

Factors Influencing the Resilience of the Quality System of "Specialized and New" Enterprises

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Abstract: In the digital era, the environment and market are changing, and the development of "Specialized and new" enterprises is limited. The ability to use quality system resilience to overcome crises and achieve sustainable development in the face of external shocks has become the key to overcoming vulnerability and achieving leapfrog development for "Specialized and new" enterprises. This paper investigates the factors influencing the resilience of enterprise quality system from three aspects: organizational structure, external environment and green financial development, and also makes a marginal contribution to the theory of quality system resilience of "Specialized and new" enterprises.

1. Introduction

With the rapid development of the digital economy, technology and market demand fluctuate, and environmental problems are becoming increasingly severe, SMEs' living space is gradually shrinking and they are prone to the passive situation of being eliminated from the market. At the same time, there is a serious trend of counter-globalization, an industrial chain crisis, weak independent R&D capability and low innovation performance of SMEs, and quantitative restrictions on hardware installations, which directly cause delivery delays^[1]. At the same time, the government clearly pointed out that the core of high-quality development, boost domestic demand, and promote the construction of a new development pattern of the domestic cycle as the main body, the domestic and international cycle to promote each other^[2], and help develop innovation driven machine "Specialized and new" enterprises to stimulate market vitality, prevent and resolve supply chain risks, optimize industrial structure, promote Innovation results output, mastering key core technologies, making up for the shortcomings of science and technology^[1], polishing and focusing on special areas, leading Chinese manufacturing towards intelligence and high-end. On the other hand, due to the industry, scale and regional characteristics, "Specialized and new" enterprises form supply chain and region-oriented industrial clusters, reduce costs while promoting regional cooperation between industry, academia and research, establish stable and reliable social networks, facilitate the exchange of scientific researchers between enterprises^[3], accelerate the process of knowledge diffusion and spillover, improve the quality of industry product quality while enhancing

the resistance to external risks.

The concept of resilience extends the focus of engineering complex systems beyond the traditional discussions of robustness, reliability and risk management^[4], it also emphasizes the recoverability of systems after absorbing shocks and self-adaptability^[5]. Due to the characteristics of the industry, "Specialized and new" enterprises have rigid requirements for product quality, usually implement total quality management within the enterprise, and are oriented to customer demand, and are vulnerable to the impact of supply chain disruptions and technology monopolies, which can lead to shortages and discontinuities and seriously affect the development of the industry. Quality system resilience aims to avoid disruption and shorten recovery time preventive maintenance, monitoring and inspection, enhance the comprehensive response capability of the quality system, and also promote innovation management, which is closely related to dynamic innovation^[6].

2. Review of the Literature

The concept of resilience first emerged in the field of physics and refers to the ability of a system to recover its original state after being stressed^[5], Holling(1973) introduced it to the field of ecology and defined it as engineering resilience^[7], which indicates the ability of an organism or system to recover its original state after being impacted^[8]. For the research on the resilience of manufacturing enterprises, mostly supply chain resilience, academic research on supply chain resilience is mostly focused on the exploration of factors influencing supply chain resilience, Cailian Liu (2023) from the perspective of digital transformation used intermediary regulation model to conclude that enterprise size and growth factors positively affect the supply chain resilience of distribution enterprises^[9]; some scholars studied the economic recovery in the post-epidemic era from the perspective of system resilience William Hynes (2022) studied the efficiency of economic systems in equilibrium from the perspective of design-induced resilience and intervention-induced resilience through physical theory^[10]. Kuang Min and Fan Fengchun (2022) investigated the effect of technological advancement bias on economic resilience from the perspective of innovation factor allocation and conclude that technological advancement bias can significantly enhance economic resilience^[11]; Wang Peng and Zhong Min (2021) pointed out that technological innovation can contribute to the transformation and upgrading of industrial structure and significantly enhance urban economic resilience^[12].

