

Study on the Influencing Factors of Quality Innovation of High-tech Enterprises

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Abstract: In the background of the quality era, quality competition has become more and more intense, and high-quality development has become the mainstream trend of the current national economic development, which is an important driving force of Chinese economic development. Total quality management, as one of the main ways of enterprise quality management, can hardly meet the complex and changing external quality environment, and enterprises pay more and more attention to quality innovation. This paper explores the quality innovation of high-tech enterprises based on the perspective of influencing factors, extracts five influencing factors such as technological innovation, organizational innovation, management innovation, quality culture and market competition, systematically analyzes the connotation of each influencing factor, and further explores the role relationship between quality innovation and influencing factors, so as to provide certain theoretical support for the quality innovation practice of enterprises and help Chinese economic continuous development. The study shows that the five influencing factors, such as technological innovation, organizational innovation, management innovation, quality culture and market competition, have a positive influence on the quality innovation of high-tech enterprises, and the stronger the force of the influencing factors, the more favorable it is for high-tech enterprises to carry out quality innovation.

1. Introduction

High-tech enterprises, as knowledge-intensive enterprises, play the role of the mainstay in Chinese economic development and are the powerful support for the rapid development of Chinese economy, and their continuous development in innovation has greatly improved the country's innovation competitiveness. The quality innovation of enterprises has accelerated the optimization and upgrading of industrial structure while promoting the innovation drive of enterprises. By increasing the investment in innovation, enterprises have gained greater value creation and enhanced their competition, enabling them to maintain stable and sustainable development in an external environment of increasing complexity and uncertainty. Quality innovation is an inherent requirement for enterprises to maintain stable and sustainable development, and the study of the

factors influencing quality innovation provides a certain theoretical basis for the development of enterprises and contributes to the long-term development of high technology enterprises.

2. Literature Review

2.1. Quality Innovation

Swann first proposed the theory of quality innovation, and he pointed out that quality innovation is a special form formed by further derivation on the basis of innovation, which could be analyzed in a certain way in the quality space dimension [1]. Haner considered quality innovation as a special form representing the degree of innovation in the finished product, the product manufacturing process, and the overall business management of an enterprise [2]. Yang analyzed in depth the development and evolution process of the concepts of quality and innovation, and pointed out that quality innovation is a specific expression of innovation in quality [3]. Quality innovation advances the improvement of quality as well as performance [4], and Cheng defined quality innovation as the improvement of the inherent properties of a product through production and technological innovation to better meet market demand [5]. Quality innovation is a comprehensive innovation tool that integrates innovation in products, production methods, and market environment to continuously improve the effectiveness of products and services and ultimately meet consumer needs [6]. Quality innovation is to create a new kind of quality, which can meet the needs of stakeholders and help companies to reach new goals for better quality development. Enterprises need innovation as a certain booster to improve quality, and this innovation not only generates new products, technologies, and processes, but also enables companies to gain certain advantages in terms of costs and thus take the lead in the industry. In the era of Innovation 4.0, quality innovation becomes an inevitable choice for high technology enterprises to take the road of quality development, which can enhance the core competitiveness of enterprises and make them better quality management.

2.2. Quality Innovation Influencing Factors

The influence factors of quality innovation are reflected in several levels such as strategic level and management level, and each element such as product, service and firm is an important basis for understanding the mechanism of action between quality innovation and influence factors, which is important for the development of quality innovation theory [7]. Qi et al. proposed that the link in the industrial chain where the firm was located and the external competitive environment of the market influence the behavioral choices made by the firm in performing quality innovation [8]. Li further proposed on this basis that the intensity of competition among the upstream and downstream enterprises in the industrial chain had an impact on the quality innovation performed by enterprises [9]. Cheng systematically analyzed the origin, development history, and role mechanism of quality innovation theory, and constructed a quality innovation strategy framework [10].

3. Quality Innovation of High-tech Enterprises

3.1. Connotation of Quality Innovation of High-tech Enterprises

With the current increasingly fierce competition in quality, enterprises are constantly seeking innovation in the process of quality management, and quality innovation is gradually arousing attention in high-tech enterprises [11]. Quality innovation is the expansion and extension of quality management, and as an important part of quality management, it has an important impact on the survival and development of enterprises to a certain extent [12]. The main content of quality

management lies in the continuous change of the enterprise's objectives, business scope, operation methods, in order to meet the explicit and implicit needs of internal and external users of the enterprise. Studied in a literal sense, the mutual integration of quality and innovation constitutes quality innovation in high-tech enterprises [13]. High-tech enterprises carry out quality innovation mainly through technology, management and other methods to meet the needs of relevant parties and achieve quality and efficiency improvement on the basis of improving inherent characteristics. The coordinated development of innovation in high-tech enterprises is an important link to enhance the comprehensive innovation capability of China. Quality innovation is the final expression form of innovation in product and service quality of high-tech enterprises, aiming to promote the transformation of scientific and technological achievements of high-tech enterprises. High-tech enterprises introduce management, technology, culture and other elements into the quality management paradigm, which can meet the changing consumer needs, thus realizing collaborative innovation, promoting the extension of product and service quality dimensions, improving the business performance of enterprises and promoting the development of high-tech enterprises [14].

