

THE DETERMINANT FACTORS AND THE MECHANISM OF UPGRADING PRODUCTS

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Abstract: *Creating new products and upgrading the existing ones are activities concerning business management in particular. We consider that any product goes through the same sequence of steps, regardless of its complexity or functional role, in order to turn from an idea to a useful good. This process is influenced by the conditions and quality of the functional and organizational systems designed by a company and it is determined by at least two categories of factors: technical (idea, sketch, design, product prototype, approved prototype, etc.) and commercial (reflecting guests' / users' living environment, the context they make comments, proposals, suggestions, requests, complaints and so on).*

Key words: *product renewal and upgrading, innovation, creativity, economic growth*

INTRODUCTION

The innovation represents the novelty that can be applied in production technique and technology or in business management in terms of efficiency. It is the result of systematic efforts that make technical, scientific and economic research and includes new production techniques and technologies, products, methods of management, exploration of new markets and sources of raw materials or materials, able to increase the economic efficiency.

In this era of competitiveness, the innovation is the key to economic growth, since it generates added value and improves products and services. Firm management should consider this mentality of innovation the best solution to economic growth, competitiveness, and organizational culture specific for innovative companies

MATERIALS AND METHODS

The concept of innovation was first introduced by Schumpeter [11], in 1912, in his "Theory of Economic Development". It was opposed to the previously used concept of "discovery". It has gradually expanded so that today includes all technical and scientific utility enforceable in a position to increase economic efficiency. The author first discussed the mechanisms and factors of innovation, arguing that entrepreneurship and the possibility of obtaining a temporary monopoly profit may stimulate the introduction of new products to market and reduce production costs. He called this "creative destruction", a phenomenon through which the previous market structure is broken to make way for a successful innovator.

Historically [8], in the second half of the 20th century, many industrial companies developed mainly due to technical and innovative economic policies. Innovation is the specific function of business initiative, whether it is an existing business, a public institution or a new business, it is the way the entrepreneur either creates new wealth-producing resources or adapts the existing ones to their potential of increasing wealth [6].

Innovations are products, processes and new distribution or financial mechanisms which are successfully applied in the economic process / market - they are not equivalent to inventions, they represent an economic and lucrative term.

"It is often said that men are ruled by their imaginations, but it would be truer to say that they are governed by the weakness of their imaginations." [2]

The innovation does not necessarily lead to a change in technique, technology, or organization and invention, it is the practical utility of an idea or discovery.

The option of a company for innovation [7] is conditioned by a number of factors such as:

- the national strategies;
- the type of activity of an enterprise;
- the size of a company;
- the nature of the innovation process;
- the ratio between the influence of market forces and the stock of knowledge available;
- the size of the research and development effort.

The company's desire to find productive changes is also important, since these are essential in supporting labor specialized in innovative purpose. In short, the reorganization in order to increase the speed of response involves changes to organizational components (positions, people, systems, technologies, etc.) and a culture directed to quality.

In order to maintain its market and customers, the modern enterprise applies different types of innovation: **the product innovation**, which includes upgrading the existing products and services, as well as their diversification; **the innovation of factors** refers to human resources and raw materials and materials; **the market innovation**: finding new markets and new customer groups.

There are three **types of innovation** within a company:

- technical innovations;
- commercial innovations;
- socio-institutional innovations.

This study focuses on the technical innovation, with the purpose of product renewing / upgrading. The main objective of the study is to analyze functionally and managerially, the innovation process of renewal and upgrading products.

RESEARCH RESULTS

The research-development within a company is one of the core strengths of its competitiveness. Without the implementation of scientific and technical progress in its work, the company can not be competitive [10]. One should consider that the scientific research and innovation are key factors for socio-economic development of every nation, which is why every country is interested in the existence of a strong research and development because:

- it is a driving force for development of the country;
- the stock of research reserves increases the efficiency of using natural resources and technical and leads to technical progress in the economy;
- it increases the national income and hence the standard of living and environmental protection capacity;
- it increases the country's participation in economic and scientific international cooperation.

The main factors that determine a company to use innovation are [1]:

- the need to develop or maintain its market position and to expand its market segment;
- development by changing the distribution channels and / or markets;
- market demand for product or service diversification;
- company's obligation to align to the regulations and standards imposed by the government, law or social and environmental requirements;

- the need to deal with a decrease in supply or higher prices of materials;
- the competition, when the main competitors substantially improve a product, have found a new distribution channel, or have managed to reduce costs and prices through changes in technology);
- the management view, that chooses the change in order to win the competitive battle (taking into account variables such as: launching new products, improve the quality of existing products, adoption of new technologies, giving up some activities, etc.).