Comprehensive domestic and foreign related research status, the resilience theory is from the micro level to analyze its impact factors, the enterprise field research is less, and scholars for enterprise quality management system research is biased towards the improvement of the evaluation system and the combination with the green concept^[13], is the innovation of enterprise quality management system, but few scholars will be the combination of resilience theory and quality management. Therefore, this paper will focus on the theoretical framework applied in the process of resilience research and the measurement of resilience in the field of supply chain and organization, and study the factors influencing the resilience of enterprise quality system^[14]from the organizational structure^[15], external environment and green financial development, so as to provide useful reference and guidance for the management and development of "Specialized and new" enterprises in this paper. This paper provides useful reference and guidance for the management and development of "Specialized and new" enterprises.

3. Factors Influencing the Resilience of the Quality System of "Specialized and Special New" Enterprises

3.1. The Relationship between Organizational Structure and the Resilience of Quality System of "Specialized and New" Enterprises

The organization is the basic unit of the enterprise, and the degree of its operation determines the prospects of its development. Common types of structure include U-shaped structure, matrix organization structure, multi-dimensional organization structure, etc. The choice of organization structure is related to the type of enterprise. It has the characteristics of clear division of labor, highly unified management, efficient communication of instructions, clear authority and responsibility^[16], but in the digital era, data has become a factor of production, the hierarchical organizational structure is easy to cause information loss, low efficiency of transmission, while limiting the motivation of employees. In the digital era, the organization structure is easy to be eliminated from the market, with low creativity, low efficiency, and products lacking characteristics and not having brand competitiveness. Therefore, the traditional organizational structure inhibits the performance of enterprises^[17].

In the digital economy, demand is constantly changing, and the traditional large-scale manufacturing model with a single variety of products cannot adapt.^[18] The "specialty" companies are known for their flexibility, diversity and creativity, which require high efficiency of information transfer within the company and production flexibility to meet diverse needs. Data has become a key production factor, and the processing of data requires the use of digital tools to screen digital information. Digital tools such as the introduction of digital twins can form complete business processes through the characteristics of business operations, enter customer and market information, and automatically follow the original process to provide business processing efficiency. The use of technology requires employees to have basic expertise, so business organizations driven by data have a strong learning ability and increased receptivity to new things^[18], providing new value to the organization. Applying digital technology to the practice of quality management reduces human error, improves product accuracy, and secures diverse customer needs.

In response to the development trend of flattening organizational structure, at the same time, the integration of information technology elements, reduce the distribution of vertical structure, most of the horizontal structure, but at the same time to retain the absolute right of leadership, to protect the enforceability of major decisions, but also to circulate information, reduce information loss, improve staff office efficiency, employees can also give their objective, reference value information through the information transfer channel, different departments information sharing between different departments and improve office transparency. At the same time, employees' quality awareness increases and uniform quality standards are established to improve production flexibility while also ensuring quality. When the market demand changes, the organization responds quickly through big data and transmits the information of changes to each department, and each department can amend the task target in time to achieve agile manufacturing, which can fully respond to the turbulent market environment and improve quality performance.

The organizational structure is gradually becoming digital, and its requirements for quality management can be slowly transmitted to each link through the information flow, breaking down departmental barriers. The digital organizational structure can monitor the quality of the whole cycle of the product in a stable and orderly manner, promote the interaction between human resources and the environment, accelerate the gathering of knowledge and information resources, improve the buffering of the quality system, enhance the resilience of the quality system and the rapid repair capability^[19], lay the knowledge base for a new round of quality innovation, and

promote the formation of industrial clusters. At the same time, the organization's coordination capability accelerates knowledge interaction among groups, facilitates talent cultivation, and accelerates innovation output, thus enabling companies to obtain policy support and promote quality performance management internally in a comprehensive manner^[3]. Therefore, in summary, the organizational structure positively influences the resilience of quality systems in "Specialized and new" enterprises.

