

# *Quality Risk Immune Mechanism of Core Enterprises in Manufacturing Supply Chain*

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**Abstract:** The survival model of manufacturing enterprises “gathering together” makes the core leading enterprises in the dynamic group “follow the trend” to follow suit. This phenomenon will directly or indirectly have a knock-on effect on the production and operation of the enterprise. Based on the perspective of tissue immunity, this study explores the immune mechanism of domestic and foreign scholars on the quality risk of core enterprises in the manufacturing supply chain through literature collation and foreign literature analysis, so as to grasp the current research results and research trends of domestic and foreign scholars, and finally Summarize and summarize, with a view to deriving follow-up research directions and key elements.

## **1. Introduction**

Under the trend of quality co-governance, quality is the lifeblood of an enterprise. However, with the diversified development of manufacturing enterprises, the quality of organization is becoming increasingly chaotic. Single manufacturing enterprises have no advantage in quality alone. How to carry out inter-manufacturing Quality joint venture? How do manufacturing companies co-integrate and control under the guidance of the supply chain? In the face of social or corporate emergencies, how can companies respond actively and flexibly[1-4]? With the emergence of Toyota’s “accelerator pedal” and other quality problems, the quality and safety issues among manufacturing companies are worrying. The origin of the incident can be traced back to four points[4-9]: Firstly, the internal employees of the manufacturing company recognize the existence of quality problems such as products. Knowing deviations, causing employees’ deviant behaviors and leading to quality crises. Secondly, an enterprise is like a large and complex organism, always facing harmful dissidents inside and outside the environment, threatening the life of the enterprise. Thirdly, the information asymmetry among manufacturing companies. Fourth, there is still room for upgrading the level of ecological knowledge in the manufacturing enterprise environment. The current manufacturing enterprise cannot fully absorb external knowledge, and the knowledge transfer and integration capabilities are not perfect.

In recent years, scholars have cross-integrated multiple disciplines such as biological immunology, human immunology, and organizational behavior to conduct quality research on manufacturing companies. Lv and others combined the biological immunity theory with the organization theory for the first time, and believed that tissue immunity is the process of eliminating harmful and alien elements and maintaining the health of the enterprise organization. It is a complete and meticulous process defense mechanism[1-5]. When faced with the ever-changing external market competition and the inherent hidden dangers that hinder the crises, the adaptive and active response behavior is adopted[1-5]. Through research, Shi and others found that tissue surveillance is the prerequisite and basis for tissue-specific immunity. Through tissue proactive prevention, the behavior of stopping damage in time; tissue defense is the strongest line of defense in the process of tissue immunity, which means that under the premise of tissue surveillance, the organization Spontaneously produce a series of behaviors that resist and eliminate internal and external environmental emergencies and threaten the life and safety of the enterprise; through emergency incident handling, the enterprise forms a new knowledge and safety system, and the process of absorbing and learning experience is organizational memory. Organizational non-specific immunity is the innate immunity behavior that is used to rectify the internal structure and operating mechanism of the enterprise when there are problems in the internal environment of the organization, such as organizational culture[1-5].

Shi and others believe that organizational quality immunity is a process by which organizations can identify the elements that threaten the quality and safety of the enterprise internally and externally, eliminate and eliminate harmful factors, and form relevant learning experiences, thereby improving the quality, safety and life health of the enterprise[1-5]. In addition, Sun and others believe that tissue quality-specific immunity refers to the organization's ability to identify "harmful dissidents" that affect the organization, and eliminate the threat of corporate quality and safety through the organization's own characteristics such as "adaptability", "stability", and "dynamics". Threats, and to generate quality memory. Organizational quality monitoring refers to the organization of a comprehensive review, real-time monitoring of factors affecting the quality and safety of the enterprise, and the first line of defense to protect the health and safety of the enterprise; organizational quality defense is the core of the organization's quality-specific immunity, which refers to when the enterprise itself threatens life When the "toxin" of health and safety appears, the enterprise is actively and flexibly the process of effective defense; organizational quality memory is the process of absorbing the emergency experience of the enterprise on the basis of the effective quality defense of the enterprise, thus forming the process of quality memory[1-5].

The quality risk immunity mechanism of core enterprises in the supply chain of manufacturing enterprises is a necessary measure rooted in the economic development and technological progress of manufacturing enterprises. The quality risk immunity mechanism is related to the life and health and safety of the organization, the quality and safety construction of the organization, and the organization of emergency incident handling, organizational knowledge and Technological innovation, quality risk immunity mechanism structure is the cornerstone of the long-term development of enterprises[10-13].