3.2. The Significance of the Role of Quality Innovation of High-tech Enterprises

Quality innovation in high-tech enterprises emphasizes the technological content of the products and the innovation of the products themselves, and its core is to benefit customers, employees and society. While traditional quality management emphasizes the quality of the product itself, quality innovation highlights the specific types of products, functional size, design, and related services to meet the needs of customers, employees, and society [15]. Quality innovation is dedicated to improving the business performance of high-tech enterprises, using quality big data as the basis for analyzing quality innovation, quality technology and standard capability as important means for enterprises to carry out quality innovation, and entrepreneurship as the driving force for quality innovation, creating greater value through collaborative innovation and helping enterprises gain greater competitive advantage. Quality innovation of high-tech enterprises can reduce innovation cost and product error rate, improve product yield and product effectiveness, which in turn improves customer satisfaction and drives enterprises to gain favorable competitive advantages [16]. As a new idea and concept, quality innovation can lead to innovative development of high-tech enterprises, thus meeting the practical needs of high-tech enterprises and also conforming to the current new development trend of China [17].

4. Influencing Factors of Quality Innovation in High-tech Enterprises

4.1. Technological Innovation

At present, China attaches more and more importance to technological innovation, and the innovation behavior carried out by high-tech enterprises mainly lies in technological innovation [18]. The technology includes the technology introduced from outside as well as the technology independently developed within the enterprise, and the innovation of technology mainly includes the original innovation independently developed by the enterprise, the re-innovation based on the original technology as well as the introduced technology by the enterprise, and the integrated innovation after the aggregation of all the technologies [19]. High-tech enterprises, as technology-based enterprises, have a greater need for technological innovation, and technological innovation in order to achieve quality innovation in the enterprise contributes to the development of the enterprise innovation system. The greater the initiative of high-tech enterprises to carry out technological innovation, the more obvious the role of the impact on quality innovation is, which can promote the transformation and application of the enterprise's technological achievements. High-tech enterprises

increase R&D investment and independent innovation investment through technology introduction, technology purchase and technology research, thus improving the production efficiency of enterprises, reducing production costs, promoting the effective division of labor and cooperation among various departments within enterprises, and accelerating the process of quality innovation. Independent research and development has an incentive effect on quality innovation of high-tech enterprises. Through independent research and development will stimulate the innovative thinking of enterprises, so that they can produce high-quality products and improve their overall performance. High-tech enterprises continuously expand the pattern of production and management to promote technological innovation, extend the length of their production, broaden the breadth of the market, and improve the enthusiasm of their quality innovation.

Based on the above analysis, the following hypotheses are proposed.

H1: Technological innovation by enterprises is conducive to the development of quality innovation and has a positive impact on quality innovation.

4.2. Organizational Innovation

Unlike technological innovation, organizational innovation encompasses the design and marketing process of producing products, the process of division of labor and cooperation within the organization, the process of rationalizing the allocation and effective use of resources, and the process of implementing the organization's macro strategy. In the process of organizational innovation, the management adopts transformative and innovative policies to enhance the innovativeness of corporate activities. In addition, the recognition and support of organizational innovation can, to a certain extent, enhance the competitiveness of high-tech enterprises, thus effectively promoting the effective implementation of quality innovation in high-tech enterprises. Organizational innovation can motivate employees to carry out a variety of innovative activities, guide them to make breakthrough innovations, and improve the motivation of quality innovation. By creating an organizational innovation atmosphere, employees can reach an innovative cognition of the quality environment they live in. In the organizational innovation atmosphere, employees can generate more innovative ideas about quality, thus integrating the concept of quality innovation into their own work and effectively promoting quality innovation in enterprises. High-tech enterprises need to carry out quality innovation based on organizational innovation, and through the continuous cooperation and innovative development of various activities within the organization, the quality of enterprise products and services can be further improved [20]. In the process of production and operation, organizational innovation can effectively integrate the internal and external resources of the enterprise, improve the management process, organizational strategy and organizational structure by adopting new ideas or implementing new systems, enhance the innovation performance of the enterprise, and then promote the development of quality innovation in high-tech enterprises and finally achieve the organizational goals [21].

Based on the above analysis, the following hypotheses are proposed.

H2: Enterprises carry out organizational innovation is conducive to the development of quality innovation and has a positive impact on quality innovation.

