PRODUCT INNOVATION AND THE COMPETITIVE ADVANTAGE

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Abstract
Innovation is considered as one of the success features in the economic companies, it’s regarded as the basic element to reach customer satisfaction and to realize their desires. It means finding a new idea which will be implemented for realizing the competitive advantage to the companies, at a time when they have had similar opportunities to present their products with low costs.
We will try through this paper to highlight the innovation in products field through the following:
Definition of innovation and creativity in the economic companies;
Products innovation: types, stages and features:
The role of the products innovation in realizing competitive advantage.

Keywords: innovation, creativity, competitive advantage, PME

Introduction
The world economic environment is characterized by rapid changes in all frameworks, especially the technological sides which become the most important discussion axe that affects the economic company’s strategies.

Under this new atmosphere that features the external and internal company's environment, it becomes necessary for company to fit itself in these changes in order to maintain its market place, and to face the aggressive competition in such an open world market. Under such a situation, companies are imposed (compiled) to carry out research and development in all fields through innovation and creativity regarding their methods that include: management process, product, marketing…etc, in order to find out new innovation ideas which distinguish the company from others and give it an efficient competitiveness.

Indeed, there are many types of innovation such as: Product innovation, Process innovation, Marketing innovation, Organizational innovation, Paradigm innovation…etc. All these types and others allow companies to realize a competitive advantage and economic benefits. We focus through this paper on product innovation for the reason that the product (whether goods or services) is the basic of a company establishment and the direct link with consumers who are considered as the most important objective of the companies.

Innovation and creativity in the economic companies:
Distinguishing from innovation and other concepts:
As we mentioned above, creativity and innovation become one of the features of this decade, within which companies are working to improve and develop their external and internal environment.

There are many sorts of innovation applied in the economic companies related to their different activities. And before discussing them, we try to give some definitions concerning innovation and creativity whatever the type.

Indeed, the meaning of innovation varies. It can range from the first commercial use of an invention to the introduction of a new or improved product or process.
There is a link between the two terms innovation and creativity, in other words they are two faces to one coin, while creativity means the creation of new ideas which does not exist before in order to solve problems (that doesn't relate to the technical side only which includes products development and process, but also the machines, production methods, management process. that lead to increase productivity) (2), innovation is the implementation of these new ideas. We find also the term “invention" which nearly has the same meaning of creativity as Fargerberg (2004) distinguished between invention and innovation. He argues that “invention is the first occurrence of an idea for a new product or process, while innovation is the first attempt to carry it out into practice”(3).

The table below indicates the different definitions of the innovation term:

<table>
<thead>
<tr>
<th>Definition</th>
<th>Description</th>
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<tbody>
<tr>
<td>Innovation refers to the economic application of new ideas that will be transformed to the commerce</td>
<td>(5)</td>
</tr>
<tr>
<td>Innovation is the commercial or industrial of something new: a new product, process or method of production, a new market or source of supply, a new form of commercial business or financial organization</td>
<td>(6)</td>
</tr>
<tr>
<td>Innovation means making new products and offering new services, or adding new value to existing ones</td>
<td>(7). It's based on the results of new technological developments, new combinations of existing technology or the utilization of other knowledge acquired by the company</td>
</tr>
<tr>
<td>Innovation is the implementation and the application of a new idea related to a new product or service, a new marketing method, a new organizational methods in business practices, workplace organization or external relations</td>
<td>(9)</td>
</tr>
<tr>
<td>Innovation is the degree to which value is created for customers through enterprise that transform new knowledge and technologies into profitable products and services for national and global markets. It covers a wide range of activities to improve firm performance, including the implementation of a new or significantly improved product, service, distribution process, manufacturing process, marketing or organizational method</td>
<td>(10)</td>
</tr>
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</table>

2- Types of innovation:

These definitions indicate that there are many types of innovation. According to Schumpeter, there are five areas in which companies can introduce innovation (11):

- Generation of new or improved products;
- Introduction of new production process;
- Development of new sales market;
- Development of new supply market;
- Reorganization and/ or restructuring of the company.

