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## The selection of enterprise innovation modes Based on the product life cycle

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### ABSTRACT

Innovation is the key of enterprises to improve the core competitiveness and maintain sustainable competitive advantage. According to the different stages in the product life cycle, the enterprise innovation mode should be different. This paper discusses the impact of the product life cycle on enterprise innovation mode, and puts forward the main innovation modes corresponding to different stages of product life cycle.

### KEYWORDS

Innovation mode; Product life cycle; Source of innovation; Integration innovation.



Innovation is the source power for a enterprise to keep sustainable competitive advantage and the carrier for a country to enhance the competitiveness. Nowadays, the adjustment and upgrade of industrial structure cannot do without innovation mode. The independent innovation mode, the Imitative innovation mode and the integrated innovation mode are widely used and have achieved great success in the Microsoft, Haier, Apple and other companies of the world. Since 1990s, with the rapid development of technology consumption demand, the product life cycle has been shortened. The successful strategy of enterprise development has adapted to different innovation modes in the introduction period, growth period, maturity period and decline period with its own circumstances' change. Right at this angle, this paper analyses enterprises innovation modes based on the product life cycle. It has very important practical meanings to improve management and obtain sustainable competitive advantage.

## PRODUCT INNOVATION MODE AND PRODUCT LIFE CYCLE

### Product innovation mode

What is called product innovation mode is the generic term of various methods, styles and types of product innovation with respect to the selection, organization, application and diffusion of product technology. It is summarized from the successful practice of enterprise product innovation

### The of product innovation mode

The type of product innovation mode mainly includes:

(1) The angle of power source of innovation It refers to the research on product innovation mode from the angle of the power source about developing new products. The product innovation mode includes technology-driven innovation mode, market demand innovation mode, Interaction of technology push and market demand pull Innovation mode and competition driven innovation mode. Among them, the first three belong to the type of initiative act, the last one belongs to the passive adaptation type<sup>[1]</sup>.

(2) The angle of innovation subject It refers to the research on product innovation mode from the angle of the product innovation subject. Normally, it includes the independent innovation mode, the Imitative innovation mode and the integrated innovation mode.

Independent innovation mode is that the enterprise carries out product innovation on the basis of its own research and development; Imitative innovation mode is that enterprise carries out product innovation through imitation, digestion, absorption the technology of leading innovator; Integrated innovation mode is that the enterprise integrates various innovation resources to make the product produce qualitative change<sup>[2]</sup>. Each of them has advantages and disadvantages

**TABLE 1 : Comparison of three kinds of innovation mode**

	<b>The independent innovation</b>	<b>The Imitative innovation mode</b>	<b>The integrated innovation mode</b>
Advantage	Getting more excess monopoly profits by patents, trade secrets and technical barriers Establishing image of the leading innovator in the market Establishing a brand image Accessing to credit and policy support of financial institutions and government departments.	Reducing the risk of innovation Sharing the excess profits of innovation with the lead innovator Reducing the cost Improving and creating a broader market prospects by learning the mature technology from the leader.	Shortening the innovation period and reducing the innovation risk dispersion Reducing the duplication development investment, reducing the cost Achievement sharing and promoting growth
Disadvantage	High investment High risk	Generally can't getting the high monopoly profits that getting by the lead innovator Profit margin keeping declining with the fierce competition Difficult to imitate the core technology	Less profits from technology innovation that every enterprise can share Strong dependence between each other Limited enterprise development speed

### 4 stages of the product life cycle and different characteristics of the innovation

Product life cycle is measured by changes in sales and corporate profits amount, it is a shape curve like "S". Generally, it experiences four stages, the introduction period, growing period, maturity period and declining period.

The introduction period refers to the product is launched into the market; through the market test, new product are agreed to be good and constantly are accepted by the market, then the product enters the period of growth; the product are mass produced and its total sales reach a plateau, the product demand is saturated, many other enterprises participate in market competition, this stage is the mature period; the market decline so the product is entering a recession. Four stages in product life cycle have different characteristics of innovation.

**TABLE 2 : 4 stages of the product life cycle and different characteristics of the innovation**

	<b>Introduction period</b>	<b>Growing period</b>	<b>Mature period</b>	<b>Declining period</b>
Product stage	Few types	Mass production	Mass production	Small production
Product Differentiation	High	Lower	Higher	Higher
Degree of competition	Weak	Strong	Strong	Weak
Profit	Low or no	Rapid growth	Higher	Lower
Key of Innovation	Products	Low cost, high efficiency	Individualization	Product transformation

**THE SELECTION OF ENTERPRISE INNOVATION MODES FOR EACH STAGE OF PRODUCT LIFE CYCLE**

Enterprises should select the corresponding innovation mode based on the different characteristics of each stage of product life cycle and the innovation environment.

