal operation of enterprises.

3.2 Purchasing Process

According to the production demand put forward by the manufacturer, the procurement department formulates the procurement plan and submits it to the finance department for review. After the approval, the purchasing department is responsible for the preliminary screening of suppliers and collecting supplier information. The quality control department evaluates the technical and quality aspects of the supplier to determine the appropriate supplier. The procurement department issues an inquiry request to the selected supplier, collects the supplier 's quotation, conducts a price comparison analysis, and draws up a procurement contract accordingly. The finance department audits the payment terms in the contract. After the two sides reached a consensus, the procurement contract was formally signed. The purchasing department issues purchase orders to suppliers and tracks the execution of orders in a timely manner. After the order arrives, the warehouse is responsible for receiving the goods and checking the quantity. The quality control

department carries out quality inspection on the goods to ensure that they meet the quality standards stipulated in the contract. Finally, the finance department pays the supplier according to the payment method and time

limit agreed in the contract. In order to show the procurement process of manufacturing enterprises more clearly, the procurement flow chart commonly used by manufacturing enterprises is drawn, as shown in Figure 1.

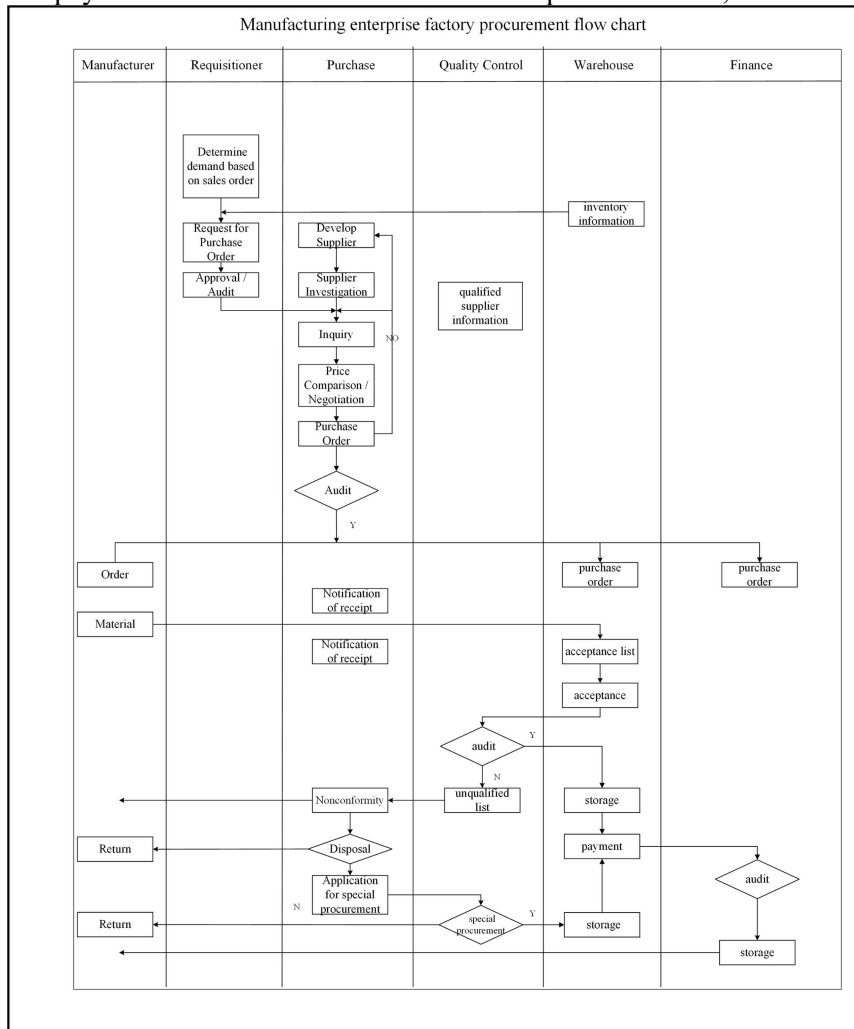


Figure 1. Manufacturing Enterprise Procurement Flow Chart

4. Manufacturing Enterprise Procurement Risk Point Identification

4.1. Procurement Risk Identification Analysis

Flow chart analysis is a method used to identify, evaluate and manage the company 's strategy and risk. This method describes the company 's business processes and related activities by drawing a flow chart, thereby helping management to better understand the company 's operations and potential risk points. Through the procurement flow chart of Figure 1, the business process, decision point, resource allocation and possible risk factors of manufacturing enterprise procurement can be

identified. Through the analysis of the flow chart, it can be more targeted to clarify the business nodes of its procurement risks, and then identify the important risks affecting the procurement business.

4.2 Procurement Risk Identification Analysis

4.2.1 Under extraneous risks

From the perspective of the external environment, most of the procurement risks are carried out around the supplier, and the key nodes are mainly concentrated on the supplier and its implementation behavior. Based on the analysis of the procurement chart process, its important risk points can be divided into the following six parts:

- (1) Insufficient supplier capacity: Suppliers with insufficient production capacity, technical capacity or service capacity are selected, resulting in substandard quality of purchased goods or services.
- (2) Supplier reputation issues: Cooperation with suppliers with poor records may face delivery delays, price fluctuations or product quality issues.
- (3) Single supplier dependence: Over-reliance on a single supplier leads to a passive position of the purchaser in terms of price, delivery time, etc.
- (4) Delivery delay: Suppliers failed to deliver on time for various reasons. Affect the purchaser's production and sales plan.
- (5) Quality problems: There are quality problems in purchasing goods or services, which need to be returned, replaced or reduced, resulting in economic losses.
- (6) Price fluctuations: market price fluctuations may lead to increased procurement costs, affecting the purchaser's profits.

