

PRODUCT DESIGN AND DEVELOPMENT:
INNOVATION IN RESEARCH TECHNOLOGY
MANAGEMENT

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ABSTRACT

Product development is an important constituent business policy and with its effective implementation in an organization products are designed, developed and positioned effectively according to its requirement and consumer behavior. A growing organization firm must concentrate on new product development techniques and old products elimination methods, as per market requirements from time to time. Innovation is the essence of development, in this modern competitive world of technological advancements, change is a consumer behavior, need for comforts and conveniences, change in expectation and market requirements organizations must be cautious to these changes taking place in its environment. New product development ideas are outcome of market research studies, consumers, competitive products, competition, etc.; it reveals market gaps by comparing the existing product conceptions of consumers. Product testing is another aspect of test marketing that has to be conducted carefully by an organization. Selecting the test market and monitoring the test and interpreting the test result are crucial factors to make the new product successful. By analyzing the adequate demand, new product must be launched in stages and old products must be eliminated accordingly in order to make product development successful.

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1. INTRODUCTION

A progressive firm must always consider new product development as a cardinal element of its product policy. Innovation is the essence of all growth. This is especially true in marketing. In the age of scientific and technological advancements, change is a natural outcome of change in food habits, change in comforts and conveniences of life, change in social customs and habits, change in expectation and requirements. Any business has to be vigilant to these changes taking place in its environment. People always seek better and better product more convenience to products, more fashion, and more value for the money they part with. A business firm has to respond to these dynamic requirements of its clientele, and these responses take the shape of new products and new services. Through such as response, the firm reaps a good deal of benefits.

2. PRODUCT ELIMINATION

New products become necessary from growth and profit angles too. Products that are already established often have their limitations in enhancing the profit level of the firm. It thus becomes essential for business firms to bring in new products to replace old and declining ones and products incurring losses. New products become part and parcel of the growth requirements of the firm and in many cases, new profits come to the firm on through new products. The need for responding to changes and the need for new profits are not the only factors that persuade business firms to go in for new products. There is a more compelling reason the threats arising from the environment. These threats make some of their current products highly vulnerable. And to reduce the vulnerability of their business as a whole, they seek our new products. New products offer new avenues of growth and thus secure to overall viability of the firm. The risk also gets spread over several products, existing ones and new products, so that the firm does not face the threat of sudden extinction. New products have to increasingly satisfy public criteria in addition to promising reasonable profits. They must be designed with consideration given to consumer safety and ecological compatibility. Government requirements have slowed down the rate of innovation in the drug industry and have considerably complicated product design and advertising decisions in such industries as cosmetics, automobiles, small appliances, and toys. A company typically has to develop a great number of new product ideas in order to finish with a few good ones.

3. SOURCE OF PRODUCT IDEAS

New product's evolution begins with an idea for the product. Hence this stage is also termed as 'Idea Generation'. The new product ideas may come from customers, dealers, in-company sources or from research organization. Consumers' problems are the most fertile ground for the generation of new product ideas. This is equally true of both industrial products and consumer products. From shampoos to computers, customers are generating product ideas. And innovation bound companies are cashing in on them. Several companies follow user stimulus strategies by announcing attractive rewards for good new product ideas. Experienced workforce, research staff and salesman are also source of product ideas. There are companies well known for silently encouraging 'skunk works' where small 'unauthorized' teams of executives / workers spend company's time and money to work to crazy product ideas of their own. Creatively techniques like brainstorming are also used for generation of product ideas. The group is encouraged to think in all possible dimensions, and slowly the problem would be made clearer to them, and their ideas would get refined.

