

Internal Obstacles and Motive Sources of Technological Innovation for Saudi Enterprises

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Abstract: In order to deeply understand the source and impact factors of technological innovation for Saudi enterprises, this research analyzes the obstacles and motive sources of enterprise technological innovation. Moreover, an integration model of examining technological innovation motive factors is constructed from three major systems: enterprise, society and market. It can be found that besides profit expectation is the main factor influencing technological innovation motive, there are also other significant impact factors such as enterprise resources, competitors and entrepreneurs' innovative thinking.

Keywords: technological innovation, internal obstacles, sources of motive, integration model

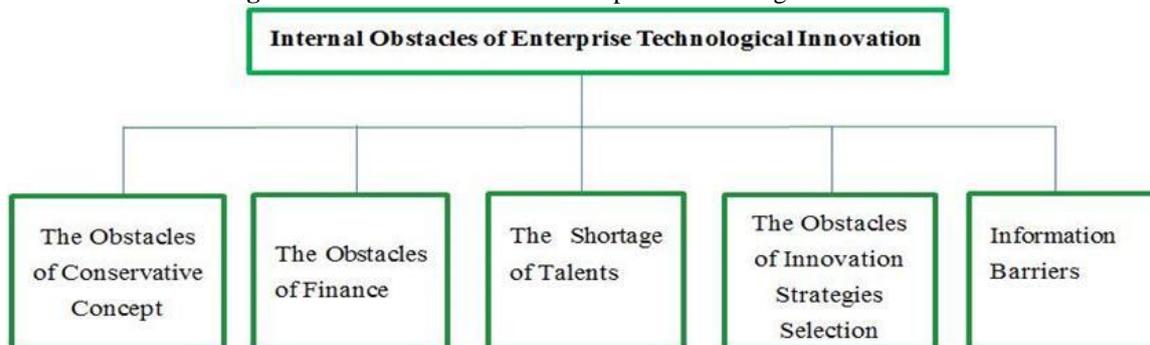
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I. Internal Obstacles of Enterprise Technological Innovation

A large number of empirical studies on internal barriers to technological innovation in enterprises show that innovation practice is a risky activity. And there is an empirical data law called thumb law. That is, a lot of innovative activities were eventually suspended or failed due to various factors, and the actual success rate was only between 12% and 20%. So, what are the factors that hinder the deepening of innovation activities? This research considers that the main obstacles to technological innovation of enterprises are their internal environment (see Figure 1 below).

Figure 1 Internal Obstacles of Enterprise Technological Innovation



(1) The Obstacles of Conservative Concept

Owing to the effect of traditional ideas, many enterprises do not have a strong concept of marketing economy and do not realize that technological innovation is the key factor for the survival and development of enterprises. A considerable number of operators in many Saudi enterprises lack the awareness of innovation and fear failure in the process of innovation. For example, their business ideas of quick success and instant benefits make them hesitate innovation. The excessively strong awareness of avoiding risks also makes companies worry about technological innovation. Furthermore, the conservative concept of enterprise innovation makes the innovation incentive system imperfect. The shortage of innovative talents is a serious problem as well. Meanwhile, there are still industries and fields with unequal competition across the kingdom. Many regions implement local protectionism and give support to local enterprises in excess of treatment. This makes some Saudi enterprises lack the pressure of competition and the motivation of technological innovation, and deepens their immanent awareness of unwilling to promote technological innovation, thus hindering the development of independent innovation of enterprises.

(2) The Obstacles of Finance

In the technological innovation process, R&D activities are in the core position. R&D funds are the main indicators to measure the investment of technology innovation. Many scholars believe that enterprises with R&D funds accounting for 1% of sales are difficult to survive, 2% can maintain the competitive situation, and 5% are very competitive. For many years, the proportion of scientific research expenditure accounting for sales income of large and medium-sized enterprises has been hovering around 1% in Saudi Arabia, while that of manufacturing industry in developed countries is around 2.5%-4.0%, and that of multinational companies in developed countries is around 5%. At the same time, financing has always been perplexed Saudi firms a lot. Take small and medium-sized enterprises (SMEs) as an example: in 2018, the loan amount of SMEs accounted for about 17% of the total loan amount in major commercial banks. SMEs have already faced severe problems such as "financing difficulties and rising costs".

