

Factors Influencing the Operational Performance of Innovation System of High-tech Enterprises

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Abstract: At present, technological change is accelerating, and the development of high-tech enterprises promotes the improvement of the overall economic level of the country. The operational performance of the innovation system of high-tech enterprises plays a key role in the innovation development of enterprises, and enterprises promote the synergistic evolution of the innovation system by improving the operational performance, and the operational performance is getting more and more attention in enterprises. Based on the perspective of influencing factors, this paper conducts an in-depth study on the operational performance of innovation system of high-tech enterprises, extracts five main influencing factors such as knowledge sharing degree, resource integration strength, organizational collaboration ability, organizational management ability, and breakthrough creativity, and then systematically analyzes the degree of influence of each factor on the operational performance of innovation system of high-tech enterprises and its mechanism of action, and finally draws conclusions for the follow-up. Finally, the conclusions are drawn to provide theoretical support for subsequent research. The study shows that five factors, including knowledge sharing, resource integration, organizational collaboration, organizational management, and breakthrough creativity, have positive effects on the operational performance of innovation system of high-tech enterprises, and the stronger the effect of the factors, the more beneficial to the improvement of the operational performance of innovation system of high-tech enterprises.

1. Introduction

Chinese economy has entered a critical period of high-quality development, and in the face of the fierce international economic competition, the report of the 19th National Congress requires enterprises to establish a market-oriented system of deep integration between industry, academia and research. The development of high-tech enterprises leads to the rapid development of Chinese economy, and the development trend of the country's internal and external economy further pushes enterprises to strengthen innovation, and the construction of an innovation system with efficient flow and allocation of production factors based on technological innovation becomes an inevitable

requirement for innovative development of enterprises [1]. The innovation system has become an important carrier for high-tech enterprises to carry out innovation activities, an important embodiment of their core competitiveness, and plays an important supporting role in the economic development of enterprises. As the owner of resources covering specific fields, an ecological chain exists within the innovation system built by high-tech enterprises, which promotes the effective operation of all elements within the system and the healthy development of the innovation system. However, while the economic level of high-tech enterprises is rapidly developed on the basis of the constructed innovation system, the degree of information sharing and coordinated operation within the organization is full of uncertainties, and the quality of service and product innovation are also problematic, and these potential risks are certain obstacles to the effective operation of the innovation system of high-tech enterprises, which cannot really improve the operational performance of the innovation system. Therefore, this paper can reflect the operation status of the innovation system more comprehensively through an in-depth analysis of the factors influencing the operation performance of the innovation system, so as to better improve the innovation capability of the enterprise and promote the long-term development of the enterprise.

2. Theory of Enterprise Innovation System

The components of the enterprise innovation system include human, financial, material, information, knowledge and skill elements [2]. In the innovation activities, the components of the system are interrelated, interact and integrate with each other, which have certain influence on the operation performance of the innovation system [3]. Within the innovation system, the enterprise sector is an important component. The external environment has an important influence on the healthy operation of the innovation system, and the enterprise sector makes appropriate adjustments to the system elements according to the changing internal and external environments, thus enhancing the resilience of the innovation system [4]. The ability of the enterprise sector to constantly adjust in the internal and external environment gives the enterprise a heterogeneous character, and this heterogeneity divides the enterprise into innovative, imitative and latecomer enterprises. In addition, the operation of the enterprise innovation system requires a series of organizational systems for restraint, which can directly or indirectly influence the regulating ability of the enterprise in the face of the internal and external environment, so that the enterprise activities can be carried out in an orderly manner, which has a certain support role for the enterprise innovation system and promotes the economic development of the enterprise. The operation of the enterprise innovation system also requires the support of external organizations, including government, universities, technology R&D centers, risk management companies, business organization associations. The support of these external organizations largely influences the organizational behavior and output of the enterprise, and has a propulsive effect on the continuous evolution of the enterprise innovation system. The association and interaction between enterprise departments and external organizations can generate cluster innovation, which can put the enterprise in a good innovation environment, strengthen inter-organizational interaction and learning, and have a positive impact on the operation of the innovation system. The market correlation between different production stages of enterprises and external technology alliances is large. This market correlation requires enterprises to strengthen the cooperation with external organizations to enhance their technological innovation and make their innovation system run effectively. And the non-market relevance requires interactive learning between enterprises and external organizations to make up for the deficiencies in the evolution of the innovation system.