## 2. CiteSpace Literature Analysis

Based on the themes of "manufacturing", "core supply chain enterprises", and "quality risk immunity", this study retrieved the literature from 2001 to 2021 in the core studies of Web of Science. The research found that foreign countries are immune to quality risk of manufacturing supply chain enterprises. Research is earlier. The subject English search was conducted on the core collection of Web of Science studies. Figure 1 shows the trend of the number of studies published

by scholars on the subject of “Quality Risk Immunity” derived from the Web of Science core database.

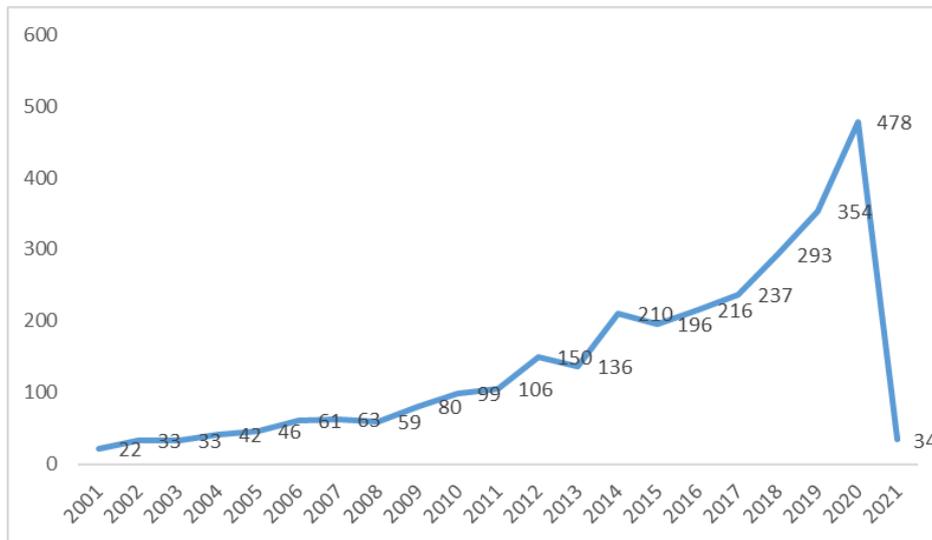


Figure 1: The number of publications on the basis of “quality risk infection” in the past 20 years.

Figure 1 shows that since 2001, scholars’ research on “quality risk immunity” has been increasing year by year. By 2021, the number of studies published has reached 478, and by February 2021, a total of 34 studies have been published. In other words, scholars are reaching a climax on issues related to “quality risk immunity”. Based on this, the core studies of Web of Science are used for literature summary and analysis, and the key themes and elements are screened out.

With the theme of “Quality Risk Immunization”, the document types are “Study” and “Review”, and the language is selected “English” to search in the core studies of Web of Science. Perform CiteSpace cluster analysis on the exported 2948 documents, and obtain 11 cluster types, namely: inflammation, Crohn’s disease, human, inhibitor, immune thrombocytopenia, immunotherapy, AIDS, stem cell transplantation, vaccine, concentration and pneumonia.

CiteSpace, v. 5.7.R4 (64-bit)  
 February 20, 2021 11:41:29 PM CST  
 WoS: C:\Users\Lenovo\Desktop\制造业供应链wos\质量风险免疫\output  
 Timespan: 2001-2021 (Slice Length=1)  
 Selection Criteria: g-index (k=25), LRF=3.0, LBY=5, ee=1.0  
 Network: N=815, E=6160 (Density=0.0186)  
 Largest CC: 761 (93%)  
 Nodes Labeled: 1.0%  
 Pruning: None  
 Modularity Q=0.1434  
 Weighted Mean Silhouette S=0.7483  
 Harmonic Mean(Q, S)=0.2406

