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NEW PRODUCT DEVELOPMENT

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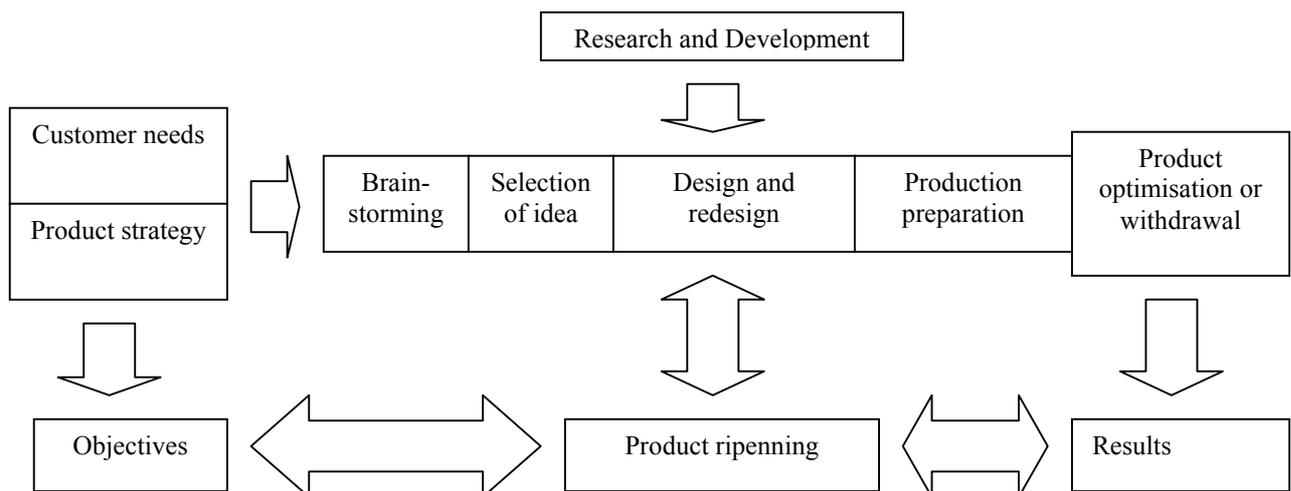
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INTRODUCTION

The development of a new product (hereonto New product development – NPD) by a company begins when the need to create a new product appears either due to the emergence of a new technology, or the appearance of a competitive product or a change in the existing legal framework and is completed with the final introduction of the product in the market.

A company or an enterprise may proceed to a new product development whether that company or enterprise is part of a rapidly changing market or not. (A rapidly changing market is one where a rapid change in technology leads to swift changes in the structure of the market, the consumer habits and their attitude).

Those new products may be based on other already existing ones (see Example 1) and act as a complement or improvement to existing offerings, or may be totally new products based on new technology without the need of support from others (Stand alone products).



A company or enterprise decision to develop a new product is probably one of the most important decisions to be made in the history of that company or enterprise, because a new product development is directly linked with the development and the evolution of that very company or enterprise. The following question, which should be raised each time, is deemed necessary for the development of a new product, and it is very characteristic and indicates the relationship between a new product development and the future evolution of the company or enterprise: “Where does the company stand today and where should it be a decade later?”.

For a company to develop a new product, the development and good management of a Research and Development (R&D) department within the company is essential. The administration, management and improvement of such departments constitute a fairly

difficult task, given the fact that market conditions and demands constantly change and future developments may be unpredictable.

For the proper development of a new product, an enterprise should follow the New Product Development Model. It is important for that enterprise to use a questionnaire - check list in order to obtain an initial estimate for the need to develop a new product, the way to develop it and the extent to which this development is feasible.

PRODUCT DEVELOPMENT MODEL

1. Creation of ideas
2. Evaluation of ideas – Selection of final idea
3. Product development
4. Manufacture of prototype
5. Product promotion

1. CREATION OF IDEAS

Prior to the development of a new product, it is necessary to have some initial ideas for new products, one of which will become the new product. The creation of those ideas forms the basis for the proper development of a new product.

α. IDEAS FROM CUSTOMERS OR USERS OF COMPANY PRODUCTS

Ideas for new products can quite easily ensue from the very customers of the company or from users of previous company products. In this case, the golden rule is for the company to offer its customers what they want and not what the company thinks they want. Gathering such ideas is very easy with the use of questionnaires either upon the purchase of a product (research at the product outlets), or over the phone (telephone research based on the company clientele list), or through the Internet (on-line questionnaires).