(3) The Shortage of Talents

If the technological innovation is a lifeline of enterprise development, then talents are the key to innovation. However, Saudi enterprises are extremely short of innovative talents. This has become other aspect restricting the improvement of enterprises' technological innovation capability. Regarding the proportion of R&D personnel of each 10,000 labor force, Saudi enterprises are only 1/10 of those in Japan and Germany. Meanwhile, the lack of innovative incentive mechanism makes it difficult for the enterprise to attract innovative talents. Therefore, the vast majority of innovative talents are outside the enterprise. Moreover, some entrepreneurs adopt short-sighted behavior without strategic vision, cannot examine the value contributed by innovative talents from the perspective of long-term interests. In addition, entrepreneurs pay less attention to the cultivation, development and reserve of talents. The companies also do not provide enough R&D training, which makes many potential innovative talents lack opportunities for self-development. This leads to a large loss of talents in Saudi enterprises.

(4) The Obstacles of Innovation Strategies Selection

Many new enterprises can really develop rapidly in a short time by virtue of a creative scheme or a patented product at the beginning of their business. However, with the increase of enterprise scale and market share, the competition in the industry tends to intensify, and the product life cycle is getting shorter and shorter. When the growth stage of the product life cycle is declining and entering the mature stage, enterprises will face a difficulty in choosing the technology innovation strategy. For example, enterprises adopt the technology leading strategy and invest a large amount of funds in independent R&D for new products to maintain their dominant position. Or do companies imitate the innovation strategy of other marketing leaders, thus saving time and R&D investments and reducing innovation risks? Or do enterprises implement the leapfrogging strategy to acquire leading technology and catch up with even surpass the industry leaders?

(5) Information Barriers

Due to the lack of customer demand information and marketing information asymmetry, the cost and risk of new product development and technological innovation will increase. It is important for enterprises to timely master high-quality and scientific information, so that enterprises can understand and gain insight into the latest technology development of domestic and foreign competitors, and make quick responses. In fact, a large number of enterprises miss many opportunities for innovation because they cannot grasp the market information well. Some enterprises also cannot fully understand the forward-looking, feasibility and applicability of technical information, and they finally chose the most challenging R&D activities, resulting in huge investment. Heavy losses have led to the failure of innovation.

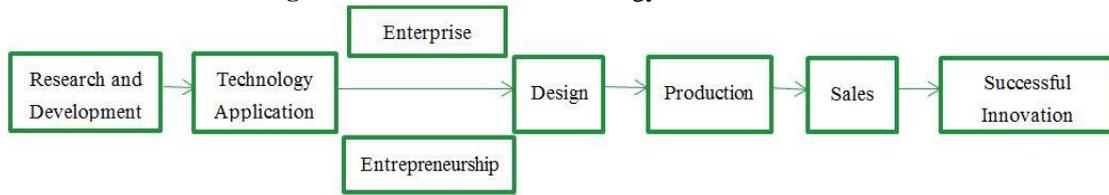
II. The Motive Source of Enterprise Technological Innovation

(1) The Impetus of Technology

The main source of technological innovation is R&D, followed by product or service design, production of new samples, sample tests, large-scale production, marketing and sales (see Figure 2 below). For example, the research and development of fingerprint identification technology was originally used in the criminal area to extract criminal evidence and determine personal identity information. With the continuous application of this technology, people have discovered its market value and applied it to many fields, including access security systems and clock-in system. The car driver identification system is also adopted this technology. The dynamic change of technology is not only a great driving force for enterprise's innovation, but also a big opportunity for the continuous innovation. On the one hand, the development of technology provides basic knowledge and technical support for research and development activities. On the other hand, the technology also provides intellectual resources and various technological opportunities for product and

production process innovation.

