



The Paths of Enterprises Independent Innovation Based on Products Upgrade

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Abstract

On basis of the interactive relationship between products upgrade and independent innovation, the possibility of the paths of enterprises independent innovation based on products upgrade are studied. Then, four directions of products upgrade further and the paths of enterprises independent innovation are brought out. Finally, the paper analyzes the impact of the quality of entrepreneurs, R & D personnel, the level of effort, and the incentive mechanism on the paths of enterprises independent innovation based on products upgrade.

Keywords: The accumulation of knowledge, Products upgrade, Independent innovation

1. Introduction

The ability of enterprises independent innovation is the basic of the capability of our country independent innovation. It affects our country's comprehensive national strength and economic security. However, compared with developed countries, our enterprises are lack of the ability of independent innovation and lack of the core technologies with independent intellectual properties. The fund of R & D intensity is more than 2% in the most developed countries and it is even more than 4% in Israel in 2007. It is an important guarantee for innovation capability under a high level of R & D input intensity in these countries. However, the fund of R & D intensity is only 1.49 percent in China. It is a large gap between China and developed countries. It results in that our enterprises are lack of necessary accumulation of knowledge for independent innovation because they don't have enough R & D fund in China. So how to improve the capability of independent innovation of our enterprises is a question which needs to be solved immediately.

In terms of independent innovation, some scholars have studied the path of enterprises' transformation from introducing advanced technology to independent innovation. Zhang Xiao-juan(2003) argues that we can enhance the industry technological level and innovation capability on the basic of making full use of external technical resources through the ways of "bringing in", "going out" and more new resources organization (JIANG X J., 2004). Song Yun and Zeng Jin-ze (2007) analyze enterprise technology study from the four areas: technology trajectory, absorption capacity, technology transfer and dynamic study and they find the required time that enterprises change from imitation innovation to independent innovation is decided by the effect of enterprise study and absorption capacity (SONG Y and ZENG J Z., 2007). Qian Jin (2006) consider state-owned enterprises must set up long-term investment mechanism and ensure that there are some main characters in a research teams before realizing independent innovation (QIAN J., 2006). Xie Xue-mei and Zeng Sai-xing (2008) debate it is the most important internal fact of lacking high-quality technical personnel that restricts enterprises independent innovation by the way of questionnaire and focused interviews (XIE X M and ZENG S X., 2009). Bi Ke-xin and Li Bo-zhou (2007) find it is one of most important ways for manufacturing to enhance the capability of independent innovation if enterprises can make products innovation and processes innovation concerted development (BI K X, SUN D H, and LI B Z., 2008). Ji Jian-yue et al (2007) argue that our electrical appliance enterprises should cultivate core competitive strength on R & D capability, manufacturing capability,

marketing capability, input innovation resources and management innovation five fields through analyzing the capacity of independent innovation of Hisense Group (JI J Y, GUO C J and ZHANG Z L., 2006). From the perspective of products upgrade, we will discuss suitable paths of independent innovation for our enterprises.

2. The interactive relationship between products upgrade and independent innovation

The basic skills, experience and the capacity of continuing improvement play a very important role during the capability of enterprises independent innovation being formation. Products upgrade can help fully accumulate basic technology and effectively exert the advantage of enterprises' resources and capabilities. So it is conducive to change unfavorable situation that our country has been neglected to accumulate basic technology for a long time during products upgrade (MAO Y S and WANG J C., 2006). There are following advantages for independent innovation based on products upgrade.

2.1 Reduce innovation risk and improve the rate of innovation's success

There are 4 innovation risks that enterprises are facing: technology risk, market risk, management risk and the external environment risk. Because the producers of enterprise do not identify the potential the demand of consumers clearly, their productions of innovation may not be recognized by the consumers. It increases the risk and the difficulty when the productions of innovation are put on the market. However, the independent innovation based on products upgrade can reduce market risk and improve success rate, because there are lots of similarities between the products that have been upgraded and the original products, even they use the same core technology. Besides products upgrade is only to update the technology partly, and extend new features.