β. IDEAS DERIVING FROM MARKET RESEARCH

Market research is another good source of ideas for new products. The successful development of a new product requires very good knowledge of customers and their needs and, more generally, of the market to which the new product is addressed. Thus, all the more companies or enterprises develop new products based on the orientation of the market (Market-orientation NPD firms). The orientation of the market can be defined as a set of interlinked procedures and activities, aiming at the creation and fulfilment of customer needs through constant assessment of those needs (need assessment). In other words, the enterprises that develop their products based on market orientation, develop tools to study the market and elaborate development strategies to constantly satisfy the needs and desires of the customers – consumers.

Market-orientation studies on companies in Scandinavian countries and the USA have shown that, despite a significant and intense government intervention and a low level of competition, those enterprises barely use this mean. On the contrary, Japanese enterprises depend all the more on the development of products through market-orientation studies. As to European and other Asian enterprises, studies have shown that the market-orientation analysis process is very important especially for those enterprises that are based on rapid technological changes; it is equally important within the framework of those markets characterised by stiff competition and doubt. All the above-mentioned studies point to the fact that, the use of market-orientation studies as a mean to guide the development of new products depends on the cultural differences between the markets of the various countries on the globe.

γ. IDEAS DERIVING FROM COMPETITORS

Expos, shows and seminars of rival companies may be a very good source for the creation of ideas, because through these events a company may become informed on market innovations, on technological advances, as well as on possible improvements on existing products – competitive or not.

δ. IDEAS DERIVING FROM COMPANY EMPLOYEES OR DEALERS

Company employees and dealers may prove valuable to the creation of ideas, when that company is operating on a market through them. They are the ones who are in constant contact with the public – customers or not – from whom they can draw information regarding company products. The public may inform them on potentially necessary improvements, complaints on existing products or the need for new products. Furthermore, in cases where the market is differentiated due to its geographical position, dealers and employees are the only ones who can offer such sort of information to a company based far away from the market it is addressed to.

2 IDEA COMPARISON AND ASSESSMENT (SCREENING)

A. Assessing ideas based on company objectives

The assessment of new product ideas based on the objectives of a specific enterprise and its strategic course in any market may enhance its objectives, also allowing it to select the optimum idea for the development of a new product in accordance with the future course of the enterprise as set through its strategic planning. This way, selecting the appropriate strategy may also function as a guide for the assessment of various ideas and the adoption of the best one amongst them.

Based on strategic planning:

- The group of customers or consumers to which a new product is addressed should be defined, either demographically or according to its life-style,

- The company objectives should be decoded as an annual anticipated outcome, whether this is defined as profits made or as company growth due to the consequent development of the new product,
- The standards for the determination of the success of each new product should be set, for example the quality of the product, its price, its position on the market compared to other competitive products, etc.

In case that any of the ideas for the development of a new product meets with the strategic planning of an enterprise as outlined above, then the future course of development of that product is feasible. Otherwise, the company strategic planning and objectives should be altered, something that could prove quite costly.

(see Example 2)

B. Assessing ideas based on sales and company profit

Each new product to be developed or each new idea to be made into a new product should be capable of producing a minimum percentage of sales, and consequently profit, for the enterprise. Prior to the development of a new idea on a new product, many large enterprises set minimum sales goals amounting to a 60% profit on the cost of the product development. In other words, for the development of each new product of a cost of 40 million dollars, they should have secured or anticipated mixed profit (before taxes) amounting to 60 million dollars. If a small company is trying to face a larger company that has set the above goals through the development of a new idea on a new product, the former should set such sort of goals – maybe even stricter ones – in order to succeed.

F. Assessing ideas based on big customers and users

An important issue that many companies, big or small, tend to overlook, is the assessment of new ideas, which could develop into new products, deriving from big customers and users. The most common phenomenon is the full development of a product ensuing from a good idea, without the slightest involvement of the end-users, due to the large enthusiasm entailed in such a development. As a result, when the product is introduced in the market it fails, jeopardising not only the investments made for its development, but also the future of the company.