It is known that the results and at the same time, the performances of any organization are given both by the professionalism and promptness of staff and the quality of relationships between them, which means, in this regard, the need to ensure the most favorable organizational climate. In organizing and running a competitive business, it is extremely important to respect that the managerial principles of innovation organization [8], according to which:

- a) A company should approach the innovation process comprehensively;
- b) The innovation should be based on organized, systematic, and continuous search for new opportunities;
- c) The companies should involve all staff in the innovation process;
- d) A company should be constantly concerned with improving the climate conducive to innovation.

We consider, at least in case of the organizations subject to these studies and observations, that the current context of economic crisis emphasized the management approaches to understanding and operating the optimal and efficient organizational climate to support innovation process. It is obvious, more than ever, the awareness of the need for rapid integration of enterprise in the current period and future requirements, with all the efforts supporting it.

Within this process, the technical sector and the productions compartments are very important in the continuous activities of research - design of new and upgraded products. All these combined in an organizational ensemble of an economic agent form the **mechanism of design - execution project / modernization - upgraded products**.

The quality and efficiency of this mechanism are conditioned by the presence and integrity of the relationships between the factors involved, in the common interest of current production, its design and modernization, in relation to market requirements. Such a mechanism [9] looks like the diagram in Figure 1.

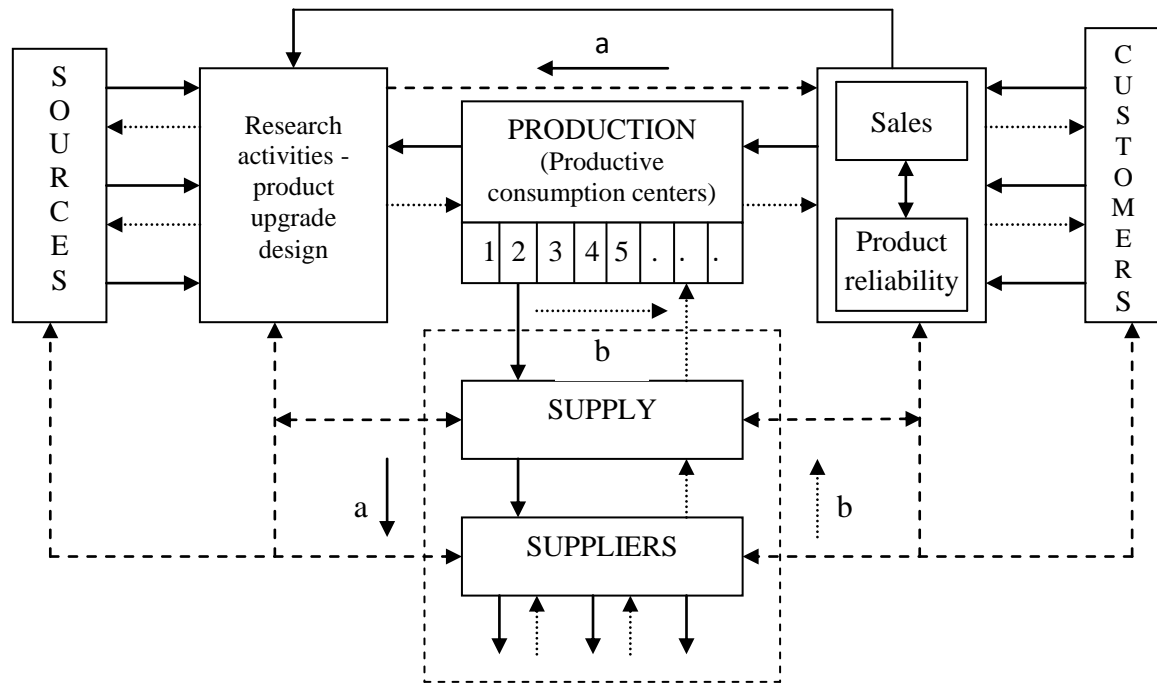
As one may notice, the mechanism attracts and requires at the same time, the participation of all factors within a company, as follows:

→ **Sales - Product Reliability** ensures knowledge of the smallest details on the state of customer options, technical architecture and product quality. This compartment is divided by attributions, duties and responsibilities, and provides for production and for the department specialized in research - design, modernization, data and information about buyers' / customers' preferences, objections, suggestions and, not least, criticism [3]. Such duties and responsibilities are linked exclusively to the fact that through the **Sales Department – Product Reliability**, the results of production are available for the market.

→ **Production**, as an activity in itself, is identified by the technological subunits of productive consumption - jobs, technical working groups, teams with production lines and manufacturing workshops, production departments, factories, plants and the like - that provide, by the specific duties set out in the Regulation of organization and operation:

- current production according to agreed technical manufacturing specifications;
- approval and uptake in mass production of new types of products required by the market, as the effect of boosting the process of renewal - modernization;

- adapting the technical, technological and organizational systems to the new requirements for quality, productivity and efficiency, regardless of the complexity of processes and operations imposed by the new varieties.
- ***The integrated assembly supply - suppliers*** forms an extremely important entity in terms of providing raw materials, materials, equipment, facilities, etc. necessary for the design, assimilation-modernization, and integration in mass production of new and upgraded products.



a – informational circuit ÷ requirements;
 b – operational circuit (documentation, implementation, compliance) ÷ execution.

