Academic Journal of Science and Technology
ISSN: 2771-3032 | Vol. 5, No. 2, 2023

Research on the Relationship between Innovation Path and Enterprise Performance

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Abstract: The theory and practice of modern economic development has shown that the path of innovation is critical for the performance of high-tech enterprises. Based on the existing research results, this paper discusses the evolution mechanism of the innovation system, builds the corresponding theoretical model, and takes the relevant electronic information enterprises as the background, uses the survey data to conduct comparative analysis, and forms certain conclusions. The findings show that the independent innovation pathway has a greater impact on business performance. The research of this paper has a strong theoretical and practical significance, and provides management insight for business decision-making in industrial clusters and innovation pathways.

Keywords: Innovation Path, Enterprise Performance, Path Dependency.

1. Introduction

Schumpeter(1912) suggested the economics of innovation, stressing that "innovation is the engine of an organism's economic development" [1]. With the increasingly prominent status of the knowledge economy, especially under the slowdown of global economic development since the epidemic, the circular economy theory on innovation paths and sustainable development has become the focus of attention of academic circles at home and abroad. The world is currently experiencing a new cycle of technological change and a critical period of industrial renewal. Application innovations such as cloud computing, artificial intelligence, and the Internet of Things are emerging one after another, which has had a profound impact on the production methods and thinking habits of human society.New industries, New energy and New situations will surely become the main factors affecting economic development. For a large organization such as a country, innovation is productivity, on which businesses count to be strong and the country to be prosperous. Adhering to independent innovation is the core of China's construction of a strong country in science and technology, and self-reliance and self-improvement in science and technology are regarded as an important strategic support at the national level.

For a company, innovation is the fundamental support and the driving force behind its core competence. Companies worldwide are constantly looking for innovative forms tailored to their own development to improve their performance and gain opportunities in the fierce competition of the market. As a complex system engineering, the enterprise organization system is difficult to construct a model through several variables to describe the operating rules of each subsystem. Field interviews and surveys must be conducted to reveal the relationship between various parameters and variables in the clustering process of electronic information enterprises. This kind of research idea is to base the production activities of enterprises on the basis of self-organization theory, and use competition or cooperative cooperation strategies to allow enterprises to adapt to the external environment through continuous innovation or organizational change.

2. The Connotation of Innovation and the Pathway to Innovation

2.1. The Connotation of Innovation

From the perspective of early marketing, innovation generally refers to the transformation of original products, innovative designs and processes, upgrading and updating sales channels, and adopting new business strategies and means of competition, thereby occupying the product market. American economist Joseph Schumpeter put forward the "creative destruction theory" to explain the real root of economic development-innovation , emphasized the importance of changes in production technology and methods, and continuously enriched the connotation of innovation , the specific content includes the following aspects:

Joseph Schumpeter (1934) explained the concept of innovation from the perspective of macroeconomics, closely linked innovation and innovation management with the development of the current external economy, extended from product innovation to the production process and enterprise management organization, effectively Expanded the connotation of innovation. On the basis of this research, many scholars put forward a more complete concept starting from the enterprise innovation system, and believed that innovation has multi-dimensionality. (Damanpour, 1991) defined innovation from points of view, and divided innovation into two categories: marketing innovation and managerial innovation [2]. Marketing innovation mainly refers to the adoption of a new marketing concept or marketing strategy that has never been used before, mainly covering product (service) design or packaging, product (service) promotion, product (service) pricing, and product (service) sales channels. The scope of business management innovation is broader, involving internal organisation innovation, technological innovation, enterprise culture innovation, strategic innovation and external environment integration innovation. Later, some researchers discussed in detail production technology and production methods in managerial innovation. To produce

new products, it is necessary to study the entire organisational system of the company, to innovate production technology, production technology and production methods, and to rethink business processes.

