

Statistical Monitoring of Green Quality and Immune System Resilience in Specialized, Refined, and Innovative Enterprises

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Abstract: A comprehensive monitoring system for green quality management in enterprises has gradually become a necessary means for quality management. This article is based on the analysis and comparison of the internal and external conditions of green quality management in specialized, refined, and innovative enterprises, and discusses the key contents of the construction of a statistical monitoring system for green quality management. This article believes that specialized and innovative enterprises need to further improve their green quality management system, establish a key monitoring mechanism that includes data acquisition, data indexing, and data decision-making, supplement the quality and safety issues caused by the lack of green quality immune system in specialized and innovative enterprises, and enhance their resilience to resist internal and external threats.

Keywords: “Specialized, refined, and innovative” Enterprises; Enterprise Green Quality Management; Quality Immune System; System Resilience; Statistical Monitoring

1. Introduction

Specialized and innovative enterprises play an irreplaceable important role in economic development. The quality of products is the life of enterprises, and the high-quality development of specialized, refined, and new enterprises cannot be separated from high-quality green products. This requires the green quality management of specialized, refined, and new enterprises to keep up with the pace of high-quality development. The immune system function of green quality management is constantly strengthened, and when facing internal and external threats from

specialized, refined, and new enterprises, it can respond independently and quickly. A complete monitoring system for enterprise green quality management has gradually become a necessary means for enterprises to carry out quality management. It plays a significant role in strengthening the immune system function of enterprise green quality management and enhancing the resilience of specialized and innovative enterprise green quality management immune system. This article analyzes the importance of establishing a comprehensive monitoring system for enterprise green quality management in specialized, refined, and new enterprises, including the development environment, the necessity of green quality management, and the resilience of the enterprise's immune system. To provide theoretical basis for strengthening the green quality immune system of specialized and innovative enterprises, solve the difficulties faced by specialized and innovative enterprises in the development process, and enhance the resilience of the green quality immune system of specialized and innovative enterprises.

2. Literature Review

"Specialized, refined, and innovative" enterprises refer to leading enterprises that focus on segmented markets, have strong innovation capabilities, high market share, master key core technologies, and have excellent quality and efficiency [1]. "Specialized, refined, unique, and new" enterprises are mainly recognized based on indicators such as operating revenue, main business revenue, "specialized, refined, unique, and new" characteristics, operating years, and quality management standards. Enterprise green quality management is an extension and expansion of total quality management to meet the requirements of the times [3,4]. Unlike Total Quality Management, Green Quality

Management is a new application of Total Quality Management in the field of green quality. It not only emphasizes the comprehensiveness of quality management, but also requires quality management to be controlled based on the concept of green development. The green quality management of specialized and innovative enterprises refers to the high-quality control of product green quality by specialized and innovative enterprises, with the aim of reducing the occurrence of quality and safety incidents [5-9]. The immune system of enterprise quality management refers to the preventive, identification, and resistance functions that enterprises themselves possess, similar to biological immunity, when facing unpredictable threats from both internal and external sources. The term "toughness" originated in the field of physics and refers to the quality of an object that is not easily deformed under external forces. Through the expansion and application of researchers, "resilience" has gradually been applied in the field of management, giving rise to words such as "enterprise resilience", "system resilience", and "immune resilience" [10,11]. The resilience of the green quality immune system studied in this article refers to the quality of the enterprise's green quality immune system that can recover from crises. The specialized, refined, and new enterprise green quality immune system monitoring system is a management system that tracks and monitors the internal and external environmental threats of specialized, refined, and new enterprises, helping to enhance their green quality immune capabilities.

3. Statistical Monitoring

The development environment faced by specialized and innovative enterprises is constantly changing. Only by timely grasping the internal and external conditions of green quality, optimizing and establishing a complete enterprise green quality management and monitoring system, can enterprises adapt to the development environment more calmly and enhance the immune system function of green quality. The resilience of the green quality immune system in specialized and innovative enterprises relies on the mastery of the internal and external quality status of the enterprise. The internal situation of an

enterprise mainly includes the degree of importance it attaches to green quality management, whether it has implemented green quality management, the level of green quality management, the means adopted by the enterprise in green quality management, and whether the enterprise has a sound feedback mechanism for green quality management [12-14]. The green quality immune system of enterprises mainly reflects their ability to effectively identify external quality threats when they arise. Therefore, the external quality status of enterprises mainly includes the green quality market supervision system, green quality standards, green quality and safety incidents, and the level of quality and safety of supply chain enterprises. The collection, organization, induction, and indicator calculation of the internal and external quality status of enterprises rely entirely on a comprehensive and reliable green quality statistical monitoring system [15-18]. The importance of the green quality immune system for specialized and innovative enterprises requires a comprehensive and reliable statistical monitoring system, which must be a multi-step, multi process, rich and comprehensive dynamic real-time monitoring process, mainly including the generation of monitoring data, data indexing, and data decision-making.