The above definition clearly distinguishes innovation from minor changes in the make up and/ or delivering of products in forms of extension of product lines, adding service components or product differentiation. Innovation is not related to production fields only, but there are other fields and activities which can be innovated as the following:

Process innovation: is the adoption of new or significantly improved production methods. These methods may involve changes in equipment or production organization or both. The methods may be intended to produce new or improved products which cannot be produced using conventional plants or production methods, or essentially to increase the production efficiency of existing products (12).

Marketing innovation: is an innovation that satisfies customer needs and develops a competitive advantage through differentiation along one or more of the following (13):

Desired Product Features and Design, Size, Usability, Quality, Time, Price ,Cost savings/ Incremental Revenues… in other words is the implementation of new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing. (14)

Organizational innovation: is the implementation of a new organizational method in the firm's business practices, workplace organization or external relations. It can be intended
to increase a firm's performance by reducing administrative costs or transaction costs, improving workplace satisfaction…etc\(^{(15)}\)

Moreover, there are other sorts of innovation adopted by companies which can be illustrated in the figure below:

![Figure 01: Innovation Types](image)


The paradigm above indicates that in every type of innovation there is a created value weather from costs, quality or performance. This classification of innovation's types according to Joe Tidd is conformed with the global value of innovation, for example, the paradigm innovation leads to the opening of new frameworks and developing the company's activities, however; the created value from the organizational innovation is restricted on the current company's activities through the introduction of new leadership models and new management methods. At the lowest level, Tidd suggested the Process improvement as a kind of innovation which means the introduction of new modifications to the existing activities and operations without complete changes, and the result is the reduction of costs and quality improvement. Despite the differences between the created values of each type of innovation, the main and essential objective is to increase the global benefit of the company.

What we can remark from the different kinds of innovation is that there is a common idea which is the improvement and the development which indicates the main role of the technological knowledge. And because any company aims to cover the largest market part or at least to protect and maintain its market position, the innovation plays a big role in that, so it can be( market) considered as an important factor to determine the type of innovation, as the following diagram denotes:
It's clear that there is an interface between the used technology and the market, we differentiate between 4 types of innovation which are formed as a combination of market and technologies:

- **Market innovation**: in this type new markets have been created using the same existing knowledge with some modifications and improvements. The main goal here is to discover new markets.
- **Basic innovation**: depends on creating new markets using new knowledge, in this type there is an interaction and combination between the different types of innovation (product, market, organizational, and process innovation).
- **Incremental innovation**: In this type companies retain the existing markets and at the same time use and create new technologies and knowledge.
- **Technological substitution**: here companies focus on using new technologies.
Figure 03: Other Different types of Innovation

![Diagram showing different types of innovation]


Whatever the kind of innovation, the basic axe of innovation remains the creation and the implementation of new ideas under some conditions that should be provided such as:^{16}

**Willingness:** including a company's capacity to change and the extent of its knowledge that change is possible;

**Opportunity:**
- Supply side: technology exists or could be developed;
- Demand side: regulatory requirement, opportunity to save costs or add to profits, pressure from workers or public;

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**Capacity:** knowledge about better techniques and the level of skill base at the company.

After this clarification about innovation and its different types we can say that it's considered as a complete system in the company included in the whole managerial system. Such a system is composed of several organizational elements: inputs, technological innovation process, resources that are internal and external factors and firm's innovativeness.

1- **Inputs:** the basic inputs that make up the process are technology, creativity and knowledge;

2- **Process:** it may be achieved on two levels: the research phase and the product development phase consists of stimulation, proposal selection, problem solving and output realization;

3- **Resources:** both internal and external resources;

4- **Outputs:** represented by: products, processes and support activities, and the general outcome of the innovative process that a business creates with the innovative capacities is that business's general innovative index. Of course these outputs will be an input to the system as feedback providing a base for forthcoming innovations. It should be noticed that the innovations that companies come up with can be grouped into five separate categories as the following:

- New to the world;
- Similar innovations adopted in other countries;
- Similar innovations adopted in firm's own industry but its innovations differ in identifiable ways from other companies' innovations;
- Same or very similar innovations adopted by competitors;
- No major innovations at all.

Figure 04: A System Model of Technological Innovation
Sources of Innovation

There are several sources of innovation in general. In the linear model of innovation, a notable source is the traditionally recognized source of manufacturer innovation. This is where an agent or business innovates in order to sell the innovation. Another source of innovation, only now

becoming widely recognized, is end-user innovation. This is where an agent (person or company) develops an innovation for their own (personal or in-house) use because existing products do not meet their needs.