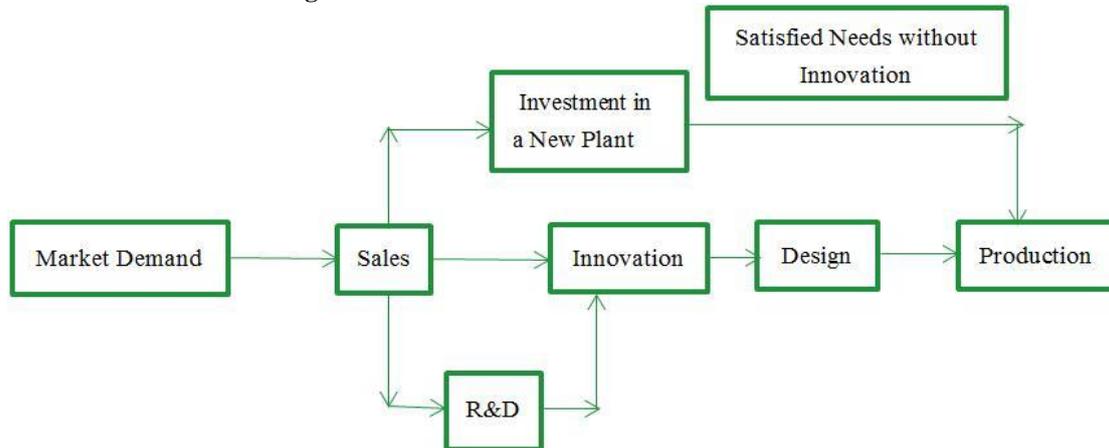
Figure 2 The Process of Technology-Driven Innovation



(2) The Impetus of Demand

The success or failure of operation activities actually depends on whether the consumers are satisfied with the products or services provided by the enterprises. In other words, this kind of satisfaction comes from whether the consumer's demand is met. If the demand is satisfied, there will be a large number of transactions in the market, increasing the market demand for the products of enterprise, making the enterprise continuously develop new products to meet the growing demands in the market. If dissatisfied, it will force the enterprise to implement different innovative activities and find new market opportunities guided by the market demand. In this way, the market demand has formed a pulling and stimulating effect on the technological innovation of enterprises (see Figure 3 below).

Figure 3 The Process of Demand-Driven Innovation



(3) The Impetus of Market Competition

The fierce market competition is a driver that forces enterprises to continuously innovate. As long as the market is not completely monopolized, the enterprises would face severe pressure of marketing competition and strong sense of acute crisis all the time. Therefore, enterprises with a leading position continue to carry out research and development activities and increase investment in innovation to maintain technological advantages. Meanwhile, enterprises with a following or lagging position will closely follow the industry leaders such as leasing patents, imitating the advanced technology. The intense marketing competition will call out the enthusiasm and creativity of enterprises, stimulating their motivation for continuous technological innovation.

(4) The Impetus of Entrepreneurship

Entrepreneurship has always been the spiritual force driving innovation. Many entrepreneurs with open mind, clear thinking and risk awareness have curiosity about certain technological and economic phenomena in production and operation activities. Their special inspiration for new technologies and desire for more profits have greatly stimulated the motivation and behavior of entrepreneurs in innovation. The entrepreneurship has a significant impact on the success of technological innovation in enterprises. For example, if entrepreneurs constantly put forward new ideas and launch new products, the organizational culture of creation and innovation in the whole enterprise would be particularly strong.

(5) The Impetus of Government Behavior

The government is not only the policy maker, but also participates in innovation activities through research, scientific and technological regulations, government procurement and other aspects. The measures taken by the government towards innovation activities can directly or indirectly affect the results of enterprises

innovation. Currently, the government has taken many meaningful actions in the field of technology planning and scientific management, such as high-tech industry planning, the innovation fund of SMEs and other science and technology guiding activities. These measures have played a strong directing role in the development of high-tech. The government also has introduced preferential measures including finance, taxation, land and regulations to create a good innovation environment of enterprises.