It can be seen from this that scholars have jumped out of the dilemma of tightly focusing on the product level, and have begun to think about issues from the perspective of corporate organizational structure, management system, operational efficiency, and external collaboration. Business development will no longer be seen in isolation, but the sustainability of business innovation will be seen in a holistic way. At present, the debate about the connotation of innovation continues to deepen, particularly in the ever-accelerating flow of innovative elements such as product design, technological innovation, knowledge and capital. Maintaining the sustainability of innovation has long been an important issue for enterprise organizations. Therefore, the competition among enterprises has shifted from the traditional resource element competition to the competition among supply chains, that is, the competition and cooperation relationship between enterprises must also be innovated. The cooperation between enterprises and organizations should shift from the traditional cooperation mode of general product sales and lower transaction costs to innovative forms such as supply chain collaboration, network organization, virtual enterprise, and international strategic alliance.

2.2. The Connotation of the Innovation Pathway

"Path" has different meanings in different disciplines. Generally speaking, the "path" mentioned in the dictionary refers to the current road or direction, and the innovation path refers to the company's use of its own accumulated experience in order to improve performance and knowledge base to achieve the expected goals of technological innovation and management innovation. The innovation path has the characteristics of multi-dimensional, multi-level and outreach, and is a complex system. The innovation path needs a carrier to realize its function. The specific carrier mainly includes the innovation subject, the innovation object and the innovation support system, as shown in the figure. Among them, the subject of innovation is composed of organizations such as individual enterprises, government departments, and scientific research institutions; the object of innovation is composed of internal elements such as enterprise knowledge base, system, technology, management, market, and organization; the support system generally refers to the external environment, usually Covers factors such as policy and legal environment, financial institutions, intermediary organizations, and geographical environment.

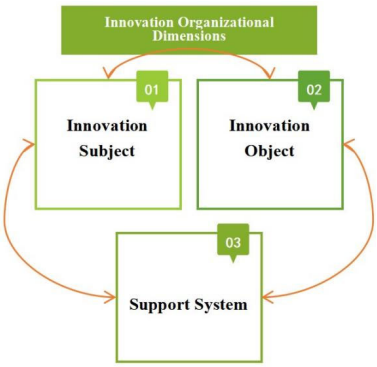

Figure 1. Dimensions of Innovation Organization

Based on the product life cycle theory, (Abernathy & Utterback, 1978) expounded the relationship between technological innovation and organizational innovation from the perspective of product design and production process, and constructed an evolution model of enterprise organizational system innovation. The path of technological innovation is dominant and receives external Environmental influences and constraints [3].

2.3. Innovation Path Evolution Process

Through empirical research, (Linsu, 1997) believes that the technological leap of individual enterprise organizations starts from learning and imitating excellent enterprises around them, and then forms their own technical knowledge base [4]; (Katsuhito, 2000) believes that the factors for the success of enterprise technological innovation are not limited to imitation and learning, but more It is a spontaneous behavior with mutual cross-influence [5]; (Nelson & Winter, 2002; Schmoch, 2007) research shows that the change in corporate organizational structure is the result of the game between the two companies. When both players in the game choose the same innovation path, both parties enter into cournot competition, facing the same endowment supply of human resource elements, material and information resources, the degree of knowledge spillover between enterprises is equal, and the evolution model of the innovation model at this time follows the path of the double hump model [6-7].

2.4. Path Dependence Theory

Technological innovation is the magic weapon for an enterprise to win in the market, and a knowledge base has been formed in the long-term business activities, which reflects the organizational behavior and scientific research technology of the enterprise; and has a certain stability. Once an enterprise chooses a routine path, under the influence of self-learning effect, external economic effect, and self-adaptation, the routine will be continuously strengthened, and the development path will be locked (Dosi, 1997; Peter, 1994) [8-9]. After a period of accumulation and precipitation, tacit knowledge generates an innovation system in the form of knowledge spillover, specifically including four levels: system, technology, market, and organization. Path dependence helps enterprises achieve leapfrog development. Through imitation learning, technology catching up with advanced enterprises, and using technical means such as big data and Internet +, to achieve the management goal of a latecomer advantage (Teece, 1986; Malerba, 2006) [10-11].