4.2.2 Endogenous risk

From the perspective of internal environment, the key nodes of procurement risk mainly focus on the ability of procurement personnel and inventory stock. Based on the analysis of the procurement chart process, its important risk points can be divided into the following four parts:

- (1) Purchasing personnel lack the sense of

responsibility. There are many problems in the procurement process, such as cost out of control, poor supplier management, poor implementation of contract terms and potential risk of corruption. These problems not only increase the operating costs of the enterprise, but also may damage the stability of the supply chain and the reputation of the enterprise.

(2) Purchasing personnel business is not skilled: generally lead to low procurement efficiency, improper selection of suppliers and lack of negotiation skills and other issues, directly affect the production schedule, product quality and cost control, thereby affecting the overall competitiveness of enterprises and market position.

(3) Inventory backlog: lead to excessive capital occupation in the procurement process, increase the operating costs of enterprises, and may lead to expiration, damage or devaluation risk, reduce the inventory turnover and profitability of enterprises.

(4) Insufficient inventory: resulting in production interruption, affecting the timely delivery of sales orders, resulting in a decline in customer satisfaction, and may even be forced to increase procurement costs due to shortage of raw materials, damaging the market competitiveness of enterprises.

As shown in Table 1 below, these are the brief risk points that have emerged in the current manufacturing procurement process

Table 1. Manufacturing Enterprise Risk Identification List

Risk Sources	Risk Indicator	Risk Factor
External	risks vendor selection	Insufficient supplier capacity Supplier reputation issues Single supplier dependence
	Purchasing execution risk	
Internal	Purchasing liability risk	Delivery delay Quality issues Price fluctuations Purchasing personnel lack a sense of responsibility Purchasing personnel business is not skilled
	Procurement stock risk	Inventory backlog Insufficient inventory

5. Procurement Risk Control Measures

5.1 Establish A Supplier Full-cycle Closed Management Mechanism

Manufacturing enterprises should establish cooperative relationships with multiple suppliers to ensure the stability and flexibility of the supply chain. Establish a supplier

full-cycle closed management mechanism, as shown in Figure 2 below. Firstly, establish a supplier pre-selection mechanism, clarify the pre-selection criteria, and ensure that the selected suppliers meet the procurement needs. Secondly, conduct a comprehensive assessment of the supplier, including the evaluation of quality price and delivery time, to ensure that the supplier can meet the

requirements of the buyer in all aspects. Finally, the supplier's risk assessment is carried out to identify its potential risks in advance, and the problems in the transaction process are tracked and analyzed until the transaction is terminated to reduce the risk in the procurement.

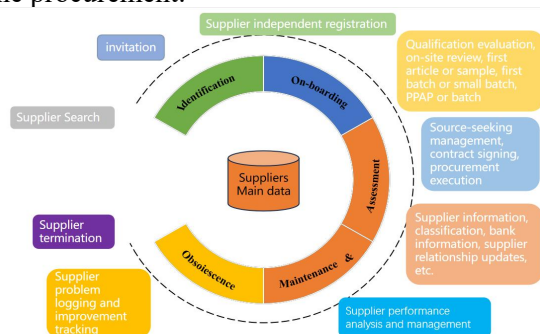


Figure 2. Supplier Full-cycle Closed-loop Management Diagram

5.2 Establish A Price Change Mechanism

In order to cope with price fluctuations, enterprises should sign long-term agreements with suppliers to stipulate the calculation method and adjustment mechanism of raw material prices. Through this mechanism, enterprises can adjust procurement costs in a timely manner according to market price changes and maintain profit margins. At the same time, regular market research should be conducted to understand the market conditions and price trends of related products or raw materials. Through data analysis and prediction models, the purchase price is predicted to provide a scientific basis for procurement decisions, so as to reasonably control the inventory of raw materials and reduce the impact of price fluctuations on procurement costs.

5.3 Departments Cooperate to form Management Synergy

Within the enterprise, it is necessary to strengthen the communication and cooperation between the procurement department and other departments (such as finance, legal affairs, technology, etc.) to jointly deal with procurement risks. Through the establishment of information sharing mechanism, the cross-departmental sharing of procurement risk-related information is realized, and the efficiency of risk management is improved. In conjunction with other departments to provide risk prevention and control support in their

respective fields, the financial department supervises the procurement funds, and the legal department fully approves the terms of the contract, forming a joint risk management force.

6 Conclusion

Based on the analysis of the procurement risk of manufacturing industry, this paper puts forward some risk control measures, such as establishing the whole cycle closed management mechanism of suppliers, establishing the price change mechanism and forming the management force with the cooperation of departments. The implementation of these measures will help manufacturing enterprises to improve procurement efficiency, reduce procurement costs and enhance market competitiveness. In the future, with the change of market environment and the development of enterprises, procurement risk management will become a continuous optimization process, which requires enterprises to constantly explore and innovate.

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