4. PRODUCT DEVELOPMENT

The idea is converted into a product that is producible and demonstrable. It is during this period that all development of the product, from idea to final physical form, takes place. The final decision whether a product should be developed on a commercial scale or not is decided at this stage because the time-lag required to attain this stage is a long one and it is possible that some adverse developments might have taken place during this period. This is different from test marketing of the product which takes place at a later stage. This stage is crucial in the total process of new product development because several vital decisions regarding the project are taken based on the analysis done at this stage. This stage will decide whether from the financial and marketing point of view, the project is worth proceeding with. Investment analysis and profitability analysis of the project under different assumptions are made at this stage. The project's overall impact on the corporation's financial position with and without the new product are estimated and compared. The financial estimates would be reliable only if they are based on a fairly accurate demand forecast and related market factors. The purpose of this stage is to project the future sales, profits, and rate of return for the proposed new product, and to determine whether these meet the company's objectives. If they do, the company will develop the new product. Business analysis is done not only at this stage but throughout the development process

as new information is accumulated about the product and the market.

Product ideas appearing sound from a business point of view can now be turned over to the research and development department. This is an important step in at least three ways. It marks the first attempt to develop the product in a "concrete" form. Upto now, it has existed only as idea, or perhaps as a drawing, or a very crude mock-up. Second, it represents a very large investment, which is likely to dwarf the idea-evaluation costs incurred in the earlier stages. Much time and money go into trying to develop a technically feasible product. And finally, it provides an answer as to whether the product idea can be translated into a technically and commercially feasible product. If not, the company's investment up to now is lost except for any by-product information gained in the process. Three steps are involved in the product development stage prototype development and consumer testing, branding and packaging. The first task is for the research and development department to build a physical prototype that realizes the attributes specified in the product concept and its trouble free and economical to manufacture. Consumer testing goes hand in hand with prototype development. Various methods have been proposed for the testing of consumer preferences among a set of prototype alternatives, such as paired comparisons, multiple choices, and ranking procedures. Consumers are normally asked to sample the alternative products in a laboratory or home setting, and the testing organization exercises the normal controls to avoid biased results. The company examines the results and decides on the prototype model that seems not promising on the overall criteria. The brand name should not be casual after thought but an integral part or reinforce of the product. The two traditional packaging concerns of manufactures are product protection and economy. A third packaging objective, which comes closer to considering the consumer, is convenience. This means such things as size options and packages that are easy to open. Over the years a fourth packaging objective has received increasing recognition from manufacturers, particularly those in the consumer's goods field. This is the promotional function.

5. TEST MARKETING

Test marketing is a form of risk control and ensures avoidance of costly business errors. It is a controlled marketing experiment with minimum possible cost and risk; to decide the soundness and feasibility of full-fledged marketing of the product. If totally new products are introduced into the market on a commercial scale without resorting to test marketing, it may so happen that the product was not the right one for the chosen market. It may be too costly a

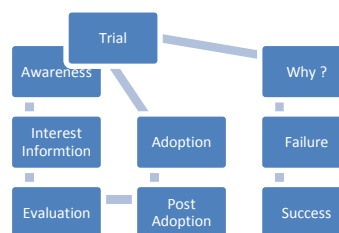
mistake for the firm. Test marketing of a product may indicate that the sales prospectus for the product is bound to be poor. The firm can save the investment by dropping the new product idea. On the contrary, if the results received from the test marketing are positive and encouraging, the firm may go ahead with the commercial production and marketing of the new product. Test marketing is an experiment that has to be carefully conducted. In many cases, test marketing is also a time-consuming process; it has to be carried out for long duration in order to obtain reliable and meaningful indications.

6. COMMERCIALIZATION

Commercialization is also the phase where marketing is most active in connection with the new product. This stage is considered to be a critical one for any product and should therefore be handled carefully. For instance, it should be checked whether advertising and personal selling have been done effectively and whether proper outlets have been arranged for the distribution. Despite the care with which the previous development stages have been planned, unforeseen events can impair commercialization seriously. Some activities are usually undertaken during this stage like that completing final plans for production and marketing, initiating coordinated production and selling programmes and checking results at regular intervals. It should be remembered that new products should be launched in the market only stage by stage. In other words, introduction may be restricted to a few regions in the first instance. This is to avoid short supply of the product due to initial gaps in production and distribution. It is not prudent to extent a product nationally and then not be able to meet demand or to come across some unexpected deficiency.