3. The Relationship between Innovation Path and Enterprise Performance

Regarding the relationship between innovation and corporate performance, many scholars at home and abroad have conducted discussions. According to existing research results, companies can indeed effectively improve corporate performance by choosing an effective innovation path. Taking domestic electronic information companies in the Yangtze River Delta and Pearl River Delta regions as samples, Chinese scholars used questionnaires to collect data and established an empirical model to verify that innovation paths have a significant positive effect on corporate performance. Through empirical analysis, the following conclusions are drawn: first, the innovation path can enhance the product or

competitiveness of the innovation subject, and better meet customer needs; second, it can accelerate industrial agglomeration and promote the development of enterprise alliances in the supply chain , to form a regional innovation platform; thirdly, choosing the right innovation path not only allows enterprises to adapt to the external market, but also reduces game risks. In a fully competitive market environment, it is assumed that there are several enterprise groups producing the same product A in the market: the advanced enterprise group Xenterprise and the relatively backward enterprise L, and the output of the advanced enterprise X in a certain period is determined in advance as Q_X, the output of the backward enterprise group L is Q_L, and the price of the product is P. If the innovation path chooses learning imitation instead of independent innovation, the marginal cost is a. If the innovation path type is inclined to independent innovation, the marginal cost of the product is respectively e and f.

3.1. Imitative Innovation Path

The enterprise performance benefits of the two types of enterprise groups are denoted as U_{XS} and U_{LS} respectively. Here, the performance scale of the two types of innovation subjects is:

$$\mathrm{U_{XS}} = \mathrm{Q_X(P} - e) = -\mathrm{Q_X}^2 - \mathrm{Q_X Q_L} + \mathrm{bQ_X} - e\mathrm{Q_X} \quad (1)$$

$$\mathrm{U_{LS}} = \mathrm{Q_X(P} - f) = -\mathrm{Q_L}^2 - \mathrm{Q_X Q_L} + \mathrm{bQ_L} - e\mathrm{Q_L} \quad (2)$$

Equation (1) is derived with respect to Q_X,$\mathrm{Q_X} = \frac{1}{2}(\mathrm{b} - \mathrm{e} - \mathrm{Q_L})$ Substituting the result into formula (2), and then taking the derivative Q_L, we can get $Q_L = \frac{b}{2} + \frac{e}{2} - f$, $Q_X = \frac{b}{4} - \frac{3e}{4} + \frac{f}{2}$, and substituting $\mathrm{Q_X}$ and Q_L into the original formula, we get,

$$U_{XS} = (\frac{b}{4} - \frac{3e}{4} + \frac{f}{2})^2 = \frac{(b-3e+2f)^2}{16} \quad (3)$$

$$U_{LS} = \frac{(\frac{b}{2} + \frac{e}{2} - f)^2}{2} = \frac{(b+e-2f)^2}{8} \quad (4)$$

3.2. Independent Innovation Path

Similarly, assuming that the corporate performance benefits of the two types of enterprise groups are expressed as UXS and ULS respectively, in this case, the performance scales of the two types of innovation entities are:

$$U_{XS} = Q_X(P - a) = -{Q_X}^2 - Q_X Q_L + bQ_X - aQ_X \quad (5)$$

$$U_{LS} = Q_X(P - f) = -{Q_L}^2 - Q_X Q_L + bQ_L - fQ_L \quad (6)$$

Equation (5) derivative to Q_X , $Q_X = \frac{1}{2}(b - a - Q_L)$Substituting this result into formula (6), and then taking the derivative with respect to Q_L ,calculated: $Q_L = \frac{b}{2} + \frac{a}{2} - f, Q_X = \frac{b}{4} - \frac{3a}{4} + \frac{f}{2}$, and substituting A and B into the original formula, we get,

$$U_{XS} = (\frac{b}{4} - \frac{3a}{4} + \frac{f}{2})^2 = \frac{(b-3a+2f)^2}{16} \quad (7)$$

$$U_{LS} = \frac{(\frac{b}{2} + \frac{a}{2} - f)^2}{2} = \frac{(b+a-2f)^2}{8} \quad (8)$$

Through empirical analysis, the research results show that both the independent innovation path and the imitative innovation path have a significant positive impact on enterprise performance, and there is a positive correlation between them, which is completely consistent with the reality. Eventually, the independent innovation path has a greater impact on the scale of enterprise performance and is more beneficial to the development of enterprises. Simultaneously, the key to improving independent innovation capabilities is to make enterprises truly become the main body of technological innovation and take measures to promote enterprises to improve their innovation capabilities. No matter which innovation path an enterprise organization adopts to conduct innovation activities, it will produce new performance. After the knowledge is absorbed by the enterprise, it will be added to the new knowledge base, and will continue to spread in a virtuous circle, promoting technological development and improving enterprise performance. It can be seen that choosing the right innovation path can improve enterprise performance faster.