Joseph F. Engelberger, says that innovations require only three things: 1. A recognized need, 2. Competent people with relevant technology, and 3. Financial support. Innovation by businesses is achieved in many ways, with much attention now given to formal research and development for "breakthrough innovations". But innovations may be developed by less formal on-the-job modifications of practice, through exchange and combination of professional experience and by many other routes. The more radical and revolutionary innovations tend to emerge from R&D, while more incremental innovations may emerge from practice – but there are many exceptions to each of these trends.

Regarding user innovation, a great deal of innovation is done by those actually implementing and using technologies and products as part of their normal activities. Sometimes user-innovators may become entrepreneurs, selling their product, they may choose to trade their innovation in exchange for other innovations, or they may be adopted by their suppliers. Nowadays, they may also choose to freely reveal their innovations, using methods like open source. In such networks of innovation the users or communities of users can further develop technologies and reinvent their social meaning.

Whether innovation is mainly supply-pushed (based on new technological possibilities) or demand-led (based on social needs and market requirements) has been a hotly debated topic. Similarly, what exactly drives innovation in organizations and economies remains an open question.

More recent theoretical work moves beyond this simple dualistic problem, and through empirical work shows that innovation does not just happen within the industrial supply-side, or as a result of the articulation of user demand, but through a complex set of processes that links many different players together – not only developers and users, but a wide variety of intermediary organisations such as consultancies, standards bodies etc. Work on social networks suggests that much of the most successful innovation occurs at the boundaries of organisations and industries where the problems and needs of users, and the potential of technologies can be linked together in a creative process that challenges both.

Product innovation

The continuance and the persistence of any company depends on its capacities to maintain its market place and face the competition which spreads rapidly and aggressively with the globalization and the expansion of the new technologies, and while product reflects the company's image its whole success depends also on the product success through realizing (compliance) consumers desires and needs, and developing new products.

Product innovation definition

Product innovation is the development of new products, making changes in the current product design or using new techniques and means in the current production methods, in other words, it focuses on existing markets for existing products, differentiating through features and functions that current offers do not have. We can look at the product innovation from two sides; internal side where it depends on knowledge, capacities, resources and the technologies used in the company, however; from the external side product innovation focuses on the consumers needs and the owners expectations.

Looking at the terms used in product innovation field one can conclude that there has been a change of meanings over time. Although “design” originates from the “making of a drawing” it is obvious that the meaning of “design” has been enriched over time. In parallel to “design” the term “product development” has evolved describing the generation of products, processes or services. In the last couple of years the term innovation was used in a variety of
meanings although the original meaning refers to a more or less radical introduction of changes. The following figure tries to illustrate these differences and their enhancements. 

Figure05: Preliminary distinction of terms


The basis of distinguishing between the three terms design, product development and innovation is the question of what has been changed (or improved). In engineering design the starting point of the discussion was introducing change to functions and concepts, where as in product development the product is in the focus of attention. Innovation starts from changing business models but is nowadays also used for describing the change of products or even technological concepts.

Product innovation advantages

Product innovation is not a new phenomenon which suddenly emerged as part of the space age. It has been around and shaped our life for thousands of years. Today's companies gain their competitive advantage and economic benefits largely from innovation. Further, we can state product innovation advantages both to the company and to industry as the following:

Product innovation's contribution to company output can be measured by sales and profits contributed by new products/services, change in market share...etc, also product innovation may increase companies' knowledge stock;

Product innovation contributes in reducing production costs and time of production process and that leads to an increase in investment returns and production efficiency, It contributes also in improving products quality and makes products more competitive in home and external markets;

Realize customers' needs with new characteristics through creating new product pattern with determined measures and features which are not found and realizing the continuance of customer’s fidelity;

Providing solutions to the production problems and creating new opportunities to use the new resources;

Product innovation is an important driver of economic growth and productivity. In this relationship the innovation output of one company becomes part of the innovation input to another. An example of this powerful dynamic is the high rate of innovation in
semiconductors (Moor's Law), which in turn helped drive the innovativeness of the PC business, which fed back as a driver of the PC business and so on\(^{(26)}\).