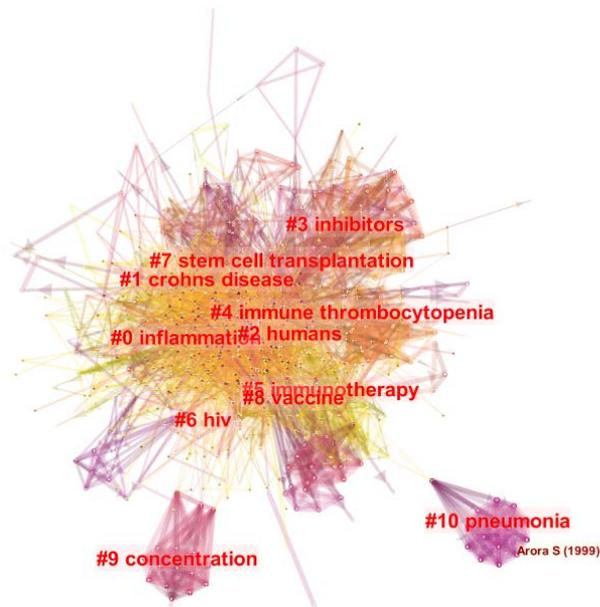


Figure 2: Cluster analysis diagram of foreign language.

As shown in Figure 2, foreign study on quality risk immunity is mainly divided into two parts: one is virology, such as inflammation, Crohn's disease, pneumonia, etc.; the other is pathological treatment, such as stem cell transplantation, immunotherapy, etc. From the perspective of foreign language cluster analysis diagrams, the study on the quality risk immunity mechanism of enterprises or supply chain networks is relatively scarce.

### 3. Construction of a Quality Risk Immunity Mechanism for Core Enterprises in the Manufacturing Supply Chain

Scholars define risk as events that people do not want to see or do not want to happen. Such events may or may not happen[13-16]. However, as time goes by, some scholars have pointed out that risk is predictable. It is the probability that something people do not want to happen within a certain period of time, causing undesirable consequences[16-19]. In summary, scholars do not have a consistent definition of risk. This study believes that risk exists objectively in production and life, people can predict and there is uncertainty, but it can be reduced by scientific means. It has the following characteristics[17-23]: (1) Predictability. Predictability means that risks can be identified. People can predict the occurrence of risks through past experience and data, and at the same time observe the key elements that trigger risks, thereby reducing the probability of occurrence of risks. (2) Objectivity. Risk is a real and possible event that will not change due to changes in people's subjective wishes. (3) Uncertainty. The existence and occurrence of risks can be avoided as much as possible through the system or artificially. The more information people have and the better the management system, the more risks can be reduced. (4) Double-edgedness. On the one hand, the existence of risk issues can cause enterprises or individuals to bear more crises and challenges. On the other hand, risks can urge enterprises or individuals to grow and carry out system optimization and reforms, thereby promoting the occurrence of innovative behaviors.

In recent years, the development model of the manufacturing industry has gradually changed to the coordinated development of the supply chain. The core and node enterprises in the manufacturing supply chain have quality control, but quality problems involve many links and

processes, and are vulnerable to the external environment and their own non-self factors. Interference, there is the possibility of conceiving risks and risk expansion. Therefore, the quality risk of core enterprises in the manufacturing supply chain has the following characteristics[17-23]: (1) Recursion. The manufacturing supply chain network is intricate, and there are direct or indirect connections between core companies and node companies. The quality risks of core companies will recurse to upstream and downstream companies along with the supply chain network structure, causing other node companies to face the same risk threats. (2) The degree of predictability is low. Due to the special industry characteristics of the manufacturing industry, product production, transportation and final use may require multi-party and multi-step cooperation. Therefore, when a product has quality problems, it is difficult to find out the real quality loopholes and reduce quality risks. (3) Time lag. The quality risk problem of manufacturing enterprises will not happen suddenly, but will gradually expand the quality risk over time, that is, quality risk has a certain incubation period. When many quality risks converge, it will trigger the butterfly effect and cause major losses for manufacturing supply chain enterprises. (4) Harmfulness. The core enterprises of the manufacturing supply chain have quality risks, which are easy to cause the snowball effect and cause a series of quality problems, which will damage the chain between node enterprises on the supply chain network and harm the interests of enterprises. Based on the above characteristics, the quality risk identification mechanism, the quality risk response mechanism and the quality risk learning and memory mechanism in the quality risk immunity mechanism are proposed to reduce the occurrence of quality risks.

#### 4. Research Conclusions

The CiteSpace analysis and combing of the literature found that foreign research on “quality risk immunity” is mostly used in medicine. At the same time, according to the recursiveness, low predictability, time lag and damage of quality risks of core enterprises in the manufacturing supply chain, three links of the quality risk immune mechanism are proposed, namely the quality risk identification mechanism, the quality risk response mechanism and the quality risk learning and memory mechanism.

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