

Product and innovation strategies

LEARNING OBJECTIVES

After reading this chapter you will:

- appreciate the strategic significance of product and innovation decisions
- comprehend the notion of the 'product life cycle'
- understand the nature and scope of product and innovation strategies
- be familiar with the critical factors in the management of innovation
- understand the key steps in the development and launch of new products
- be familiar with recent developments in the strategic management of products and innovation

INTRODUCTION

We have discussed the analysis that precedes and is essential to the development of marketing programmes designed to meet corporate and strategic marketing objectives. In this, and subsequent chapters, we consider strategic decisions concerned with planning and implementing elements of the marketing mix; namely product, price, place and promotion (the four Ps).

This chapter examines the wide ranging nature and scope of product and service strategies (the term product covers services like banking and insurance so when we refer to products, this includes services). Products convey to customers more about a company than any other marketing activity. Not only are they the source of revenue and profit, but new products are the most important element in the marketing mix that establishes success in the future. A product can be a piece of machinery with physical characteristics or a service with intrinsic characteristics like hairdressing. The common denominator between products and services, whether physical or intangible, is that they need to meet the needs and requirements of customers and provide satisfaction. Product decisions determine the upper limit to a company's profit potential; the rest of the marketing mix determines the extent to which this potential is achieved. It is essential to manage a company's product mix effectively in a competitive marketplace. Companies are under increasing pressure to continuously develop new products which are timely and respond to customer needs. Successful businesses are able to develop new products to meet changing needs in a dynamic marketplace and it is this aspect of product management that is particularly emphasized in this chapter.

ELEMENTS OF PRODUCT STRATEGY

To illustrate the range of decisions which this key area encompasses, we consider product strategy as a hierarchy of related decisions ranging from product item to product mix elements. The nature and importance of service products are considered in a more detailed discussion of service product characteristics in Chapter 17.

Product item decisions

The first level of product decisions concern individual products/services that a company manufactures and markets. Some companies produce only one product, but most are multi-product. A **product item** is, by definition, any item that can be considered as a separate product entity and that may be distinguished from other products the company produces irrespective of its relationship to those

other products. Provided that any product differs in some way from another, either through modification or market application, it is regarded as a product item. At the product item level, product decisions include: design, quality, features, packaging and branding.

Product line decisions

Individual product items that are closely related are classed as **product lines**. The relationship could be different variations of the same basic product, e.g. the range of different fillings as product items in a range of Sainsbury's sandwiches – the product line, or a range of industrial and domestic air conditioning filters as two product lines containing product items for different end use applications.

Product line decisions involve the marketing planner in considering the number of product items in a selected product line e.g. Ford Motor Company must determine how many models in the 'Ford Focus' line they should offer, and what the nature of these variations should be (engine, trim and accessory variations).

Product line decisions are not easy. A careful, detailed evaluation of demand and cost interrelationships between individual products in the line is vital. A sense of balance is needed; if too many variations in a line are offered, costs increase, but if a product line contains too few variations customer satisfaction may be unfulfilled through lack of variety. In competitive multi-product markets, it is essential to maintain balance within each product line to achieve and maintain market share. Product lines should focus on target markets to achieve market concentration and maintain competitive advantage.

Management of the product line means frequent appraisal of the range of product items in each product line, determining whether they are too extensive or too constrained. Policy must be set to add and delete items from product lines to meet financial targets while maintaining customer service levels. This can be a difficult dilemma as frequently opportunities arise to extend the product line either by moving up-market by adding higher quality products to the line or meeting 'budget market' requirements by adding economy lines. A clear rationale is needed for such decisions. Over time there is a tendency for product lines to extend in size as new products are added, while older outmoded ones, for many reasons, are not deleted. This calls for clear policy guidelines on the addition or deletion of product items from established product lines.

Over 30 years ago one of the UK Polytechnic institutions introduced the first undergraduate marketing degree in the United Kingdom. This was a straightforward marketing degree with no specialist options aimed at producing graduates who wanted to work in some area of marketing activity. During the first few years after the programme was launched there was little or no competition. Demand for the course built slowly but steadily, and there were good employment prospects with graduates proceeding to work in brand management, advertising, marketing research, retail marketing, and so on.