Successful innovation results in new products and services, gives rise to new markets, generates growth for enterprises, and creates customer value. Innovation improves existing products and processes, thereby contributing to higher productivity, lower costs, increased profits and employment. Firms that innovate have higher global market share, higher growth rates, higher profitability and higher market valuation. Customers of innovative products gain benefits in terms of more choices, better services, lower prices and improved productivity. As innovations are adopted and diffusion, the "knowledge stock" of the nation accumulates, providing the foundation for productivity growth, long-term wealth creation and higher living standards.\(^{(27)}\)

**Main Factors That Affect Product Innovation**

Companies are working within an environment characterized by the rapid changes: social, economic, political, organizational, marketing and technological changes. Under this new environment companies become obliged to adopt themselves with these changes to ensure its continuance, at the same time, these changes and variables are considered as opportunities and threats which push companies to create new methods adopted with these environment needs. For instance, the social and organizational factors influence companies through adapting innovativeness in their activities including product innovation to realize market needs, on the other hand, market forces affect strongly the current product position in the market especially with the aggressive competition, further, market situation (circumstances) may influence the current products and directly current product life cycle which has been short with the technological development.

The stable political environment and the support given by authorities for innovation encourages both companies and individuals to innovate whether in production field or other fields through establishing Research and Development centers and providing the necessary financial and human resources to them. Moreover, technological forces provides new methods in products innovation field according to customer’s needs, and in order to increase profits, competitiveness and maintain the market share companies should take the technological innovation as a part of their global strategy\(^{(28)}\). All these forces represent opportunities to companies for solving their problems through innovating new products or making modifications in the existing ones. The figure below denotes the main elements that influence product innovation.

Figure 06: Factors affecting product innovation

We remark clearly the interaction of the different elements of company's environment and their influence on innovation process in general and on the product delivery system.

There are other external and internal factors that affect product innovation such as:

Customer needs and expectations: companies oriented to customers are responsive to their final needs, measure their satisfaction level and improve the processes in order to satisfy them. In the context of product innovation, Hippel's (1988) approach based on customers’ needs emphasized that companies, in their innovative efforts, have to turn to users’ needs (29). Christensen (2003) emphasized that focus on existing customers can limit a company aptitude to innovate because managers are not keen on serving new users. However, focusing on existing customers is not the same as to be completely market oriented (30). Verhees et al (2004) carried out a research in Holland on the role that customers have regarding radical product innovation in small companies. They proved the hypothesis that expressed needs of existing customers for radical product innovations influence positively on radical product innovation acquisition in small companies, however, in the case of expressed needs of potential customers the hypothesis has not been proved (31).

Technological opportunities: product innovation is closely related to a scientific base and scientific knowledge growth. Technological opportunities emphasizes the importance of organized activities of Research and Development in companies. According to Baldwin and Sabourin (1999) organized R&D activities are more important for product innovation, they found that the probability that companies with R&D departments will introduce innovations in products is 59% whereas for companies that do not have R&D departments the probability is 37% (32).

**Product Innovation Types**

Product innovation includes many sorts such as:

- Development of the old products which are produced already in the company with making modifications and partial changes in shape or product components;
- Innovating new products to realize market’s needs;
- Using new techniques in production process;

**Changing production methods**

According to Booz Alnet Hamilton there are several types of products innovation which are (33):

- Launching new products which are not existing before through; buying innovations from other companies, or developing new products through R&D programs done by companies in their laboratories or in external ones;
- Widening products mix through adding new products;
- Improving existing products;
- Reclassification products positions and oriented new products to new markets;
- Reducing costs through applying new techniques to produce new products.

**Product Innovation Stages**

In a modern industrial company the design of a new product is not an isolated activity. Product design is part of a more comprehensive process called "the product innovation process". In short, product innovation is the development of a new business activity around a new product.

There are many stages that companies should follow in product innovation process. Although they differ from one author to another, there are some common stages as we'll denote below.
Product innovation stages according to Roozenburg and Eekels

According to Roozenburg and Eekels product innovation process consists of six main stages which are:

- Product planning;
- Product policy;
- Idea finding;
- Strict development;
- The technical development process;
- The commercial development process.

Product planning

In the product planning stage, a product policy is formulated and new product ideas are generated. In this phase it is decided which product will be developed and when. Finding fertile product ideas is not only a matter of creative generation, but also of proper selection and, therefore, of the recognition of favorable opportunities. A new product idea is the basis of the assignment for product designers, and the start of the strict development phase.