Reasons for the failure of new products
Underestimation of competitors
Overestimation of the number of potential consumers
Overestimation of the price of the product
Lack of or failure to identify mature markets for the distribution of the product

All of the above reasons, for which a new product may fail, are due to the lack of communication between the enterprise and its customers and the users of its products upon the assessment of new ideas to be developed into products.

In some enterprises of hi-tech or pharmaceutical products, where a lot of time and many financial resources are spent on the development of new products based on new ideas, the involvement of customers and end-users in idea assessment is a fundamental factor for the development of an idea into a new product and the avoidance of the afore-mentioned negative factors.

3 PRODUCT DEVELOPMENT

a. RESEARCH AND DEVELOPMENT (R&D)

For the development of a new product, in most cases it is necessary to use research and development departments within the company. The aim of these departments is to perform research on new technological and non-technological applications and to further develop them into products. Rapid development of new technologies, especially in the fields of material, medicine, genetics, pharmacology, electronics, etc., and the reduction of product life have rendered the existence of these departments essential. The basic factors constituting the proper organisation and operation of such departments are the following:

a1. Finances

The operation of a research and development department can be very expensive.

a2. Perplexity

A new product should be simple and so should be its research and development procedure. The possible complexity of the product or of its research and development procedure could cause delays and increase of its development cost. The more complicated a development procedure is, the more experts are involved in it, the more difficult is the possibility of making swift, dynamic decisions; all these issues are translated into more time and more money.

a3. Manpower

The development of a new product through a research and development department moves faster and more effectively when the team involved in the specific project consists of 6 to 10 individuals working full-time. For the development of several products, such as cars, computers and airplanes, larger teams are required. However, since this is not always possible due to cost, the development of the product in such cases is effectuated with the participation of part-time employees or through outside contractors.

In order to plan and find the most efficient combination of people to form such a research and development team for new products, an enterprise should take the following into consideration:

If there is one product to be developed and the time for its development equals “A” man-hours, then by doubling the members of the team, the time for the product development is reduced by half.

If there are a lot of products to be developed simultaneously within the research and development department each year, then by doubling the members of the team and reducing by half the number of products to be developed simultaneously, the research and development of less products is completed within a specific period, for example within six months, but the same number of products is developed within the year.

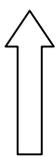
a4. Management

The development of a new product within a research and development department may cause a series of problems, the solution of which requires dynamic decision-making. Therefore, the expeditiousness of the solution of the various problems depends on the expeditiousness of decision-making. If decisions are taken at an outside or distant management – decision-making center (distant from a geographical point of view), delays in product development are inevitable. For this reason, each research and development team or department should enjoy the freedom to make autonomous decisions.

a5. Suppliers

The participation of suppliers in the development of a new product during the research and development procedure may prove very profitable as to the cost and quality of the end product, as well as to the cost and time for its development. Thus, the participation of suppliers (of either materials or services) seems to be essential. Nevertheless, in the case of products consisting of multiple parts or materials, such as electrical or electronic devices, cars, airplanes, etc., it may lead to an increase as to the complexity of the product development, resulting in higher cost and more time. Therefore, prior to involving the suppliers in the product development procedure, the enterprise should draft a plan or conduct a study as to the degree to which this involvement will be of help, to the timing of the participation, to the way it should be conducted and to the stage of the procedure at which it should be effectuated.

First of all, one should explore the way in which contact with the various suppliers should be made and how quickly this can be achieved. The following table indicates the various means of contact, their speed in providing information, as well as the pros and cons of each type of contact.

Information completeness	Mean	Speed	Type of contact	Channel
High  Low	Face-to-face	Immediately	Personal	Audiovisual
	Over the phone	Fast	Personal	Audio
	In writing – Personally	Slow	Personal	Partly visual
	In writing - Corporately	Very slow	Impersonal	Partly visual

Secondly, there should be a sort of questionnaire based on which an enterprise may determine the participation or not of suppliers in the product development procedure. Such sort of questionnaire could be like the following:

- Based on the company technological possibilities, how detailed should the product specifications be in order for the development of the various parts of the new product to take place?
- Are there suppliers with production knowledge or ready products that could be part of this new product?
- Are there suppliers who can contribute to the development procedure of a part of the new product more effectively than the enterprise itself?
- To what extent is the participation of the suppliers in the development of parts of the new product necessary?

Having answered such a questionnaire, an enterprise can easily determine the participation or not of the suppliers in the product development procedure during the research and development stage, as well as during the production of the end product. If participation is finally decided, the best suppliers should be found upon meticulous investigation of the market.