The selection of enterprise innovation modes in product introduction period

When products or services is in the introduction period, the enterprise’s internal system, the process, product factors and market factors are generally not very mature, the innovation environment of this stage is shown in TABLE 3

**TABLE 3 : Enterprise innovation environment in product introduction period**

<b>Environmental factors</b>	<b>Description</b>
Strategic objectives	Accepted by the most of customers, forming the market as soon as possible
Degree of commercialization	Lower
Basic elements of product	Imperfect
Industry chain	Lacking and incomplete
Cooperative partners	Uncertain and sparse
Industry rules	New, not yet formed
Market and customer	The market is just a prototype, products has not been accepted and recognized by the practical customers
Sales channels	Preliminary established, inefficient

(1) Technology-driven innovation mode In the product introduction period, what enterprises should take is the technology innovation mode, it usually begins with a breakthrough innovation. In this stage, by taking advantage of their own technology, enterprises bring forth new ideas in basic elements and core functions of new products to meet the needs of the customer<sup>[3]</sup>

(2) The independent innovation mode The independent innovation mode most concerns about basic elements and core functions of the product or service. Once independent innovation is successful, the products or services will meet the basic needs of customers. At the same time, the product or service in the introduction period is not mature and the vacancy of market is large, so the independent innovation has a larger development space.

In the introduction period, only a small group of customers will choose the new product, and only a handful of customers who like pursuit new things will buy it. A manager should position correctly so that the market will accept the product as soon as possible, it can shorten the introduction period and make the product quickly enter the growth stage.

**The selection of enterprise innovation modes in product growing period**

When the market about the product or service has been formed, enterprise not only owns the first batch of customers, but also the more pragmatists began understand and trust the product or service. However, enterprise will suddenly find the other product has caught on, which is driving enterprise to keep innovating. When product or service has great improved, it enters the growth period. The enterprise innovation environment is shown in TABLE 4.

**TABLE 4 : Enterprise innovation environment in product growing period**

<b>Environmental factors</b>	<b>Description</b>
Strategic objectives	Attracting more new customers, increasing market share
Degree of commercialization	Preliminary commercialization
Basic elements of product	More perfect
Industry chain	Has been established but not perfect
Cooperative partners	Basically determining but the strength is not strong
Industry rules	Basically formed
Market and customer	Get accepted by a lot of practical customers, Fast growth
Sales channels	Preliminary established

(1) Competition driven innovation mode When the product is in the growth period, the size of the market will be substantial growth and profits will be very rich, then the strength of market competition will be increased dramatically, so enterprises should take competitive driven innovation mode<sup>[4]</sup>. Enterprises should pay close attention to change triggered by a competitor's products, services, prices and market demand and customer changes, keep innovating product driving by the competition, and enhance enterprise competitive advantage.

(2) Interaction of technology push and market demand pull innovation mode According to the characteristics of the growth period, enterprises are more likely to prolong the time of growth period, on one hand enterprises need take progressive technology innovation on the product, such as adding new functions, developing new modes, changing the product design and developing new applications. On the other hand, enterprises should closely follow the market needs to meet the increasingly diverse needs. Therefore, innovation mode of interaction of technology and market products emerges in growth period.

(3) The imitative innovation mode The independent innovation mode can successfully create a unique product or service in the product introduction period, make the enterprises occupy the character of standard makers in the market, and give customers to leave the one and only image in the future market. In product growth period, imitative innovation mode on one hand can make enterprise do technical accumulation, and gradually cultivate an innovative talent team to enhance the strength of their own research and development; and on the other hand, according to the technology-related degrees, enterprises can find a new target market, extend the industry chain and enter into other related industries.

In the product growing period, enterprises should firmly apply the Pareto principle, it is product which is derived through innovation should go mainstream route. The so-called mainstream is products that can be accepted by 80% customers. But in the market products can be accepted by 80% people also are the 20% products, the enterprise should make their own products become the 20% of all the same kind products. For example, if the product shape carries on the innovation in the mainstream form, the probability of success will be relatively larger.

#### **The selection of enterprise innovation mode in product maturity period**

When the product has been widely accepted by the market, the sales growth rate has slowed down, then product or service has entered into product maturity period. In this stage, the enterprise innovation environment is shown in TABLE 5

(1) The market demand innovation mode Along with the fierce competition within the industry, the enterprise's original technological advantages gradually lost, development speed slows down or even stagnation. At this time, enterprise should base on the improvement of product, stabilizes the core technology. Market demand innovation whose first characteristic is market demand becomes the main innovation mode.

**TABLE 5 : Enterprise innovation environment in product maturity period**

<b>Environmental factors</b>	<b>Description</b>
Strategic objectives	Protecting and expanding market share, getting more profit.
Degree of commercialization	High commercial degree
Basic elements of product	Perfect
Industry chain	Perfect
Cooperative partners	Determining
Industry rules	Stable and clear
Market and customer	Scale is no longer expanding, the market begins to breakdown
Sales channels	Perfect

(2) Integrated innovation mode For the enterprise, integrated innovation mode is the key to enhance the core competitiveness of enterprises and keep sustainable competitive advantage in the maturity period. Integrated innovation mode is a new one to adapt to the knowledge economy, it can integrate the new technology and the market which varies fast. The new knowledge, new technology and the enterprise values are integrated to form the core competitiveness and achieve the goals of enterprise<sup>[5]</sup>. Through the integrated innovation, enterprises should be closer to the customer demand, improve the satisfaction of interaction process and enhance the core competitiveness of enterprise.