Product policy

A policy covers two things: goals and strategies. Companies do have all kinds of policies: investment policy, R&D policy, personnel policy, sales policy…etc. Almost all policy sectors have elements that are important to the development of a new product. The most important strategic components - the kinds of products a company wants to manufacture and the functional markets it wants to cultivate – are known as the product-market strategy. In addition the product policy states objectives in the form of criteria for the assessment and selection of product ideas.

Idea finding

Companies find its new product ideas through:
- Keeping informed about new markets and customer’s needs;
- Investigate the strengths and weaknesses of the company;
- Getting inspired by those studies and generating new product ideas;
- Selecting the most promising product ideas and formulating them into an assignment for further development.

Strict development

In this stage the idea for a new business activity ought to be worked out into detailed plans for the product, the production and the distribution. These plans are developed with a new product idea as point of departure, and it is very important that they are properly attuned to one another.

The technical development process

The goal of manufacturing is the production of a number of products according to a particular design. This goal is the material goal of the product development process. The idea for a new business activity includes a first formulation, still rough and provisional, of this goal in the form of the product idea, together with a statement about the expected number of items to make. In the technical development process the material goal is worked out, and the means of production are developed. Technical development is an iterative or spirally proceeding process. The designs for the product and its production grow in successive cycles from vague ideas to concrete plans.
The commercial development process

A company which does not make a profit cannot last in the long run. Therefore, product development ought to fulfill a business economic goal as well as a material goal. Contrary to the material goal (a product’s function), which is worked out during the process of product development, the business economical goal is given prior to the development process, as part of the product policy. Which role does this goal play in product development? Answering this question brings us to the area of marketing. To calculate the profit, one must know what the development, production, distribution and sale of the new product costs, and which numbers one plans to sell at a certain price. To calculate the costs of manufacturing, most of the data can be derived from the technical designs. The data about the expected sales, the planned selling price and the sales costs (distribution, advertisement and so on) are to be taken from the marketing plan. Central to the marketing plan are the so called marketing mix decisions, about (the nature of) the product, the price, the distribution (the place) and the promotion.

Figure 07: Product innovation stages according to Roozenburg and Eekels:


Another model including product innovation stages is the Stage-Gate Process. Stage-Gate is a widely employed product development process that divided the effort into distinct time-sequenced stages separated by management decision gates. The table below summarizes the stages.35
<table>
<thead>
<tr>
<th>Stage</th>
<th>Possible Tasks</th>
<th>Proposed Tasks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discovery</td>
<td>-Brainstorming, -Mind mapping, Value -Innovation, TRIZ, Check lists</td>
<td>-Voice of Customer -Mind Mapping combined with Group Brainstorming</td>
</tr>
<tr>
<td>Preliminary Investigation</td>
<td>-Set up idea database -Market and technical analysis -Competitive analysis</td>
<td>-Collecting Ideas into database -Define market and technical characteristics, -General competitive analysis such as number and size of competitors through the internet</td>
</tr>
<tr>
<td>Detailed Investigation</td>
<td>-Portfolio Management, Scoring Models, Economic Models</td>
<td>-Portfolio Management, Constructing competitor’s products roadmap -Trade show visit -Define marketing planning for selected product: e-advertising, direct marketing (cooperate with partners), target costing strategy. -Partnering and outsourcing</td>
</tr>
<tr>
<td>Development</td>
<td>-Customer feedback, , shortening development time</td>
<td>-Customer feedback, shortening development</td>
</tr>
<tr>
<td>Testing and Validation</td>
<td>-Field trials, , e-commerce test market</td>
<td>-Field trials, e-commerce test market</td>
</tr>
<tr>
<td>Launching</td>
<td>-Implementing Marketing Launch Plan (Marketing Mix)</td>
<td>-Implementing Marketing Launch Plan</td>
</tr>
<tr>
<td>Post Launching review</td>
<td>-Profitability Analysis</td>
<td>-Profitability Analysis</td>
</tr>
</tbody>
</table>


The stages according to this model include the detailed ideas as the following:

Preliminary Investigation: includes the following steps:
*Collecting Ideas into database;
*Define market characteristics:
  - Market size and ports, user benefits, competitor info
*Define technical characteristics:
  - Number of dialog states, Perplexity of the grammar, customization
*Internet competitive analysis:
  - General info and characteristics.