(see Example 3)

b. ENVIRONMENTAL RESTRICTIONS

The enactment of strict environmental regulations and consumer awareness as to the protection of the environment have led many companies to the development of new products bearing in mind the protection of the environment. However, such a tactic bears consequences on the way these products are developed, since it concerns their production, consumption and final disposal as refuse. Either way, each change as to the way these new products are produced in order to be environmentally friendly is very costly. The high cost of those changes gave birth to the new product development tactic known as “Green design”.

This tactic consists of two strategies: the first one is trying to find ways to reduce environmental pollution during the production and development of the new product, and the second one is attempting to find ways of reducing pollution after the use of the product, by optimising recycling or re-use of part of the product or the product as a whole. The four parts forming those two strategies are presented below:

STAGE OF THE STRATEGY	PRIMARY OBJECTIVE	SECONDARY OBJECTIVE	MEASURES
Extraction of raw material	To find and use environmental friendly raw material	To use that material which meets the quality, cost and reliability demands	Use of recycled material, such as aluminium, and clean energy sources, such as solar energy
New product production and development	To reduce environmental impact during the production and	Swift, simple, reliable and low-cost development	

	development of the new product		
Consumption	To reduce or even completely eliminate negative environmental impact		Non-use of that material, which harm the environment during the consumption of the new product (aerosol, ammoniated fertilizers, etc.).
Disposal of new product	To find environmentally friendly disposal methods for the product after its use	Low-cost disposal	Use of biologically decomposing material (e.g. paper), as well as that sort of material that can be partly or totally recycled.

4. PROTOTYPE MANUFACTURE

a. PROTOTYPING

The rapid development of models or prototypes may largely reduce the development cost and the product development cycle. In addition, they can be used in test markets prior to the entry of the product in the final production and commercialisation stage. Since it is based on technological changes or improvements, the development of such models or prototypes is usually conducted by technologists, who have no regard for the cost of such a development. (The cost of such a development is due to the cost of the material, additional personnel, training of that personnel and system changes). Therefore, any such development should be conducted upon an initial assessment of the models or prototypes from a combined team of technologists and economists. Usually, the former submit a development proposal and the latter assess it based on the cost of the proposal and the future profit after its materialisation.

The rapid development of models will be successful only if the following apply, and only then:

- Each prototype should provide answers to specific questions.
- The prototype should be as detailed and complex as necessary to provide the required information.
- If there are multiple ideas, then it is necessary that multiple prototypes be developed.
- Decisions should be made during the development of the prototype and one should not await its final form.
- The swifter the prototype development, the swifter the overall development of the new product.

b. MARKET TESTING

Each new product should be subjected to a limited or extended market testing, so as to record the reactions of the market and thus perform the final changes or improvements on the product or even on the way it is developed prior to its full introduction in the specific market. The time those tests are conducted varies, for example it is possible to perform those tests before the product is introduced in the market, but even after its introduction. Here below there is an indicative way of conducting such tests:

Testing – study prior to the introduction in the market	Testing – study after the introduction in the market
Market focussing – identification	Reliability study
Market behaviour study	Study on optimisation needs
Focussing on involved consumers	Study on new advertising strategies
Testing the product idea	
Testing the product name and packaging	
Product testing	
Study on the possibility to copy the product	

5 PROMOTION OF THE PRODUCT

a. FINAL STRATEGIC PLAN AND MARKETING OF THE PRODUCT

The final strategic plan for the development of a product before it enters the market is probably the most important product development step, since it places the emphasis on the details regarding the presentation, use, etc. of the new product in the market. The following are strategic plan points and provide the first sense of a new product marketing method.

- **Use.** The new product must be user-friendly, safe and simple.
- **Appearance.** The presence of colours and shapes providing singularity and originality is necessary in order for the new product to attract the interest of the consumer.
- **Easy maintenance.** The maintenance of the new product should be easy and low-cost.
- **Low cost.** The new product should have a low purchase cost.
- **Communication.** There should be direct communication between the enterprise and the consumers of the new product upon the introduction of the product in the market, in order to solve any potential problems.

