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Different Stages of Innovation Process

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Abstract

According to freeman innovation consists of a set of technical, industrial and commercial operations. Nowadays researchers reach to a point that given to a diverse complications in the model, we can not define innovation process in a linear form, so we should use nonlinear processes in order to evaluate better the innovation processes. As a result, researchers presented several patterns for evolving innovation processes these models, which was presented for innovation processes, were: 1) science push 2) market pull 3) doubling model 4) integrated and SIN model 5) Kline Rosenberg model. In this article these mentioned models will be presented.

Keywords: Freeman, Commercial, Innovation

1. Introduction

According to Freeman innovations in other words consists of a set of technical, industrial and commercial operations [5, 6, 7]. So it simply can not be defined as simple linear forms. Before the 80’s models presented for the process of innovation, was based on simple linear thought process which began with basic research, leading eventually to create ideas and produce a new product or process, but given to broader research and more precise investigations in the process of critical behavior. Different conditions that other complications were observed, as a result; they could not be summarized in a linear process. Therefore, nonlinear processes were evaluated and several researchers were trying to identify innovation processes [4, 8].

1.1. Process Innovation

Process innovation, new product ideas into the process (product or service) or process is new or fully developed.

![Figure 1-1: The process of innovation and creativity](image)

| Nation | Idea | Create | design and engineering | Production | Publication |
|--------|------|--------|------------------------|------------|-------------|

Creative Process

Table 1-1: Studies of different stages in the innovation process

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1) Cooper(1979)
2) Lawton & para Suraman(1980)
3) More(1982)
4) Maidique & Ziger(1984)
5) Yoon & Lilien(1985)
6) Cooper & Brentania(1991)
7) Klein Schmidt & Cooper(1991)
8) Lee & Na (1994)
9) Ali, Krapfel & Labahn(1995)
10) Atuahehe -Gima(1995)
11) Green ,Gavin & Aiman-Smith(1995)
12) Olson , walker & Ruekert (1995)
13) Mishra , Kim & Lee(1996)
14) Souder & Song (1998)
15) Song & Montoya-Weiss(1998)
16) Xcolarelli Oconnor(1998)
17) Song & Montoya-Weiss (1998)
18) Veryzer(1998)
19) Goldenberg , Lehman & Mazursky(1999)
20) Kessler & Chakrabarti(2000)
21) Chandy & Tellis
1-2. Patterns of innovation development process

1-2-1. Science push model
During the years 1960-1950 process innovation which was based on a linear model was defined. In this simple model is considered a new innovation begins with scientific research and in later stages of product development, manufacturing and marketing, and at the end product and service, or new process will be successfully sold. Linear model of innovation in Figure 1-2 is shown [1, 9, 10].

According to this model is expressed that for creating prosperous market we should develop scientific researches and emphasize on research and development and also market needs are defined on research and development activities and they have not an independent existence which it means the success secret of innovation. On the base of this model The large investments in research and development have been done [2, 3]. The model specifically was supported after World War II, especially when the atomic bombs on military research was discovered and produced. Finally in the early 1980 many policymakers Economic Cooperation Organization of Europe, accepted the approach that producing a product, service or process, was the result of basic scientific research and with the use of trading ability of the employees, they can sell their products. In this model no gorge between the stages are not considered, so this model only respond to simple industries such as petrochemical [12, 13].

1.2. Pull Market

From early 1960, the second linear model of innovation given to the economic vision was shaped. In this model innovation was the result of requisites and demands for market and market demand directly cause the development of new technology for companies. In this model most of innovations are the result of departments which work directly with the costumers. Because in these departments they know better the needs and demand of clients, therefore they recognize better the place of investments. In this model, the market will determine that in what projects in R & D fields company must invest and also in this model the focus and emphasis is on market and customer needs [14, 15].

1.2.3. Doubling model
But most of researchers, with scrutinizing the two above mentioned models, got that they cannot express clearly the innovation process in the simple linear form. But sometimes scientific researches cause new production in the market, and in contrast sometimes market force the R&D section to new innovation s. In fact the goal of third model
is exhibiting the sequence of operations in innovations, and also another target of this model is being feedback between R&D section and market [3, 11, 12]

Figure 1-4: The connection to the process of innovation

1.2.4. Integrated and SIN model:

The third model also was not responsive to many innovations in companies. Therefore, fourth and fifth generation models with a short interval of time arose. In the new models more attention to the feedback between the stages has been paid. In the fourth generation the attention has been paid also to parallel development in each stage along the horizontal unity. In these models more concentration is on the customer and customer needs and supplier resources is considered as a part of the company's interests. In this model emphasis is on R & D and manufacturing and development. In the fifth generation model, more objective was integrating development strategies among the various internal and abroad organizations so that shareholders of a product or a service, have strategies which are close together. Using new techniques, such as institutional development in parallel rather than sequential development and moving toward organizations with a process perspective, this new approach of innovation can be achieved. For example, the use of expert systems and simulation models in R & D activities or using networks to create stronger bonds between customers and suppliers, can get closer to this model. This model emphasizes on flexibility and speed of the company against changes in development are based on time and focus more on quality rather than finished cost of the product.

1.2.5. Value chain model Klein Rosenberg

Perhaps the best model of the nonlinear elements explaining the innovation process, value chain model is Klein Rosenberg. This model of innovation process is summarized in five steps:

Figure 1-5: The value chain Klein Rosenberg

1. Identify potential market needs
2. Invent or create new analysis plan for producing new products
3. Designing with details, testing and redesigning projects
4. Production
5. Distribution and Marketing

So the main effective activities in innovation process according to this model include:
2. Conclusion:
As a conclusion we cannot define innovation process on the base of simple linear form due to many complications and many involved factors to this model, but researchers suggested number of models and they were trying to express the model which is nearer to the real innovation process. These recommended models have their own advantages and disadvantages. As the new models suggested by researchers arrived, the models got closer to the reality. Generally, all of the models which are clarified in the article have considered many things such as costumer, market, equipments needed for developing new technologies, and also the interesting point was that in many occasions, require of clients and market demand were the most significant factor in innovation process and developing new technologies to satisfy costumer’s needs. In the different suggested models by researchers every stages from the beginning point (for example imagination and creating idea) to the end point (production and sale) of innovation process, have been thoroughly described.

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