7. NEW PRODUCT ADOPTION PROCESS

When a new product is launched, it can be highly successful if the management identifies the nature and extent of adoption process of that product. Stanton visualizes six mental stages which a prospective user goes through while deciding whether or not to adopt new product. The Fig 1 is the model build by us during the research.



(Fig 1. New Product Adoption Process Model)

The stages are awareness stage, where the individual is exposed to innovation-product, service, idea-but knows very little about it, interest information stage, where the prospect becomes interested to ask for and knows specific information about it, evaluation stage, in which the prospect mentally measures the relative merits and demerits of the innovation, trial stage, in which the prospects actually adopted the innovation on a limited basis, adoption stage, in which the individual decides whether or not to use the innovation on a full scale basis, post-adoption stage, in which the prospect continues to seek assurance that he made the right decision, why new products fail? Despite careful attention to product planning and development, as many as 50% of the new products actually entering the markets have a very short life span and market failures occur.

8. SUCCESS AND FAILURE OF NEW PRODUCT DEVELOPMENT

The reasons for the failure of new products are inadequate market analysis; if the market analysis is inadequate, improper, biased or not extensive enough, the analysis will yield only wrong idea. Acting on such data leads to product failure, product problems and defects. It arises out of technical mistakes in the process of production. This is a basic reason for product failure. Inadequacies in products, to a large extent, are got rid of by proper product testing, higher costs than estimated costs. This is another reason for product failure. The cost estimate often also goes wrong when the products are finally introduced into the market, poor/Bad timing of introduction. The basic principle to be followed in product planning is to find out the exact time within which the product is to be introduced into the market. Usually when and how the two questions are, a manufacturer often finds it difficult to answer. A close analysis of market conditions and the consumer behavior and attitudes is essential to find out an answer to the two problems, failure to estimate the strength of competition, this is also an important factor that leads products to struggle hard in the market. There are various methods to overcome severe market. Price cuts on the marked price and various kinds of discounts, etc., may be adopted. Whatever it is, improvement in the quality alone will withstand competition. Customers cannot be cheated by price cuts, discounts, etc., insufficient and ineffective marketing effort. It is wrong to assume that a manufacturer's job ends at the moment a product is ready for sale. He should try very much to market his product by proper promotional activities, inadequate sales force. Selling is done by personal or impersonal methods. Impersonal methods constitute the advertisement and similar

promotional activities. Personal methods on the other hand, are more intimate and more efficient. Promotional activity should be backed by adequate sales force to introduce the product in the market, failure to recognize rapidly changing market environment, failure of product to fill consumer needs due to ignorance about consumer's attitudes and about new products, too many new products entering the market and many products are not new as perceived by consumers.

All these problems could be solved by timely action of the marketing management. The following methods are suggested to prevent a new product failure: By analyzing and ensuring that there is adequate demand existing for the product. In other words one should identify and ensure a potential market for his products. By making a product that would exactly fit into the existing market structure of a company. By using continuous and efficient demand creation methods and by selecting a product that should reflect the company's image already created in all respects, especially with regard to quality and price. There are some products which cannot be improved or modified to suit the market. Here, the profitable alternative would be withdrawn the product.

9. Conclusion

The technological change in the industry and the market. For example, if Mrs. Indira Gandhi's government had not decided to expand the television network to cover 70 percent of the Indian population, launched its own Satellite INSAT IB and started colour telecast in 1982, it is extremely doubtful if many of today's products would have seen the light of the day in the Indian market. Application of chips technology to the watch making industry gave us a quartz watch something that Titan watches have successfully marketed the product in India. The driving force in new product development is changing customer life styles, leading towards a change in the customer's preferences and expectations. The changing role of women, growth in the nuclear and stand alone families, increase in education and income levels, and a manifold increase in the electronic media also contributes towards changing customers expectations and preferences. Marketing management will have to undertake constant checking of a new product throughout its life cycle. Product improvement search will be a continuous affair to introduce necessary improvements, modifications, innovations etc., in the existing product on the basis of changing consumer preferences as well as or account of development of science and technology. Your product must be up-to-date and then only it can prolong its life cycle against keen competitions.

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