4. Countermeasures to Improve the Ability of Independent Innovation

4.1. Unswervingly follows the path of independent innovation

Adhering to scientific and technological innovation can only take a road of scientific and technological innovation that suits China's national conditions. In the report of the 18th National Congress of the Communist Party of China, Xi Jinping emphasized that China's scientific and technological innovation must unswervingly follow the path of independent innovation; and specified the inevitable path of scientific and technological innovation. China's path of independent innovation has the following two advantages: First, give full play to our country's institutional advantages. The second is to uphold the fine tradition of self-reliance. We must persist in promoting system innovation through theoretical innovation based on practice, uphold and improve the existing system, proceed from reality, seek truth from facts, closely focus on the direction of socialist development, formulate some new systems in due course, and build a complete system, scientific norms, and effective operation institutional system.

4.2. Establish a systematic Self-organization Innovation System

The self-organization theory holds that to build a balanced system with stable development, an enterprise organization must have the conditions of system openness, nonlinearity; fluctuation and imbalance. The above content has analyzed the self-organization operation mechanism; and proposed that the enterprise organization should respond to the fierce external competition market according to the needs of social development, adjust the innovation path in real time, and focus on the development policy of competition and cooperation. That is to say, the government plays a leading role from the beginning to end, providing scientific and technological service platforms, incentive policies and guarantee measures, creating a good atmosphere for competition, cooperation and interaction for enterprises, universities and scientific research institutions, and

promoting enterprises to strengthen their independent scientific research capabilities and make breakthroughs in key technologies. System innovation is the source of innovation, and system innovation is the premise to ensure core competitiveness. The government is the promoter of innovation, forming a good atmosphere and institutional environment to encourage and support independent innovation from the aspects of system reform, mechanism improvement, policy preference, talent introduction, and efficiency construction. For example, Shenzhen's achievements in innovation are because the government has always focused on independent innovation, always serving enterprises; and focusing on the four aspects of R&D institutions, scientific and technological personnel, R&D funds, and patent applications. It is also because its scientific and technological systems, policy systems and incentive mechanisms are constantly innovating and advancing with the times, which has greatly improved the innovation enthusiasm of entrepreneurs and the majority of scientific and technological workers; and created a good business environment conducive to the growth and development of innovative achievements.

4.3. Build a strategic Cooperation Alliance of Industry, University and Research

The industry-university-research cooperation model refers to leading enterprises and scientific research institutions to conduct innovation activities through the research and development platform provided by the government. The specific cooperation modes mainly include: the enterprise directly purchases the technology of universities or research institutes; the mode of joint research and development by enterprises and scientific research institutes; Finally, jointly cultivate talents, fund various scientific and technological talent plans, and encourage the transformation of outstanding scientific and technological project achievements.

5. Summary

Economic development theory and practice have proved that innovation has an important impact on the performance of enterprises. Basis on the existing research results, this paper discusses the connotation, evolution mechanism and classification of innovation paths, and constructs corresponding theoretical models. Simultaneously, based on the calculation and analysis of enterprise data, certain conclusions have been formed. The results show that enterprises advocating the independent innovation path can obtain high-quality resources to the maximum through the competitive mechanism; and obtain the dominant position in the market by using survival of the fittest; while the imitative innovation path is difficult to obtain breakthrough technologies in a short time, and may be eliminated at any time. Therefore, independent innovation paths have a greater impact on firm performance. The research of this article has strong theoretical and practical significance; and provides management enlightenment for the decision-making of enterprises in industrial clusters and innovation paths.

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