Figure 1. The relational mechanism to operationalize the production system of scientific research results in the process of product updating - upgrading

According to the literature [4], the creative innovation is ensured by compliance with the following six **steps**:

- Step 1: create an innovative environment in the entire company;
- Step 2: restructuring - to create a separate innovational function;
- Step 3: attracting key personnel for the success of the innovation function;
- Step 4: activating the functional capacity for an innovative and creative purpose;
- Step 5: controlling the innovation process;
- Step 6: combining the innovative-creative function with an company open to innovation.

The studies and analyzes on identifying a **mechanism of product update-upgrade process** confirmed that the organic connection between the imaginative (ideal) form of a product (mark, piece, subassembly) and the configuration (real) one specific to the current manufacture concerns permanently people employed in conception - research - design.

We consider that any product, in case of creation-manufacture-modernization, goes through the same sequence of steps (schematically in Figure 2), regardless of its complexity or functional role, in order to turn from an *idea* to a *useful good* [5].

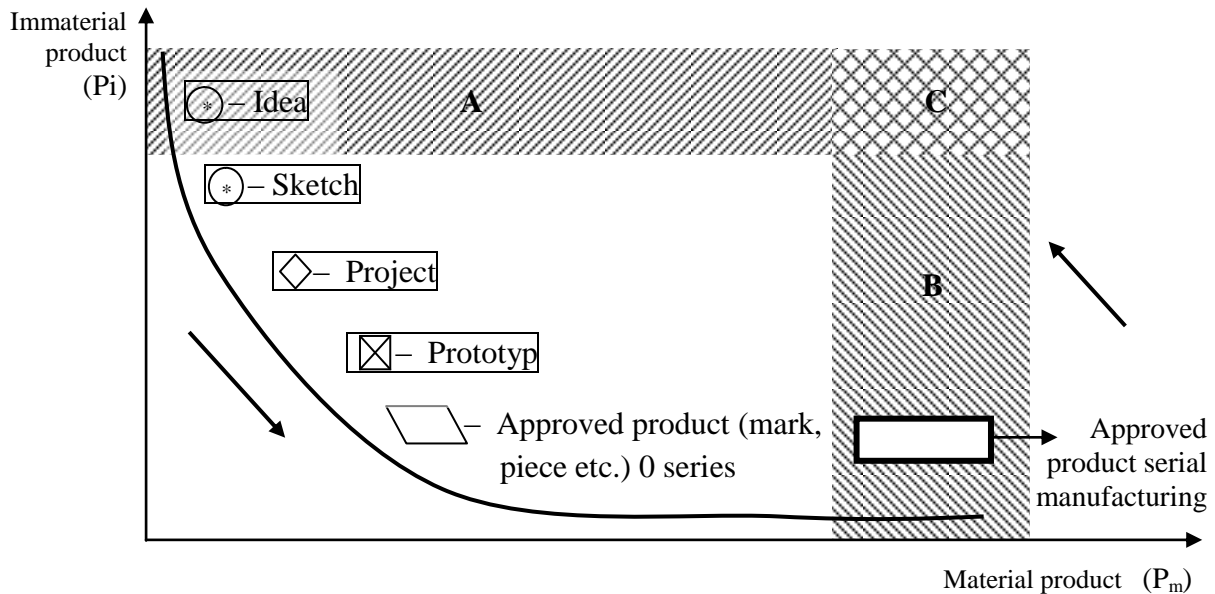


Figure 2. The development stages of the upgraded product from idea to material good

In case of ensuring consistency with market demands and conditions, the shaded areas A and B in Figure 2 have the following meanings:

– "**A" area** corresponds to a large and complicated process of constantly thinking and selecting from many ideas those most representative in terms of objectives, responding to:

- all utility requirements in the product stage;
- real technical possibilities, according to the technical and technological parameters of quality and productivity for the current manufacturing system;
- integration capability - assimilation in the execution of the requirements of series manufacture;
- the period of consumption;
- cost and efficiency requirements for the process of transformation specific materials into products, parts or sub-assemblies of various configurations, facilities and quality requirements;
- the requirements of legality and safety of people and the environment, etc.

– "**B" area** corresponds to a large and complicated process that aims to identify new opportunities, whose form of presentation is an important source of creative stimulation, either in support of the modernization of the product - the object of series manufacture, or to generate and design of new products. It is the area where, by virtue of its source of creation, accumulates as much as possible, all observations of technical, economic, commercial, psycho-behavioral and other nature (suggestions, comments, complaints, complaints etc.), expressed by the current or potential buyers-customers, in order to meet their requirements.