2.2 Alleviate the pressure of market competition

The essence of products upgrade is to increase products differentiation between our company and our competitor, and increase our products' advantage such as cost, function, features and so on. The more products differentiation is, the higher the price will be. So we will get more profits and we will avoid getting into the trouble of price war. Haier designs the Oxygen Bar air-conditioning in 2003 by products upgrade, in order to meet consumers' needs at the same time avoid the occurrence of air-conditioned disease. Haier avoids price competition among the competitors and enjoys high profits by products upgrade.

2.3 Fully use existing resources and improve products' value-added

Because the products which have been upgrade are similar with the original products, on the production side we can purchase the same raw materials, and use the similar technology to manufacture productions. On the market side we have similar clients, the same distribution channels, and the same management skills. These have contributed to share resources, receive enormous economies of scale, and reduce overall operating costs.

At present, most industries of our country, including some high-tech manufacturing, still belong to low-value-added industrial value chain. However, it is obvious that the essence of products upgrade is to enhance the original products' value. So we can change the status quo that our country enterprises' products are low added value and promote industrial structure upgrade by the independent innovation based on products upgrade.

2.4 Guide the consumers' needs; stimulate the development of related industries

Compared with the original products, the products that have been upgraded have more advantages. Consumers are more inclined to purchase products which have been upgraded, when there is little difference in terms of price. So it plays a role of leading consumers' needs. At the same time, the sale of enterprises that have realized independent innovation based on products upgrade tends to increase. So it makes enterprises to expand their current production scale to cope with the increased products sale. Finally enterprises expand the procurement of raw material and the increase of raw material will directly drive the development of upstream enterprises.

3. The path of independent innovation based on products upgrade

Integrating the existing literature on the models of independent innovation (FORBES N and WIELD D., 2001), we bring forward the path of independent innovation based on products upgrade (Figure 1). Generally, the path of enterprise independent innovation based on products upgrade includes 3 phases: accumulation of knowledge → products upgrade → independent innovation. Specifically, the path of independent innovation based on products upgrade, involving 4 kinds of accumulation of knowledge combinations and 4 kinds of products upgrade combinations.

3.1 Accumulation of knowledge

The accumulation of knowledge is that enterprises allocate internal knowledge and resources, absorb external knowledge, integrate and activate the internal knowledge and resources to generate new knowledge in order to enhance the capacity of products upgrade. Enterprises with R & D strength may cooperate with the domestic technology to accumulate knowledge and realize innovation on the basic in-house R & D. If they encounter problems that they can not solve by themselves, enterprises can introduce, digest and absorb advanced technology and then realize the goals of

knowledge accumulation and innovation. All in all, the ways that enterprises acquire knowledge include: enterprise in-house R & D (joint R & D) + domestic technology cooperation; enterprise in-house R & D (joint R & D) + domestic technology cooperation + introduction, digestion and absorption technology; enterprise in-house R & D (joint R & D) + domestic technical cooperation + introduction technology + in-house digestion and absorption technology; enterprise in-house R & D (joint R & D) + introduction technology + cooperative digestion and absorption technology.

3.2 Products upgrade

As mentioned above, products upgrade plays a role of reducing R & D risks during enterprises' independent innovation, and the direct performance of products upgrade includes expanding the features of existing products, enhancing quality and life of products, making leading products design and reducing the cost of production and use.

Expand the features of existing products. Existing products have been recognized by markets and products upgrade is only to expand existing products' feature. So it will not change its core technology and improve the rate of innovation's success. For instance, Newman has been developed two MP3 product lines with features of flash memory and hard drive, more than 40 kinds of products through expanding products' additional features. These products have different additional features, suitable for different types of consumers, which make Newman become the preferred MP3 brand in China.

Insert Figure 1 here

Enhance quality and life of products. High products' quality and long service life will bring a brand effect to consumers. If an enterprise can improve its products' quality and extend its products' service life, its products will be able to bring a high-quality effect to consumers, gradually become a brand in the industry. Then the enterprise will be more competitive strength and gain more profit in the long run.