4.3. Management Innovation

With the development of digitalization and informatization, under the background of the technological revolution represented by the Internet of Things, the focus of enterprise quality management gradually changes from process control to process innovation, and various elements such as knowledge, technology and culture are integrated into the quality management process of enterprises. Enterprises are gradually strengthening their management innovation, which is mainly

reflected in the reshaping and re-optimization of the internal system of enterprises for improvement. Effective quality management measures can promote the development of enterprise quality innovation [22]. Strengthening enterprise management innovation is an important choice to achieve sustainable development and can create important strategic opportunities for enterprises [23]. Enterprises improve their management systems by changing their organizational management style, which in turn changes their organizational structure, management practices, and management techniques to promote the development of management innovation. Management innovation involves the resource level, production process level, cost control level. It helps to guarantee the implementation of enterprise organizational strategy, improve the flexibility of enterprise management, reduce the sharing cost of resources, and improve enterprise performance. The elements of quality innovation include resources, technology, culture and system [24]. Management innovation promotes the coordinated development of these elements, which is conducive to standardizing the quality management of enterprises, guaranteeing the sharing of enterprise resources level, improving the production process level, and promoting the synergistic development of all aspects of the enterprise quality system. Management innovation can improve the flexibility and efficiency of organizational decision-making, reduce the cost of resource sharing within the organization, and help improve the innovation performance of high-tech enterprises and promote enterprise quality innovation.

Based on the above analysis, the following hypotheses are proposed.

H3: Management innovation by enterprises is conducive to promoting the development of quality innovation and has a positive impact on quality innovation.

4.4. Quality Culture

Quality culture is the endogenous driving force for the development of quality innovation in high-tech enterprises, and the construction, promotion and dissemination of quality culture and the stimulating effect of quality culture can promote the quality innovation of enterprises. Quality culture includes consciousness, quality concept, high quality thinking and high quality code of conduct. Quality culture is the way of thinking and activity formed by enterprises in quality practice. A good quality culture of high-tech enterprises can regulate the quality behavior of enterprises and improve the quality consciousness of employees, which can promote enterprises to better achieve quality goals and enhance the cultural soft power of high-tech enterprises. Quality is the baseline of enterprise development, and the continuous pursuit of quality culture can regulate the quality behavior of enterprise employees and lead the behavior of employees from the ideological consciousness. High-tech enterprises strengthen quality culture construction, which is conducive to enhancing the overall quality atmosphere of the enterprise. The employees need quality culture as the ideological support to carry out quality practice activities, and quality culture plays a normative role in the quality behavior of employees. The construction of quality culture in enterprises can enhance employees' attention to quality, make changes in their minds and improve their quality concepts, so that employees have a sense of quality mission. Quality culture is the concrete embodiment of the soft power of enterprise culture, which can guide the development direction of the enterprise and make the enterprise better to achieve sustainable development. Quality culture can positively motivate enterprises to carry out quality innovation and promote sustainable development of enterprises. Strengthening the quality culture of high-tech enterprises can promote the quality innovation of enterprises and make them develop better and faster.

Based on the above analysis, the following hypotheses are proposed.

H4: The creation of a good quality culture in enterprises is conducive to the development of quality innovation and has a positive impact on quality innovation.

4.5. Market Competition

Competition is the market norm faced by the development of high-tech enterprises. Good market competition can bring positive impact to enterprises, which can improve the quality of products and services, and is an important factor for quality innovation. Market competition will push enterprises to develop new technologies and update their products to enhance their competitiveness [25]. Competition faced by companies includes competition within markets as well as competition between markets. In the case of a large number of enterprises providing similar products, intra-market competition drives enterprises to improve quality while reducing the cost of producing products and the damage to the surrounding environment, and drives them to innovate in quality, so as to change the quality level of products and services and make them more competitive, and promote the improvement of enterprise innovation [26]. The stronger the market competition is, the greater the quality innovation of the enterprise. In the case of products sold in different markets, the competition among markets drives the enterprises to continuously improve the share of this market and to obtain a larger market with the help of quality innovation. The stronger the degree of market competitiveness, the greater the motivation for quality innovation, and the higher the possibility of developing innovative products, so that enterprises can gain a unique competitive advantage and expand their market share. Effective market competition can speed up the process of quality innovation, prompt enterprises to develop high-quality products, obtain low-cost advantages, improve their risk tolerance, and enable them to gain greater market prospects, which is conducive to their future sustainable development.

Based on the above analysis, the following hypotheses are proposed.

H5: Benign market competition is conducive to the development of quality innovation and has a positive impact on quality innovation.

5. Conclusions

Chinese economy has entered the new normal of high-quality development, quality and innovation are indispensable parts for high-tech enterprises to carry out high-quality development, and they influence and integrate with each other, and quality innovation theory is a further development of quality management theory, and by studying the factors that have an impact on quality innovation, we can gain an in-depth understanding of the influence mechanism and mechanism of action of quality innovation, which provides important support for the development of quality innovation theory, and provides important theoretical value for It provides important theoretical values for the quality management model of high-tech enterprises and the path of quality innovation realization. From the research process, it can be seen that five influencing factors, such as technological innovation, organizational innovation, management innovation, quality culture and market competition, can positively influence the quality innovation activities of high-tech enterprises and promote their quality innovation.

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