Over the years success of the product encouraged more competitors to enter the market, and potential students began to pick and choose. Some competitors, encouraged by increasing specialization in the marketing jobs market itself, began to introduce more specialized marketing undergraduate courses. Slowly at first, but then with increasing urgency, in response to increasing competition and changing demand, the original Polytechnic (now a University) provider began introducing new marketing degree course products to its range. Examples included: 'Marketing with

a Foreign Language', 'Global Marketing', 'Sports Marketing' and Retail Marketing'. This University has over 20 different marketing degree specialisms in its product range, including the original programme introduced over 30 years ago. Only a small number of students apply for the original marketing degree. Most choose one of the more specialized degrees. Despite this, there is some residual nostalgia for the original course, coupled with a degree of inertia. This has meant that the original has never been dropped despite its now poor sales.

This situation can be found in many companies. Old, established products, which in the past were often the basis of the organization's initial success, are kept in the product range which simply continues to expand until it becomes unmanageable.

PRODUCT MIX DECISIONS

The **product mix** constitutes all individual product items and product lines the company markets. The product mix is described in terms of 'width' and 'depth'. This enables an analysis of the 'constituency' of the product mix to be made. Figure 4.1 illustrates a company that manufactures and markets three separate product lines: fountain pens, cigarette lighters and wrist-watches. Within each product line the company offers a number of separate product items. This is typical of diversified companies with multiple product lines. Here, the product mix represents the sum of the firm's products – in this case, 30. The number of product lines is three. **Line depth** refers to the number of products in each line – 9, 13 and 8 respectively – with the average depth being 10. **Line width** refers to the number of product lines offered.

By using the product mix concept a strategic assessment of the company's product offerings can be made e.g. product line three could be extended (and hence the product mix) by adding digital watches. The company can also assess the extent to which products in the same line are complementary to, or compete with, each other and hence which might be deleted.

Decisions about new products should reflect consistency with existing product lines. Conversely, is any one product so valued in terms of image and reputation that its deletion will damage the product mix? As Lancaster and Massingham¹ point out, ultimately the addition to the width of the mix and the depth within each product line should be compatible with long-term marketing strategy. Short-term opportunist decisions may be damaging the company's market position in the longer term.

Product mix analysis is a vital part of strategy review. In the case of Personal Products Ltd in Figure 4.1, the following are possible strategic options:

- 1 Augment the product line by adding rollerball pens. This would remove some measure of exclusivity and represent a strategy of being 'all things to people' in a bid to serve the whole market for ink-based writing implements.
- 2 Delete all but the most expensive men's lighters from line two. This would have the effect of making the company a market specialist in men's lighters, aiming at an exclusive market segment.
- 3 Delete lines one and two and become a specialist in a single product line i.e. wrist-watches, and options one and two would still be available to the company.
- 4 Delete all but one product and become expert in its marketing and production.



FIGURE 4.1 A hypothetical product mix for Personal Products Ltd

- 5 Add another product line. In the case of Personal Products Ltd, it could be a new line of pens aimed at the graphics market.

Given the existing product mix and the options available, the company must begin to take product decisions that are in line with long-term strategy and are consistent with that mix. The introduction of ball-point pens could influence the perception the consumer has of the company as a whole. Low-cost disposable pens might not be consistent with the firm's reputation for high quality lighters. Similarly, the firm may be technically capable of producing an industrial line, but lacks marketing expertise required to serve this new market effectively.

Analysis of the product mix examines every aspect of the company. Each decision has financial, technical, marketing and market implications. The critical nature of product strategy becomes more apparent when one considers the consequences of failure and the need for success. Strategic choice options that relate to product mix decisions should be carefully considered through a set of evaluation criteria, so decisions taken are rational and not emotional or opportunistic.

PRODUCT LIFE CYCLE

The **product life cycle** is a ubiquitous in marketing terms, but before we examine its uses and limitations in strategic market planning, we explain the concept.

The product life cycle proposes that like all life forms, products have finite lives. Hence, once a product is introduced to the market it enters a 'life cycle' and will eventually fade from the market.

In addition, the concept proposes that during its life cycle a product will pass through a number of different stages, where each stage has characteristic phenomena that suggest specific and different marketing strategies. This notion, together with the suggested shape and stages of the 'typical' product life cycle, are shown in Figure 4.2.

The characteristics of each stage are:

- 1 *Introduction*: At this stage the product or service is new to the market. The risk of failure is high and any initial sales are likely to be slow. Purchasers at this stage are likely to be innovators who are willing and able to take risks. Profit margins are likely to be small or non-existent due to the low volume of sales and high initial launch and marketing costs. Money spent during this phase should be regarded as an investment in the future.
- 2 *Growth*: Provided the product or service meets customer needs and there is a favourable market reaction, sales begin to accelerate as news of the product permeates the market. Customers take fewer risks than initial innovator purchasers, but they welcome novelty, and begin to purchase the product. Attracted by sales growth and potential profit, new competitors enter the market, often offering variations on the original product to encourage brand loyalty or to avoid patent infringement.
- 3 *Maturity*: Eventually the rate of sales growth will begin to slow down and then cease. A number of factors contribute to this process:
 - *Approaching market saturation*: Quite simply, there remain fewer and fewer potential customers left still to purchase the product as it is diffused through the market. Eventually, only replacement sales are made with comparatively few new customers left to purchase for the first time.