Make leading products design. The so-called design is to do everything possible to make a product conceptualization and have ideal characteristics. These characteristics correspond to different level of factors, including aesthetic factors that correspond to the emotion, as well as the performance factors that correspond to function. A new design requires "the match between technology and market" (CAO L S and JIANG Y., 2006). The products designed finely can be distinguished from other similar products easily, and consumers have a preference for them, so the products designed finely can enhance consumers' loyalty, in other words they can enhance the profitability of enterprises.

Reduce the cost of production and use. In the same market, if the substitutes' quality and performance are almost the same, price becomes competitive advantage in the market. However, the factor that decides price is production cost. So, enterprises can take measures to upgrade products to control production cost in order to reduce products' price. In the consumer's point of view, reducing products' use cost is very important. If the product has a long service life, consumers will choose the product with low use cost even if it has a high purchase cost.

3.3 Independent innovation

Enterprises have enough knowledge, and a certain amount of R&D strength, they can achieve independent innovation based on four kinds of products upgrade. If an enterprise brings products upgrade into effect successfully, and products have been recognized by consumers in the market, the enterprise's independent innovation is successful. In contrast, enterprise's independent innovation is a failure. At this moment, the enterprise should identify where the problem of the independent innovation is.

4. The effect of independent innovation's factors

4.1 The quality of enterpriser

Entrepreneurs are the core of independent innovation, so the capacity of entrepreneurs' technology identification, the ability of combining the technology factors with management, capital, business and other factors effectively are the key to the success of enterprises' independent innovation (HAN L M and ZHAO X H., 2006). If an entrepreneur has a nicer sense of innovation, he will be able to create a good atmosphere for independent innovation in the enterprise, and he can lead his employees to transform the invisible pressure of market competition into products upgrade's power. If an enterpriser can constitute a scientific innovation strategy, and grasp the direction of products upgrade, he will enhance the rate of independent innovation's success.

4.2 R & D personnel

R & D personnel are very important to the capability of enterprises' independent innovation. Not only they relate to the accumulation of knowledge, but also relate to the products upgrade. Although the number of R & D personnel increases every year, however, the ratio of R & D personnel in every ten thousand people in large and medium-sized industrial enterprises is still very low. Averagely, there are only 85.8 R & D personnel in ten thousand people in 2007. It is shown that the lack of R & D personnel has become an enormous obstacle to enterprises' innovation. Therefore, the government and enterprises should take active measures to attract technical talents and promote enterprises to build an

effective human capital management system as soon as possible.

4.3 The level of effort

The level of effort has an effect on studying knowledge, especially on tacit knowledge. So it is very important of the level of R & D personnel's effort to the capability of enterprises' independent innovation. If our enterprises' R & D personnel all have a very high level of effort, then, whether in the accumulation of knowledge or products upgrade, Our enterprises will shorten the gap with advanced foreign enterprises.

4.4 The incentive mechanism

The incentive mechanism can improve R & D team's efficiency of learning and innovation and affect the ability of enterprises' independent innovation. We can also set up performance appraisal system. In accordance with the performance of employees, enterprisers take positive incentive and negative incentive combined measures to give the excellent staffs material and spiritual rewards, and punish staffs with bad quality by the bottom elimination system. Lenovo is a company which implements performance appraisal system and failed staffs in the examination will enter the district of bottom elimination. Meanwhile, Lenovo also cultivates reserve cadres in order to replace failed staffs. In this incentive system, every employee of Lenovo must do their best to avoid entering the district of bottom elimination. It plays a very important role in the development of Lenovo.

5. Conclusion

With increasing competition, enterprises must learn independent innovation in order to survive. Independent innovation is an essential way to cultivate enterprises' core competition strength. Facing with the situation of our enterprises lacking of independent innovation, we analyze the interactive relationship between products upgrade and independent innovation, then we bring forward paths of independent innovation based on products upgrade and analyze every aspect of the paths of independent innovation. Finally, we talk about the effect among entrepreneurs' quality, the number of R&D personnel, the level of effort and incentive mechanism on independent innovation based on products upgrade.

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