3.1 Monitoring Content Regarding the Data Generation Process

The process of generating green quality data for specialized and innovative enterprises mainly focuses on collecting and obtaining information on the green quality status both internally and externally. In terms of internal green quality management in enterprises, on-site investigations are used to conduct multi-level and multi-step sampling surveys and administrative records on the quality level of green products in enterprises [19-21]; In terms of the external green quality status of enterprises, a comprehensive understanding of the green quality market supervision system and green quality standards is required. The green quality market supervision system and green quality standards are quantified, and expert evaluation is used to evaluate the quality and safety of upstream and downstream supply chain enterprises, thereby forming effective external green quality status

data. Compared with only collecting and following up on internal information of the enterprise, collecting and obtaining green quality status information from both internal and external sources can comprehensively and systematically grasp the real-time situation of the enterprise, provide systematic data for comprehensive analysis and decision-making, and contribute to the long-term healthy development of the enterprise.

3.2 Regarding the Monitoring Content of the Data Indexing Process

The indicator process of green quality data for specialized and innovative enterprises is still divided into two parts: internal green quality management indicators and external green quality status indicators. In general, the indicator process is the process of processing and organizing the collected and acquired data, using scientific calculation and modeling methods to vividly and specifically reflect the internal and external statistical monitoring of the resilience of the enterprise's green quality immune system, providing quantitative indicators for specialized and innovative enterprise managers to make green quality management decisions [22,23]. The internal green quality management indicators of enterprises mainly include quality compliance rates related to the green of enterprise products, and other indicators; The external green quality status indicators of enterprises mainly include the green quality compliance rate of upstream and downstream enterprises, as well as the occurrence rate of market quality and safety events and other external indicators. The indicator process of green quality data for specialized and innovative enterprises is based on the classification and summary of internal and external data of the enterprise, and scientifically reasonable indicators are calculated. Compared with only targeting internal information of the enterprise, comprehensive targeting of green quality status information both internally and externally can comprehensively and systematically grasp the real-time situation of the enterprise, provide systematic quantitative values for comprehensive analysis and decision-making, and facilitate enterprise decision-making.

3.3 Monitoring Content Regarding the Data

Decision-Making Process

Decision making refers to the process of selecting the optimal solution through analysis, comparison, weighing, and judgment when facing multiple choices. Simply put, decision-making is the process by which people come up with ideas and make decisions about various events. The decision-making process for the green quality data of specialized, refined, and new enterprises is to integrate the internal and external green quality management status indicator data of the enterprise, combined with the development status of green quality management of specialized, refined, and new enterprises themselves and the overall development strategy of specialized, refined, and new enterprises. Through comprehensive, scientific, and reasonable analysis and judgment, the process of adopting the optimal solution enhances the resilience of the immune system for green quality management of specialized, refined, and new enterprises [24]. Based on the scientific indicator values obtained from the indicator process of specialized, refined, and new enterprise green quality data, enterprise decision-making can be made quickly and efficiently, which enhances the correctness of decision-making.

From a cyclical perspective, the significance of green quality statistical monitoring in specialized, refined, and new enterprises lies in providing decision-making references and targeting goals for enterprises to formulate quality management strategies, enhancing the resilience of the green quality management immune system in specialized, refined, and new enterprises, and improving the level of green quality management in enterprises. From a structural perspective, statistical monitoring of green quality in enterprises can provide rich market safety information on green quality, and provide a basis for solving green quality problems in the production industry and reducing green quality and safety crises.

4. Conclusion

As the development of enterprises gradually shifts from the goal of rapid development to the goal of emphasizing high-quality development, quality problems in enterprises are gradually emerging, and the green quality and safety issues of enterprise products are becoming increasingly prominent. The

resilience of the enterprise's green quality immune system needs to be continuously strengthened. In this context, the development environment faced by specialized and innovative enterprises is constantly changing. Only by timely grasping the internal and external conditions of green quality, optimizing and establishing a complete enterprise green quality management and monitoring system, can enterprises adapt to the development environment more calmly and enhance the immune system function of green quality. Specialized and innovative enterprises still need to further improve and strengthen their green quality immune system immune function. The optimization and establishment of a green quality management monitoring system for specialized, refined, and innovative enterprises cannot be separated from the grasp of the internal and external quality status of the enterprise. Starting from the information status of green quality inside and outside the enterprise, combining internal green quality management monitoring with external green quality and safety event monitoring can help comprehensively reduce the risks of green quality and safety in the enterprise, and enhance the resilience of specialized, refined, and innovative enterprises to resist internal and external threats.