3. Factors Influencing the Operational Performance of Innovation Systems of High-tech Enterprises

3.1. Degree of Knowledge Sharing

In the innovation system, each innovation subject inside and outside the enterprise collaborates with each other to collect, select, integrate and transfer the knowledge in the innovation system, and use and innovate it to form effective knowledge sharing within the system [5]. The evolutionary characteristics of knowledge sharing behavior in innovation system divide the knowledge sharing process into four stages, namely, initiation stage, learning stage, system stage and integration stage [6]. These four stages work together to promote the operational performance of the innovation system. The initiation stage of knowledge sharing mainly gathers complementary knowledge resources into the innovation system, and the enterprise integrates internal and external knowledge bases to build a knowledge collaboration network, forming an overall atmosphere of knowledge sharing within the system, allowing explicit and implicit knowledge to be transferred within the system, and enabling the knowledge resources of the internal departmental subjects of the enterprise to be complementary [7]. In the learning stage of knowledge sharing, the innovation system, as the medium of knowledge network, shares explicit knowledge and tacit knowledge within the system through document dissemination and manual training [8]. While enhancing the stock of knowledge, the flow of explicit and tacit knowledge further promotes the structuring and standardization of the existing knowledge, experience and technology level of the enterprise [9]. In the system stage of knowledge sharing, the innovation system orders the knowledge on the basis of knowledge standardization and forms the knowledge sharing cluster of the system, which is absorbed and utilized by the enterprise innovation system, thus realizing the spiral development of innovation performance [10]. The knowledge sharing integration stage can promote the integration of knowledge stock and flow, so that knowledge sharing can be deeply nudged [11]. As the degree of knowledge sharing increases, the more active the learning and sharing among subjects within the innovation system is, thus promoting the improvement of system operation performance and the development of the enterprise [12]. In response to the above analysis, the following hypotheses are proposed.

H1: The degree of knowledge sharing can directly improve the operation performance of innovation system of high-tech enterprises, and the higher the degree of knowledge sharing within the organization, the better the operation performance of innovation system. Therefore, the degree of knowledge sharing has a positive effect on the operational performance.

3.2. Resource Integration Strength

The development of innovation system of high-tech enterprises requires enterprises to carry out resource integration, and such resource integration runs through the whole process of enterprise innovation system. Resource integration theory is related to enterprise innovation theory and enterprise competition theory, and resource integration strength and resource integration efficiency can have an important impact on the operation performance of innovation system [13]. Effectively improving resource integration can stimulate enterprise innovation enthusiasm, improve the performance of innovation system, and then improve the competitiveness of enterprises [14]. Resource integration within the innovation system refers to the planning, coordination, management and optimization of resources in the innovation system, so that the resources can be better used in practice and the system's operational performance can be improved [15]. It is important to discuss the strength of resource integration to improve the utilization of resources within the innovation system. Resource integration can optimize the sharing platform of enterprise innovation system and

continuously expand the marketization and specialization of innovation system in space and function, so that enterprises can better position themselves in market coordinates. The innovation system of high-tech enterprises integrates scientific and technological resources at different levels and from different sources, thus making the resources more systematic and comprehensive and promoting the optimization of resources. The process of resource integration within the innovation system can bring into play the innovation motivation of enterprise researchers and guide enterprises to improve the operational performance of the innovation system. High-tech enterprises need the support of material resources to carry out scientific and technological innovation. Increasing the integration of resources can accelerate the progress of scientific research results, which is conducive to enterprises to put scientific research results into practical application and realize the scientific and technological value, and this enhancement of scientific and technological value can play a role in promoting the operational performance of innovation system, and the higher the scientific and technological value, the better the operational performance of the system. In response to the above analysis, the following hypotheses are proposed.

H2: The intensity of resource integration can directly improve the operational performance of innovation system of high-tech enterprises, and the greater the intensity of resource integration, the better the operational performance of innovation system. Therefore, the intensity of resource integration has a positive effect on the operational performance of innovation system of high-tech enterprises.

3.3. Organizational Collaboration Capability

Organizational collaboration ability of innovation system is important for enterprises to coordinate the interests of internal and external related parties [16]. By coordinating various departments, enterprises can effectively improve resource utilization, enable effective coordination and integration of various business processes and innovation links, meet the interests of all subjects in the system, promote the synergistic development of innovation system and improve operational performance [17]. As a necessary ability to coordinate innovation elements and innovation links, organizational collaboration capability can, on the one hand, optimize enterprise resource allocation and accelerate the process of collaborative innovation, and on the other hand, improve the cohesion of enterprise departments, integrate enterprise innovation knowledge, accelerate the process of enterprise technology research and development, and make the innovation links of enterprises tend to be standardized and industrialized, so as to improve the level of system operation performance and promote the synergy of enterprise system Innovation [18]. The mutual collaboration between different departments within the innovation system can promote the synergistic evolution of different innovation links, improve the mobility of scientific and technological resources, enhance the scientific and technological level of high-tech enterprises, facilitate the transformation of scientific and technological achievements, and enable enterprises to better carry out scientific and technological innovation activities. In addition, the mutual cooperation of different innovation links can effectively improve the output level of the innovation system, increase the flexibility of the organizational structure adjustment, make the organizational structure of the enterprise's innovation system adjust in the direction that is conducive to the improvement of operational performance, standardize the management of the internal departments of the innovation system, help the enterprise make accurate analysis of the external market, improve the coordination ability of the internal management agencies of the system, and thus accelerate the enterprise's innovation activities This will accelerate the speed of innovation activities, reduce the cost of innovation, and improve the operational performance of the innovation system. Therefore, based on the above analysis, the following hypothesis is proposed.

