

New Product Development

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Stages of New-product Development

Product life is limited and the product life cycle remains a fundamental concept in marketing. Thus the growth, and even the survival, of individual firms and industries depends on their ability to develop new and improved products and processes.

It is widely agreed that there are six stages in new product development consisting of the following: explorations, screening, business analysis, development, testing and commercialisation (Dean 1968, Kastner et-al 1981, Pessemer 1965).

In this paper, the new-product process is broken down into the following manageable stages for planning and control.

- Search
- Screening
- Economic analysis
- Development
- Product testing
- Commercialisation

Figure 1: Stages of new-product development

Search:

The expansion of idea, through creative analysis and studies, to locate potentially profitable additions to firm's product line or capabilities. This may include market studies, Research and development work and acquisition studies. The idea generation comes at this stage.

Screening:

Low-cost studies and quick analysis to eliminate weak proposals and to determine which ideas are worth further studies.

Economic Analysis:

Detailed studies to expand the ideas that survive the preliminary analysis. The outcome of this stage is to scrap the proposal, postpone it or proceed to develop it

Development:

Transformation the idea into a tangible product or process.

Testing:

Commercial experiments and market tests to measure the acceptance of the product.

Commercialisation:

Full scale production, marketing, distribution and sales operations

The idea generation stage involves identification of potential new product ideas. Emphasis is given to stimulation and encouragement of individuals within and without the firm to suggest products or product market areas for development. All functional areas within the firm are encouraged to submit product ideas. The decision at the idea generation stage involves the choice of product ideas to be passed on to the business analysis stage for more formal analysis.

The business analysis stage decision involves choosing from among a group of product ideas the specific product projects to be developed technically. Financial decision criteria used in the business

analysis stage include return on investment, discounted present value, return on sales, and so on. Marketing and technical decision criteria are also often used, including definition of the market segment to be filled, rate of sales growth, contribution to technical knowledge, and R & D personnel interests.

These six stages describe all of the steps involved in the usual R & D to operations process, although many firms combine or skip some stages. Selection of specific products for development is generally made using various decision criteria which are based upon the subjective opinion of the decision maker or by arbitrary mathematical algorithms.

The existing literature treats the R & D to operations planning process as a set of independent steps. The decisions to be made at each step are normally considered to be independent of decisions at other steps, as if each is to be made in a vacuum rather than in the context of an ongoing process. Ramsey suggested that it is possible to list a series of usual process flow stages developed from review of the literature so that the total R & D to operations process can be viewed as a system (Ramsey 1978).

Success and Failure of New-products

Barclay (1992) reviewed the research work into the process of product development and the way it has progressed over nearly forty years. He has showed three interesting findings:

1. These research studies have consistently failed to lay down clear guidelines for the application of the research results.
2. Closer examination of these studies, reveals that there are definite trends in the pattern of the work. In the early work, researchers concentrated on identifying the factors or attributes associated with success or failure in product development or technological innovation.
3. It is also clear that most of the research studies are not widely known by practising managers. An added problem is that the results of the past research work are not presented in a format that allows for ease of application.

Barclay and Benson (98) proposed a comprehensive application methodology based on the evidence from past research work. They found a total of 140 factors associated with new product success. No one study or review summarised the findings of the whole research accurately. It is difficult to simplify and classify these factors as many overlap and interrelate, however the following five attributes were found to be of exceptional importance in new product success:

Attribute	% of studies in which attribute is identified	Number of factors in total
An open minded and professional management	78	30
A good market knowledge and strategy	78	23
A unique and superior product that meets customer wants and needs	67	10
Good communication and coordination	56	14
Proficiency in technological activities	56	17

New-product Development Strategy

There are a number of strategies in which firms utilize technology as a basis of competition. The strategies a firm chooses will be based to a large degree on its accumulated knowledge.



Strategic importance of R&D (Freeman's strategy types)

- Offensive strategy
- Very high research capability
- Close monitoring of any development in the field
- Large resources in terms of equipment, laboratories, scientists and engineers
- High marketing capability

Offensive strategy

A firm with an offensive strategy maintains a world-class research capability that is able to keep abreast of virtually any development that a competitor might unveil. This strategy obviously can be very costly, in terms of overheads on research laboratories and equipment as well as large staffs of well-paid researchers, but many large firms that are leaders in their industries follow this strategy to some degree.

Because of many uncertainties, only a relatively small number of firms will be willing to follow an offensive strategy, and even those which do may well retreat somewhat to consolidate their former successes (Freeman 1982: 176).

Defensive strategy

Defensive strategy is, mainly, based on the firm's experience to introduce a lower-cost version of a new product. Firms with a defensive strategy are able to react rapidly when a competitor firm unveils a new product, introduces a lower-cost version of a relatively new product, or may be known to be on the verge of new discoveries in some field. (Porter 1985: 176-93).

Imitation strategy

An imitative strategy will usually entail a somewhat greater degree of engineering expertise, oriented towards low-cost manufacturing processes, and relatively little actual scientific research capability, at least in comparison with firms in either the offensive or defensive categories.

Dependency strategy

There are dependent firms, which are wholly reliant on others, such as suppliers, to initiate technical changes. A dependent firm will typically conduct no R&D at all and have no capability in product design. Traditional firms, which are usually suppliers to larger organizations, change only in response to specification from the outside.

Opportunity strategy

Finally, opportunist or niche firms may be quite innovative, but serve a market with few, if any,

competitors, but opportunities for differentiation in settings where economies of scale or experience provide little advantage. By serving only small markets, niche producers can easily switch from product to product. Niche firms are often remarkably innovative and provide the foundation of many regional economies (Doeringer, Terkla, and Topakian 1987: 82-96; Sabel et al. 1987).

Thin markets' strategy

A variant of the niche strategy that is used to enter new markets in order to perfect new technology is the 'thin markets' strategy (Abernathy 1980; Lifton and Lifton 1989). It makes use of 'learning by selling' and feedback from lead users (Thomson 1989; von Hippel 1989). Best applied in limited, specialized markets, this strategy involves convincing a small number of firms to purchase the new technology, even though its cost typically is higher than presently used products.

The technological capabilities of firms largely determine their relationship with other firms and the strategies which are open to them (Taylor and Thrift 1982a; Thorelli 1986).

Protection of innovation

Companies take various measures to protect their competitive advantages of new or improved products. These measures are (97):

1. Patents to prevent competitors from duplicating the product.
2. Patents to secure royalty income
3. Secrecy
4. Lead time
5. Moving quickly down the learning curve, and
6. Superior sales or service efforts.

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