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References

- [1] Xiaomei Li, Huanhuan Li, Menghao Wang .The Evolution Mechanism of High Quality Development of Specialized, Refined, Unique, and New Enterprises in the Era of Artificial Intelligence Scientific Management Research, 2023, 41 (06): 106-114.
- [2] Shuchun Liu, Jie Jin. Digitalization reshapes the value and creativity of specialized, refined, and innovative enterprises - theory, mechanism, model, and path Research on Financial Issues, 2023, (11): 3-14.
- [3] Jiyun Liu, Junfeng Lai, Linyan He. Analysis of Green Quality Management in Enterprises in the Digital Era Volkswagen Standardization, 2023, (21): 23-25.
- [4] Gdv, Kec. Technology to solve global problems: an emerging consensus for green industrial policy? Environmental Research Letters, 2023, 18 (9).
- [5] Yihua Wang, Ping Lv, Bo Xu, Zhenning Yang, Xiaoyang Su, Debin Du, Zhicheng Song, Xingguo Duan. Preliminary exploration of tissue immunity research. Science and Technology Management, 2006, (06): 133-139.
- [6] Ping Lv. Empirical study on the impact mechanism of organizational immune behavior on organizational performance. Science and Technology Management, 2011, 32 (07): 15-23.
- [7] Liping Shi, Qiang Liu, Shulin Tang. A Study on the Path of Quality Performance Improvement from the Perspective of Organizational Specific Immunity: Empirical Analysis of Projection Pursuit and Forced Entry Methods Nankai Management Review, 2012, 15 (06): 123-134.
- [8] Xu Yang, Yu Guo, Qiang Liu. Innovation Factors, Innovation Radiation, and Frontiers of Product Quality: The Transmission Mechanism of Organizational Quality Specific Immunity under the Logic of Innovation Dominance Nankai Management Review, 2021, 24 (05): 38-52
- [9] Liping Shi, Qiang Liu, Yanan Jia, Xinqi Yu. Optimization of Quality Performance Improvement Path Based on Projection Pursuit RAGA-NK-GERT: An Explanatory Framework Dominated by Organizational Quality Specific Immunization and Product Lifecycle. Operations Research and Management, 2015, 24 (04): 188-197.
- [10] Guohong Wang, Huan Lin, Hao Huang. The impact of resource allocation on organizational resilience of small and medium-sized enterprises from a digital perspective Technological Progress and Countermeasures, 1-10 [2024-01-18].
- [11] Bergami, M., M. Corsino, A. Daood, and P. Giuri. Being Resilient for Society: Evidence from Companies that Leveraged Their Resources and Capabilities to Fight the COVID - 19 Crisis. R&D Management, 2022, 52, (2) :235 - 254.
- [12] Haiqi Lu, Zhihua Tang. Research Group on Statistical Monitoring of Sharing

- Economy, Evaluation and research on sharing economy based on statistical monitoring Research World, 2023, (11): 58-67.
- [13] Huajuan Xi, Xiaoe Wang. Statistical monitoring, regional disparities, and dynamic patterns of China's common prosperity Statistics and Decision Making, 2023, 39 (17): 5-10.
- [14] Xi Zhang. Construction of employment monitoring system and macroeconomic regulation: based on international comparative perspective Labor Economics Research, 2023, 11 (04): 118-143.
- [15] Qinchuan Du. Improve statistical monitoring indicators to promote stable and high-quality development of the digital economy Macroeconomic Management, 2023, (07): 10-18.
- [16] Delia. The concept, model, and development strategy of data element circulation supervision for public data authorization operatio Modern Intelligence, 2024, 44 (03): 93-104.
- [17] Zheyun Zhao, Yumin Liu, Xiaoying Liang. Consider the four party evolutionary game of product quality supervision with insiders whistling Chinese Management Science, 2024, 32 (02): 43-53
- [18] Zheyun Zhao, Yumin Liu, Nan Chu. Evolutionary Game Analysis of Internal Employee Participation in Product Quality Supervision Operations Research and Management, 2023, 32 (12): 50-56.
- [19] Xiang Li, Baowan Jia, Jiaqi Ding. Industry Competitiveness, Government Enterprise Interaction, and Product Quality - The Logic of Multiple Incentives for Regulators Industrial Economic Review, 2023, (06): 43-66.
- [20] Hongtao Ren. Institutional Reflection and Legal Improvement of Carbon Emission Data Quality Supervision under the Background of "Dual Carbon" Guangxi Social Sciences, 2023, (02): 11-19.
- [21] Zhiqiang Zhang, Han Li, Man Chen. Product Quality Supervision and Industrial Transformation and Upgrading: An Empirical Analysis Based on Threshold Effect and Technological Innovation Mediation Effect Macro Quality Research, 2023, 11 (01): 1-14.
- [22] Youfeng Mao, Fangdong Yu, Yichen Li. Research on the Conceptual Connotation and Characteristics of Statistical Supervision in the New Era Statistical Research, 2022, 39 (07): 3-11.
- [23] Yi Sun, Xinrui Li, Yongmiao Hong. Construction of a Digital Economy Monitoring and Evaluation System Based on High Quality Development - Taking the Construction of Beijing as a Global Digital Economy Benchmark City as an Example Journal of the Chinese Academy of Sciences, 2022, 37 (06): 812-824.
- [24] Juan Wu, Wenjia Wang. Statistical monitoring and evaluation of high-quality economic development of provinces along the "the Belt and Road" Statistics and Decision Making, 2022, 38 (07): 67-71.