3.2. The Relationship between External Environment and the Resilience of Quality System of "Specialized and New" Enterprises

Enterprise quality system is determined by the industry uniform standards, with market demand and constantly changing, but the degree of change determines the change or not of the enterprise quality system. For external environmental changes, it is common to see sudden changes in the environment, which are unpredictable, sudden and potentially dangerous, and have a strong destructive power^[20]. "Specialized and new" enterprises are creative small and medium-sized enterprises that are vulnerable to sudden environmental changes, but most of them are able to recover and rebuild from such changes with their own complete and robust organizations.

At the beginning of the sudden change of environment, the "specialized and new" enterprises are technology-intensive, and the available resources are gradually shrinking, squeezing the survival space of small and medium-sized enterprises, making enterprises take the initiative to improve the value of human resources, streamline the scale of employment, reduce human expenses, and ensure the available cash flow of enterprises, so as to provide strong protection for enterprises. This can provide strong protection for the enterprise. At the same time, the existing systems and strategies of enterprises are effective in a short period of time^[21], enterprises will refocus on existing strategies, consider market changes and government taxation and support policies, change the original enterprise system, fully integrate external resources, improve the resilience of the system^[22], pay more attention to human resources, close cooperation with employees, while encouraging employees to explore innovation, expand new channels of merchandising, strengthen cooperation with other enterprises cooperation, introduce new technology or new equipment, guarantee the output of the original products while following up the market demand, develop new products, innovate step by step, fully integrate old and new resources internally^[23], improve innovation performance, guarantee corporate performance while being able to follow up new markets, and alleviate the pressure of resources brought about by sudden changes in the environment.

In the middle of the sudden environmental change, the enterprise has become aware of the risks and has formed an overall group consciousness while resisting, and the team cohesion has been improved. A new round of technological change has begun within the company, cultivating a diversified technology system^[24], using diversified platforms for technology integration as well as product and market expansion, actively seeking external financing, and taking the initiative to go through relevant procedures with the government or financial institutions^[25], in order to obtain more external capital to provide impetus for subsequent R&D. At the same time, change the strategic thinking, change from zero-sum game to a state of cooperation and symbiosis in the industry field, enhance the relationship with the surrounding social network connections, obtain valuable information from the network^[20], the organization regains its original dynamism and the quality system is transformed with the renewal of technology and products^[26], more adapted to the production characteristics of the company.

In the late stage of the sudden environmental change, "Specialized and new" enterprises form new profitable businesses and adopt new strategies to cope with the new environment while fully considering the marketing and after-sales of new products. The company's original strategy can no

longer adapt to the reconstruction of the enterprise, so the leadership of the company focuses on the core business and the intelligent transformation of the enterprise, considering the use of digital factories and Internet of Things technology. By using digital technology instead of the original quality tools, companies can improve the performance of new products, integrate product production and quality monitoring, focus on waste recycling and utilization, reduce pollution and improve corporate image. We focus on training the learning and transformation ability of employees, always pay attention to digital transformation trends, constantly improve the quality system, reduce the ambiguity of quality problems, and reduce operating costs. The environment can also enhance the "Specialized and new" enterprises' sense of worry, rich resource reserves, with strong strategic resilience^[27], ready to respond to market changes, promote quality system change, enhance the resilience of the quality system. To sum up, the external environment can improve the quality dynamic capability of "Specialized and new" enterprises, thus enhancing the quality system resilience.

3.3. Relationship between the Development of Green Finance and the Quality System Resilience of "Specialized and New" Enterprises

Green finance is a key factor in promoting the green upgrading of industries and directing the flow of funds to environmental industries^[28], providing development direction for small and medium-sized enterprises. Green finance has a high green influence, it promotes the development of green technology of "Specialized and new" enterprises by improving the application criteria of green credit and strict examination system^[29], so that they can develop with high quality while considering environmental benefits, energy saving and emission reduction is the purpose. Due to the problem of information disclosure, "Specialized and new" enterprises have difficulty in financing because of their size and industry characteristics, and the high cost of innovation of high-end products and low return on investment under the financing constraint have caused enterprises to avoid the problem of innovation^[29]. Financial institutions and governments prefer enterprises with a high sense of social responsibility, green credit can relieve financial pressure, and green production methods reduce environmental regulations, so most enterprises are willing to improve the level of corporate environmental protection, trying to obtain government subsidies and reduce environmental taxes.