#### **The selection of enterprise innovation mode in product recession period**

Any product or service will be replaced by other more alternative goods, once it happened, this trend is irreversible, but speed is uncertainty. Although products or services will be weeded out sooner or later, there is not necessary link with the demise of the enterprise. As long as the new business of the enterprise gradually replaces the recession business and is accepted by the market, the enterprise will continue to develop<sup>[6]</sup>. In this stage, the enterprise innovation environment is shown in TABLE 6.

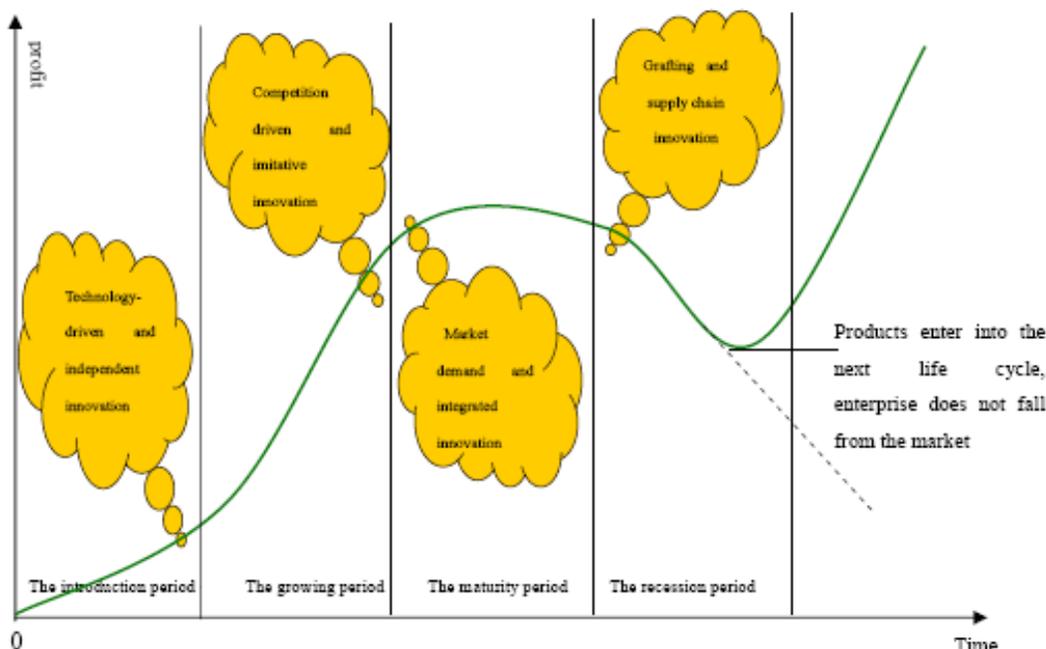
**TABLE 6 : Enterprise innovation environment in product recession period**

Environmental factors		Description
The goal of innovation		Transferring to the next generation product
The environment of declining product	Development and production	Transforming research and development capacity to adapt to new product innovation
	Market resource	Making full use of the existing sales channels, keeping the old customer
The environment of inheritance product	The product stage	Product or service in growth period
	Innovation time	Urgent
	Market resource	Lacking market integration ability, obtaining scarce resources (standard, technology)from the market

(1) Grafting innovation mode When the product enters into a recession, it marks a new substitute appears, but new alternatives must go through a process that are accepted by user gradually, it provides an opportunity for the further development of enterprise. The enterprise should take timely grafting innovation mode, retain the original and core technology, and graft other forms of technology innovation, system innovation and management innovation to meet the sustainable development of the enterprise.

(2) Supply chain innovation mode In the increasingly fierce market competition, the competition between enterprises has gradually evolved into the competition between supply chains because of links to products. Facing the unpredictably situation, the traditional way that rely on an enterprise’s own strength to carry out product innovation seems to be more inefficient. Therefore, enterprises should put themselves in the whole supply chain, implement the integration of logistics resources, improve supply chain visibility and enhance collaborative supply chain management. Enterprises achieve the sustainable development by improving the competitiveness of the supply chain. In a recession, what the most important is transforming product to meet the new product innovation challenge. To sum up, the innovation mode based on life cycle of products is shown in Figure 1.

In fact, innovation mode in every stage of product life cycle is not immutable and frozen, in the actual operation process of enterprises, various innovation mode should be cross used flexibly.



**Figure 1 : Enterprise innovation mode based on the product life cycle**

**THE CONCLUSION**

Nowadays, the market environment and customer demand changes very fast, it difficult for enterprises to grasp effectively, enterprises bears more pressure of competition in the market. This paper presents: in every stage of the product life cycle, enterprises should select different innovation modes. In the introduction period it should import technology innovation mode and independent innovation mode. In the growing period it should adapt to competition driven innovation

mode, technology and market interaction innovation mode and imitative innovation mode. Market demand pull mode and integration innovation mode should be used in the maturity period. In the recession period it should import the grafted innovation mode and supply chain innovation mode. The perspective of supply chain and customer value will has important research value.

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