In practice, most companies consider that "**B" area** is an important source of referral and / or modernization and renewal, since the information are processed and

systematized as such through strategies, programs, decisions, etc. In the systemic vision, the concerns for a permanent updated products motivate the existence of "B" area in the graph in Figure 2, according to the conception of the scheme - Figure 3.

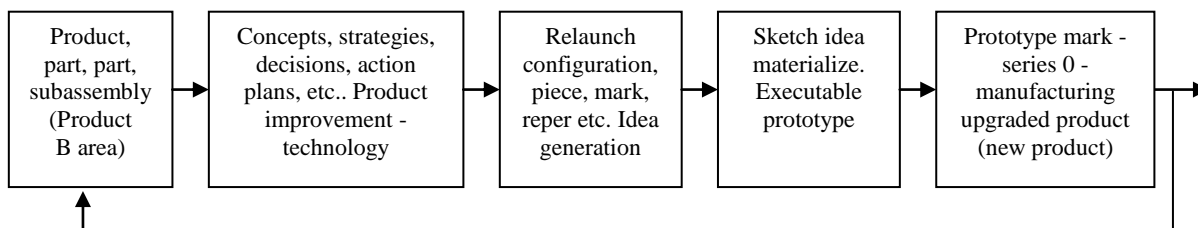


Figure 3. The process of product relaunch-upgrade in systemic vision

A fact that should attract the attention within this mechanism is the presence of "**C" intersection area**" that suggests and supports the reasoning that:

- the idea generates the product;
- the product feeds the idea, bringing continuous improvement in terms of configuration and quality to the initial product. It is what in the literature [8] identifies the state of the 3 C (Creation - Quality - Competitiveness).
- it outlines a set so in the company of "perpetuum mobile" - product idea, idea - product as shown in Figure 4.

A "perpetuum mobile" ensemble occurs within the enterprise environment: product → idea, idea → product, as figure 4 shows.

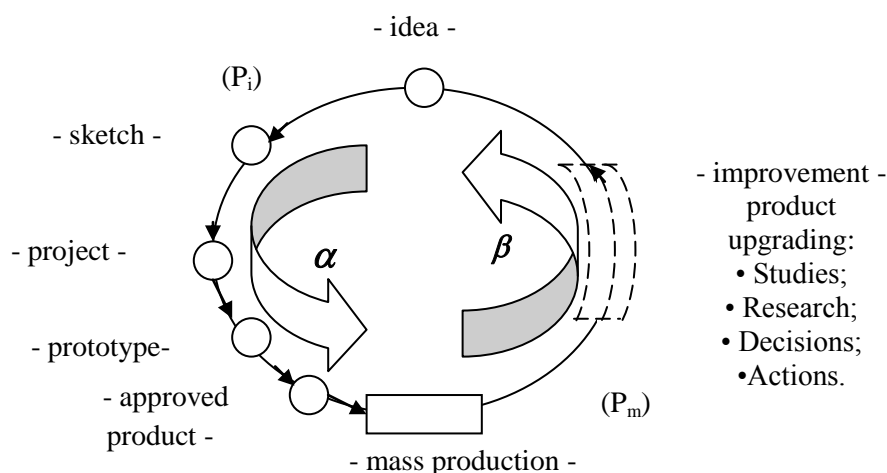


Figure 4. The mechanism of product creation and modernization - concept, in technical activity - research - design

CONCLUSIONS

An innovation process may be successful only if the new knowledge is assimilated into the concrete conditions of a company, creating value by:

- generating operational flexibility and efficiency;
- attracting new groups of customers or entering on a new extended global market;
- meeting customer requirements;
- offering new products or new services;
- redefining the manufacturing process or business model.

In the scientific research, constructive design and technological design, developed from the need or sometimes from the initiatives regarding the technical and market state of any product and its components, there are at least two decisive factors:

a - *technical*: the idea, sketch, design, product prototype, approved prototype, determining employees' involvement according to the need for change - modernization;

b - *economic, social - behavioral and commercial*, as expressions of the living environment of the clients- users, since they make comments, proposals, suggestions, requests, complaints etc. taking into account more or less by the economic agents. As the economic agents perceive them as important sources of information in need of new or upgraded products, they act to meet their requirements through their current business instruments, actions, programs, decisions, studies, projects of modernizing - creating new products and so on, guided by the objectives of quality, timeliness, efficiency.

We conclude that, at present, the competitive businesses have realized the need and major interest of existence of some concrete programs, with deadlines and responsibilities, in terms of upgrading their products. The designed organizational systems meet almost all requirements.

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