Detailed Investigation:
* Portfolio Management through
* Constructing competitor’s products roadmap;
* Trade show visit;
* Define marketing planning for selected product:
  • e-Advertising;
  • direct marketing (cooperate with partners);
  • target costing strategy;
  • Early follower strategy.
* Partnering and outsourcing.
Development, Launching:
*Post Launch Review;
* Customer feedback, shortening development time;
* Field trials, e-commerce test market;
* Implementing Marketing Launch Plan:
  - Direct Marketing;
  - E-Advertising;
  - Target Costing;
  - Early Follower.

*Profitability Analysis.
  In order to apply these new ideas or new innovations, there are supplementary activities such as:\(^{(36)}\):
  Providing the necessary raw materials with the precise features;
  Studying and determined the favorable organizational relationships needed in production process;
  Making market research;
  Putting juridical procedures to protect new innovations.
  It should be mentioned that in order to success the new product the marketing mix of the new product should illustrate other characteristics such as: better quality degree, better packaging, innovated distribution places…etc to ensure that the new product will be accepted by customers. Further, some conditions should be provided in companies as:\(^{(37)}\)
  Good knowledge of the cible markets through collecting information getting by market studies for planning and determining the favorable time to innovate;
  Insuring that the new product realizes customers needs and performing well in markets;
  Having the competences to use technologies for presenting the innovated product.

IV-The role of product innovation in enhancing competitive advantage in PME:
Developing and innovating products is considered as a growth driver for companies, whereas; companies competitive position is determined through their capacity to innovate in their product portfolio and the time that they need to launch their new products.\(^{(38)}\)

The success of developed companies refers to the innovation in their strategies, process and products. Innovation helps companies to realize positive results in market and competition rates such as: Nokia (in mobile commerce), Microsoft (in computer trade), GMC (in cars trade)…etc. Product innovation precisely is considered as one of the most important strategies which allows company to be differentiated within its competitors, in other words, product innovation is a source of the competitive advantage.

Competitive advantage definition:
There are many meanings of competitive advantage as:
  It means the company's capacity to provide products and services to customers with higher quality than other competitors in the world market. It means also the capacity to produce new product with higher quality, preferred price and favorable time;\(^{(39)}\)
  It is the capacity to innovate new products in order to be more competitive through: quality, higher techniques, perfect marketing…etc for attracting customers;\(^{(40)}\)

There are several strategies to realize competitive advantage which are related directly with products such as: low costs strategy, differentiation strategy and focus strategy. The first one means the company's capacity to produce or to sell the same product by a lower price than the competitors, the second strategy (differentiation strategy) - that was proposed by Porter-means to differentiate the product in order to create new value to the customers.\(^{(41)}\)
strategy aims to develop company's products and to improve the quality for maintaining an advanced competitive position through product innovation which create a new value.

In the third strategy (Focus strategy) the company concentrates and focuses on a selected part of the market and tries to realize its needs through the differentiation in products or prices or both.

**Figure 08: Strategies Types**

![Strategy Types Diagram]

To be distinguished company, it should follow some steps such as

Customers need analyses: the main objective to differentiate products is to present an added value to the product for realizing customers' needs in this case customer can buy the products with higher prices. So that, it's necessary to analyze customers' needs which are not realized by the existing products and studying the value or the amount which can be paid by customers;

Having higher capacities and competences to develop products;

Developing the marketing capacities: because analyzing customers' needs and developing products need advanced marketing competences. Also to sell differentiated product, companies should convince customers to buy their products. Further, to protect the commercial brand companies should apply efficient strategies especially when they adopt differentiation strategy because the famous commercial brand and the higher performance encourage customers to pay more;

Focusing on development and creativity;

Adopting R& D programs;

Using high technologies for reducing costs and managing products development activities.

**Conclusion**

Company's continuance is related to its capacity in developing competitive advantages in its products that allows it to obtain customers' fidelity and widening its market share through product innovation. So companies become obliged to adopt product innovation and provide the favorable environment through:

Encouraging R& D;

Providing financial sources to support new innovations;

Putting efficient programs and policies;

Motivating innovators

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