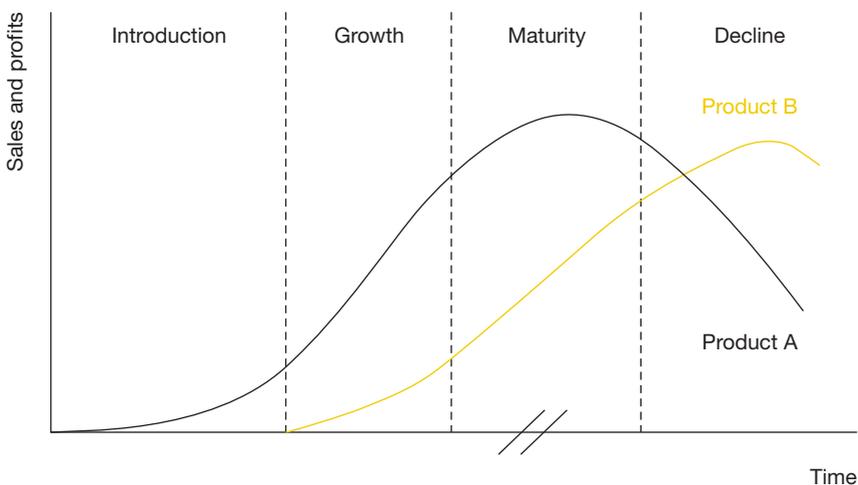


FIGURE 4.2 The product life cycle concept (PLC)

- *Customer boredom/desire for novelty*: Customers are fickle when it comes to their appetite for new products. Customers who initially purchased the new product may become bored and switch to other products or brands.
 - *New products/technological change*: Successful new products carry within them the seeds of their own destruction. As sales and profits grow, competition is attracted to the market. Often they can only gain entry and market share by developing new or improved versions of the original product. If successful, new products and changes in technology begin to supersede the original product and sales begin to slow.
- 4 *Decline*: Eventually, forces and factors which contribute to the onset of maturity will erode the market to an extent that sales begin to diminish. The rate at which this will occur, and hence length of time the old product will remain viable, varies. Sometimes decline is rapid, as in fashion markets, or when a major technological breakthrough occurs. In contrast, the rate of decline may take many years e.g. when a hard core of loyal customers refuse to switch product category or brand.

The product life cycle concept has attracted much attention and criticism as a tool of strategic market planning. As a result, the basic concept described here has been developed and refined to include, for example, the notion of different levels of life cycle, i.e. life cycle analysis for brands, product forms and product classes and the notion of variations on the classic S-shaped curve. We examine some of these refinements and their relevance to the use of the concept in strategic market planning shortly, but first we look at some of the suggested uses of the basic concept in strategic decision making.

USING THE LIFE CYCLE CONCEPT

The basic product life cycle concept brings with it a number of suggested implications for strategic market planning.

Different objectives and strategies for each stage

The major use of the product life cycle concept in strategic market planning is based on the notion that characteristics of each stage of the life cycle lend themselves to particular objectives and strategies. We examine this by tracing through each of the stages.

- 1 **Introductory stage** At this stage, awareness of the new product is low, and competitors are few or non-existent. Considerable effort may have to be made to bring the product to the attention of distributors and consumers. Marketing efforts are likely to be focused on informing customers and promotional and distribution elements of the marketing mix will be targeted at innovator categories. Pricing strategies can be aimed either at 'skimming' the market through high initial prices that gradually reduce, or at 'market penetration', aiming to achieve high levels of market share quickly through low prices. Distribution will tend to be exclusive or selective, and advertising aimed at building awareness.

- 2 **Growth stage** If the new product is successful, we can expect a rapid growth in sales. During this stage new competitors can be expected to enter the market and marketing strategies will need to be focused on combating these new entrants. Although price wars are unlikely to develop at this early stage, considerable effort may be required to establish the intensive distribution required for ultimate mass market demand. Communications will be aimed at creating brand image.
- 3 **Maturity stage** Competition is at its peak. Market share needs defending, while at the same time preserving profit levels. Brand preferences and loyalties are likely to be already established by this stage, but there is likely to be considerable emphasis on trying to encourage brand switching through sales promotion. Price reductions feature here and distribution efforts are aimed at maintaining dealer relationships.
- 4 **Decline stage** Sales promotion may be reduced to a minimum as the market shrinks. Price competition and price cutting are likely to be intense. Emphasis is likely to switch either to looking for ways to extend the product life cycle or to new products, with the old product being 'milked' for profits.