Environmental problems are becoming increasingly serious, traditional manufacturing methods cause ecological damage, environmental treatment is expensive, and long-term considerations, so companies are more willing to change their production methods and increase their willingness to invest in environmental protection. Financial institutions' financial guidance can regulate the market mechanism, green products are respected, and environmentally conscious consumers are more willing to pay for environmental protection^[26]. Therefore, the stakeholders of enterprises consider the overall situation, increase the investment in environmental protection, cultivate the environmental awareness of employees, incorporate environmental monitoring into the quality management system, use the PDCA loop to improve green quality issues at all times, design simple and environmentally friendly packaging, focus on energy saving and emission reduction in the logistics process, and improve service quality.

Green financial development stimulates enterprises to take the initiative to assume social responsibility, stimulates green consumption, and drives green spillover effects, at the same time, under the supervision of public opinion and the majority of consumers; enterprises will make full use of high technology to reduce energy consumption. Under the background of "double carbon", the government introduces carbon footprint traceability to monitor the carbon emissions of enterprises, quantify the environmental indicators and regulate the carbon emission behavior of

enterprises. Green finance promotes enterprise green technology innovation to achieve the effect of emission reduction, at the same time, the enterprise still has the remaining carbon emissions, it can be sold to energy companies to obtain emission reduction income, used for green technology research and development and new product development, to obtain sustainable income, not only can get a good social reputation, but also can improve the use of innovation output conversion rate, to high-end market. After occupying the high-end market, the requirements for quality are also being drawn up, while the enterprises' own production systems have been updated with sufficient technology and knowledge reserves as well as adequate staff quota, flexibility and strong self-healing ability to reduce the damage of quality crisis. Therefore, the development of green finance is influencing the resilience of the quality system of "Specialized and new" enterprises.

4. Conclusions and Recommendations

4.1 Research Findings

"In the post-epidemic era, the economic situation is volatile, and key core technologies have become the core competitiveness at home and abroad, which is also an important factor to master the global core value chain. Quality is the basis for enterprises to compete, and quality system resilience is the protective factor of the enterprise quality system in the event of external risk impact, this paper examines the relationship between the internal organizational structure changes, the three periods of external environment and green financial development of "specialized and new" enterprises. Finally, we conclude that organizational structure, environment, and green financial development all have positive effects on quality system resilience, which enriches the related research on quality system resilience.

4.2 Policy Recommendations

"Specialized and new" enterprises have a gradient cultivation model, but due to technology intensity and management factors, some "specialized and new" SMEs have difficulty in achieving cross-volume development, therefore, from the government level, it should broaden the financing channels for SMEs, provide multiple options for investors, and establish special credit products. Therefore, at the government level, it should broaden the financing channels for SMEs, provide investors with multiple options, establish special credit products, implement a tax system that promotes innovation in industrial clusters, build a free learning platform, promote cooperation and knowledge sharing among enterprises, develop a public service demonstration platform for SMEs, gather multiple resources on an online platform, provide free business management consulting, and take the initiative to select high-quality partners for SMEs to reduce venture investment risks.

Enterprises mainly focus on high-intensity R&D. The fast-changing market environment makes it difficult for this type of enterprises to achieve innovation breakthroughs and easily fall into a plateau period, which is rooted in the poor collaboration between various departments and poor management correlation of different links. Therefore, in terms of the internal management structure of enterprises, the traditional linear structure, inefficient and poor response to unexpected events, while management digitalization can provide decision makers with more systematic data, analyze market preferences through big data calculations, and reduce decision-making risks. The digitalization of quality construction in "Specialized and new" enterprises improves the visualization of quality processes, facilitates the collection and processing of quality issues, and forms a closed-loop quality system, while improving the early warning and warranty system for equipment, networking equipment status and real-time observation to improve response speed and reduce equipment maintenance costs.

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