III. Integration Model of Examining Technological Innovation Motive Factors

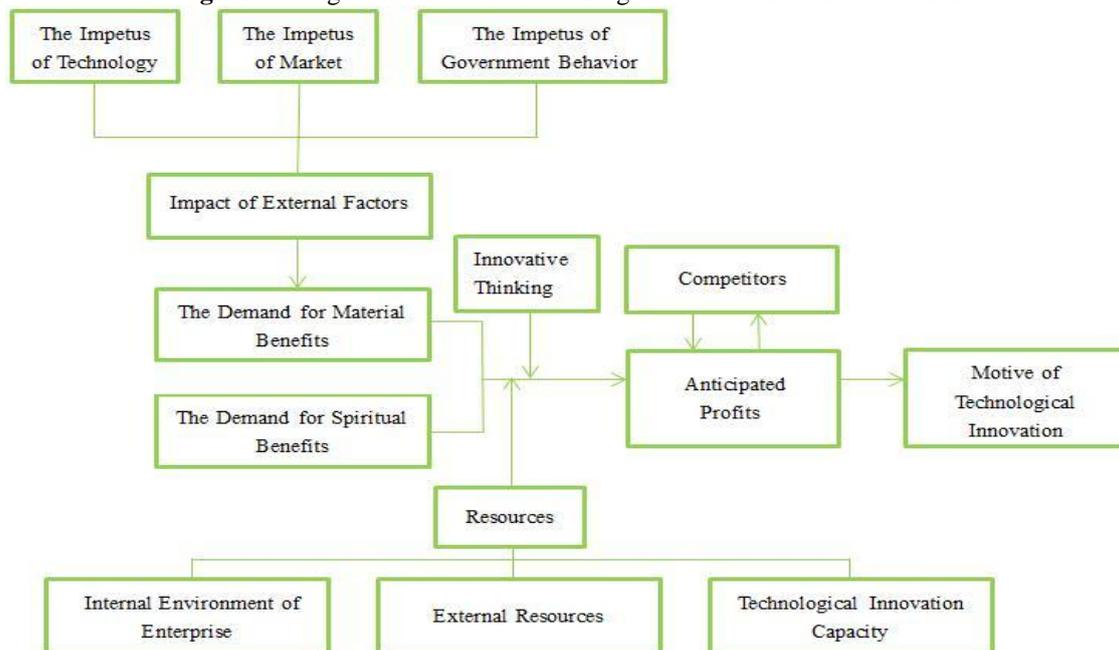
First of all, from the point of view of innovative psychology, the demand for technological innovation includes the demand for material benefits and the demand for spiritual benefits. The demand for material benefits means the enterprise desires to maximize economic benefits. The decision-making of technological innovation depends on whether the innovation can ultimately bring profits to the enterprise or not. The demand for spiritual benefits means the enterprise's pursuit of technical status, competitive advantage and market reputation in the innovation process.

Then, the entrepreneurship determines the direction of enterprise innovation. As the helm of an enterprise, the innovative ability of entrepreneurs plays a crucial even decisive role in the enterprise sustainable development. With constant innovation, enterprises may go downhill and even face the danger of bankruptcy.

Furthermore, the enterprise needs to consider the constraints of resources and external factors to make the final decision of technological innovation. The external factors such as the social and cultural environment, industrial environment and government policies that have a certain impact on technological innovation of enterprises.

Lastly, when studying the motive force of technological innovation in enterprises, it must take into account factors such as organizational environment, control over resources and self-innovation ability. From the perspective of demands, entrepreneurship, external and internal environment, the integration model of examining technological innovation motive factors is established as Figure 4 below.

Figure 4 Integration Model of Technological Innovation Motive Factors



IV. Measures to Improve Enterprise's Technological Innovation Initiative

Financing has always been a serious problem for Saudi enterprises, especially SMEs. When promoting technological innovation activities, companies should first understand the difficulty of various specific financing methods, and then take the appropriate needs of capital utilization based on costs, demand and financing efficiency as criteria, instead of blindly pursuing more capital and obtaining more loans.

Furthermore, risks are inevitable in the research and development process. The risks of innovation failure should be accepted by a company, leading to the vitality of organizational culture.

To attract more talents, enterprises can adopt the policies of favorable treatment, bumper bonuses, combination of short-term employment and long-term support. Every employee is encouraged to make use of spare time to implement innovation activities. Moreover, the joint cooperation of enterprise-industry-research institution has always been an effective way to make innovation successful.

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