In case any of the above points is not met, it would be advisable to return the product to the development stage and to proceed to the production of new prototypes.

b. INTRODUCTION OF THE PRODUCT IN THE MARKET

b1. Tests and packaging

Prior to the introduction of the new product in the market, it should be tested in various temperature and humidity storage conditions, and according to the results of these tests, the packaging should be selected. No enterprise would like the product to be destroyed due to bad storage before it is even introduced in the market.

b2. Market selection

This should take place during the initial stages of the development, since any product development would be pointless without an initial market orientation.

b3. Distribution and delivery

Good organisation of distribution and delivery of the product ensures the immediate placement of the product wherever the customer needs it. The distribution and delivery cost, which includes the storage, transportation and product return costs, should be calculated in the total cost of the product.

QUESTIONNAIRE – CHECK LIST

INITIAL DEVELOPMENT STRATEGIC PLANNING

- Are there the necessary funds to develop a new product or service?
- Does the company have the technological ability to support the development of a new product or service?
- Is there the necessary time for such a development?
- Is there the manpower for such a development?
- Does a competitive enterprise offer the new product or service? If yes, is there such an improvement leeway as to justify its development?
- Is there a market for the new product?
- How do the consumers – customers view the possible introduction of such a product or service in the market?
- Is the development idea supported by the current manpower of the enterprise?
- Is the new product or service unique?
- Is this development compatible with the long-term course and strategic planning of the enterprise?
- Has the new product or service been sufficiently researched?
- Have the competitive enterprises been sufficiently explored?
- Is the new product based on current or future trends in the market? If so, what are they?

PRODUCT RESEARCH – PLANNING AND DEVELOPMENT

- How many people should be involved in research and planning?
- How much will research cost and where will the resources be found?
- Who will the suppliers be and how reliable are they?
- How much will the creation of a prototype and its assessment from the buyers help?
- Which will be the rules governing the various procedures from the beginning to the end of the development?
- At which time point will planning be introduced to the productive procedure? Will this point in time be fixed or variable?
- Are there time and money margins for unexpected events during planning?

INTRODUCTION OF THE PRODUCT IN THE MARKET

- Has the way the product will be distributed in the market been decided?
- What are the positive features of the product or service?
- What are the negative features of the product or service?
- Is there a possibility to improve the product?
- What is its estimated value?

EXAMPLES –CASE STUDIES

1st Example: Development of products based on existing ones

The «Gillette» company started its business activity as a manufacturer of razors and shaving blades. However, it realised that it could provide its customers with much more. Therefore, it developed products such as shaving foam, various gels, as well as after-shave skin care products. Furthermore, the company proceeded in the elaboration of the changing shaving-blades technique, those blades however only fit in razors manufactured by the same company. The above development is an example of those companies that were not based on the development of brand new products, but of products that came as a natural continuance of an already successful product.

2nd Example: The need of strategic planning during new product development

The following is a typical example of the need for strategic planning for the development or improvement of services or products of a company: A grocery store in a large city center lost 50% of its profits and its customers when a large supermarket opened in the same area. Initially, the grocery store manager reduced the prices of the products, by reducing his profit margin and increased the variety of his products in an attempt to recapture the customers he had lost. However, this had the opposite effect than the one expected. Thus, he turned to strategic planning in order to better develop the provision of his products and services. By studying the “market”, that is to say his customers, he came to the conclusion that they only spent a specific percentage of money on specific products. In addition, by using a simple questionnaire, he realised that many consumers would be attracted by new provisions. As a result, he introduced services such as free home delivery of the products within a specific distance, the dispatch of small gifts to customers during the holiday seasons, as well as the sale of new products such as freshly baked bread, newspapers and cigarettes. This way, not only did he regain his lost customers, but also acquired new clientele.

3rd Example: Participation of the suppliers in new product development

“Philips Medical Systems (PMS)” is part of the “Royal Philips Electronics” company in Holland. It is involved in the development of products such as X-ray equipment, ultrasound devices, etc. In an attempt to reduce the new product development cost, it introduced the participation of the suppliers of the various parts forming its products, during the new product development procedure within the research and development department. This led to a significant reduction of the new product development time and cost.

In order to achieve its goal, it studied the relationship between the participation of its suppliers and its products. It examined the degree to which participation was necessary, at which point of the development it would prove most profitable, what would be the quickest means of communication with the suppliers, etc. The study was conducted with the use of questionnaires and through constant contact with the suppliers, the company technicians and the customers.

LINKS

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