H3: Organizational collaboration capability can directly improve the operational performance of innovation system of high-tech enterprises, and the stronger the organizational collaboration capability, the better the operational performance of innovation system. Therefore, organizational collaboration capability has a positive effect on the operational performance of innovation system of high-tech enterprises.

3.4. Organizational Management Capability

High-tech enterprises are the key to enhance the competitiveness of science and technology, and the smooth implementation of enterprise innovation activities requires good organizational management capability to match them [19]. Organizational management capability includes organizational structure, management mechanism and organizational capability. In terms of organizational structure, an organizational structure that takes into account both daily operations and innovation activities can promote the development of enterprise innovation system and enable enterprises to carry out innovation activities better [20]. In terms of management mechanism, enterprises use advanced management paradigms to manage innovation activities and business activities in the enterprise system. In terms of organizational capabilities, management capabilities that are compatible with innovation activities enable better implementation of corporate activities. The improvement of organizational and management capabilities can promote the generation of scientific and technological achievements in high-tech enterprises and facilitate the operation of the enterprise innovation system. By using advanced management approaches, enterprises can enhance the professionalism of the enterprise innovation system, thus forming a long-term mechanism for good operational performance. A good management organization is a sign of a mature enterprise, and the establishment of the management system can enhance the ability of the enterprise innovation system to resist risks and improve the overall efficiency of the enterprise. In addition, the improvement of organizational management capacity can enable enterprises to obtain certain intellectual support, and enterprise employees can better participate in the production of products and services. Enterprises can make scientific production plans to further develop the market and promote the operation of the enterprise innovation system, so that the enterprise innovation activities can be carried out efficiently. In addition, the improvement of organizational management capability can strengthen the effective management of resources in high-tech enterprises, prevent the waste of resources and other phenomena, further reduce the various costs of enterprises, and improve the operational efficiency of the enterprise innovation system. Based on the above analysis, the following hypotheses are proposed.

H4: Organizational management capability can directly improve the operational performance of innovation system of high-tech enterprises, and the stronger the organizational management capability, the better the operational performance of innovation system. Therefore, organizational management capability has a positive effect on the operational performance of innovation system of high-tech enterprises.

3.5. Breakthrough Creativity

Breakthrough creativity is an important source for high-tech enterprises to gain competitive advantages, different from the existing practical activities of enterprises, and is a new idea and activity to carry out the development behavior of enterprises [21]. Breakthrough creativity is mainly manifested as novelty and unfixeness, and this novelty and unfixeness will promote the generation of innovative thinking of enterprises and make them have core competitiveness [22]. Breakthrough creativity of enterprises can help enterprises reconstruct the competitive ecological field, prompt them to continuously improve the current situation, create more business opportunities

for enterprises, and thus make them have core competitive advantages. Breakthrough innovation refers to the process of producing products, providing services, developing business models or management styles, deviating from the existing mindset and using a large amount of new knowledge to carry out the enterprise's technical activities or open up new markets, thus having a positive impact on improving organizational performance. Breakthrough creativity generates value in a way that is different from the value generated by the company's existing products and services. This creativity is based on a completely different level of technology, creating new products and processes for the company and driving the operation of its innovation system. Breakthrough creativity is both technical and market creativity. Based on existing knowledge and capabilities, enterprises develop business models that are different from existing products or services, make further breakthroughs in existing technologies, and carry out breakthrough innovation from both technical and market dimensions. Based on the innovation system operational performance perspective, breakthrough creativity can promote the performance characteristics of a company that are different from previous products or services, giving the company a unique advantage. This breakthrough creativity deviates from the existing capability of the organization and can significantly improve the system operation performance and enhance the competitive advantage of the firm. Based on the above analysis, the following hypothesis is proposed.

H5: Breakthrough creativity can directly improve the operational performance of the innovation system of high-tech enterprises, and the stronger the breakthrough creativity, the better the operational performance of the innovation system. Therefore, breakthrough creativity has a positive effect on the operational performance of innovation system of high-tech enterprises.

4. Conclusions

Under the social wave of rapid development of information technology, innovation plays an important role in economic development and social progress, and the technology-based economy, as an important force to promote Chinese economic development, how to improve the operational performance of innovation system of high-tech enterprises has become a common concern in academic circles. By studying the factors influencing the operational performance of innovation system, this paper can provide an in-depth understanding of the influence mechanism and mechanism of action of innovation system of high-tech enterprises, and provide important support for the development of innovation system theory. From the research process, it can be seen that the degree of knowledge sharing, resource integration strength, organizational collaboration ability, organizational management ability, and breakthrough creativity can positively influence the improvement of innovation system operation performance, and give full play to the role of these influencing factors in promoting innovation system operation performance, enhancing enterprises' own advantages and helping them to develop firmly. In addition, the research on innovation system performance in this paper is limited to the overall level, and some micro factors may be ignored. In the future, a more detailed research on innovation ecosystem performance can be conducted by constructing a comprehensive system of influencing factors.

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