As we can see from this outline of strategies, within broad limits the suggestion is that by identifying the life cycle stage of a product we can develop appropriate marketing mix strategies for each stage. These suggested emphases are not definitive, but they can serve as guidelines.

Criticisms and refinements of the basic product life cycle concept

Amongst the most cogent of these critics have been Dhalla and Yuspeh² who have challenged the whole concept of the product life cycle. Indeed, in their influential article we are counselled to forget the concept. They argue that there is a danger of allowing the life cycle concept to dull the planner's management judgement by over-relying on 'recipe marketing'. They suggest that its use can lead to costly and potentially irrevocable mistakes in strategy. There may be a danger of selecting entirely inappropriate strategies for a particular stage of the life cycle of a product because of the unique circumstances pertaining to that particular product.

Some critics have gone further in their assessment of the limitations of the conventional life cycle in strategic market planning. Essentially, such criticisms are based on the extent to which the concept is irrelevant or even misleading. The most fundamental criticism is that there is little or no consistent empirical evidence to support the notion of products following a natural and preordained life cycle with the distinct stages; in short, the product life cycle simply does not exist.

Doubt about the existence or otherwise of both the S-shaped life cycle and the distinct stages which it is supposed to comprise, can only be resolved by an appeal to the facts. With such a long-standing marketing theory, numerous empirical studies have been undertaken over the years designed to confirm or refute the PLC concept. Very early studies include those of Cox,³ Polli and Cook,⁴ and Day.⁵ More recently, Baker and Hart⁶ have provided further thoughts regarding the validity, or otherwise, of the PLC concept. In general, evidence from these and other studies suggests that the classic S-shaped life cycle does exist, but not for all products or for similar products on all occasions; in other words, we should not consider the traditional PLC concept as a universal law. If this is the

Keep Taking the Tablets

Developed in 1897, 'aspirin' is one of the world's longest established pharmaceutical products. Originally launched by the German company Bayer, aspirin was hailed as a wonder drug and was one of the most effective over-the-counter pain killers ever launched. By the late 1960s, however, it looked as if aspirin was approaching the end of its life cycle. New modern products were being developed to compete in the painkiller market: products which were heralded as being much more effective and with fewer side effects. As a result, many of the large pharmaceutical companies with aspirin-based products began to look to develop their own new painkiller products. Some withdrew their aspirin-based products completely.

In the late 1980s and the early 1990s research began to emerge that aspirin might have the effect of reducing the incidence of heart attacks if taken regularly in small and managed doses. The research appears now to be conclusive and aspirin can be effective in preventing heart attacks. As a result, it has enjoyed a resurgence of sales, seeming to defy the product life cycle and the decline stage it had appeared to have reached. Bayer now enjoy higher sales from aspirin than they ever have. Furthermore, ongoing research into aspirin is revealing that it may have other important uses in fighting a whole range of diseases from prostate to bowel cancer. Companies who withdrew their support for aspirin-based products are still feeling the pain.

Source: <http://almaz.com>: <http://www.aspirin-foundation.com>.

case, then where does this leave the strategic marketing planner with respect to the use of the concept with regard to suggested applications outlined earlier? We have counselled the use of judgement and experience in interpreting the concept for marketing strategy. The view is taken that critics and researchers of the concept, particularly those who have not supported the classic S-shaped PLC, have added to the debate concerning the usefulness of the concept to strategic marketing planning.

We can see that use of the product life cycle concept is one that raises uncertainty and debate as to its usefulness or otherwise in strategic market planning. The position taken here with respect to this debate, and hence with regard to this use of the life cycle concept, is well summarized by Brassington and Pettit,⁷ with whose view we are in accord: 'Despite its weaknesses, the PLC is a well used concept. Product marketing strategies should, however, take into account other considerations as well as the PLC.'

Different PLC patterns

In addition to the S-shaped life cycle, other variations on this pattern have been observed. Some of these are shown in Figure 4.3. We see that the product life cycle can exhibit different patterns from that epitomized by the traditional notion of an S-shaped curve. Moreover, there is evidence to suggest that the 'typical' shape of the pattern may be associated with the type of product/market under construction.

Life cycle (a) is suggested as being frequently found in the market for many small household appliances. Initial sales growth after a new product launch is rapid, followed by a quite severe drop

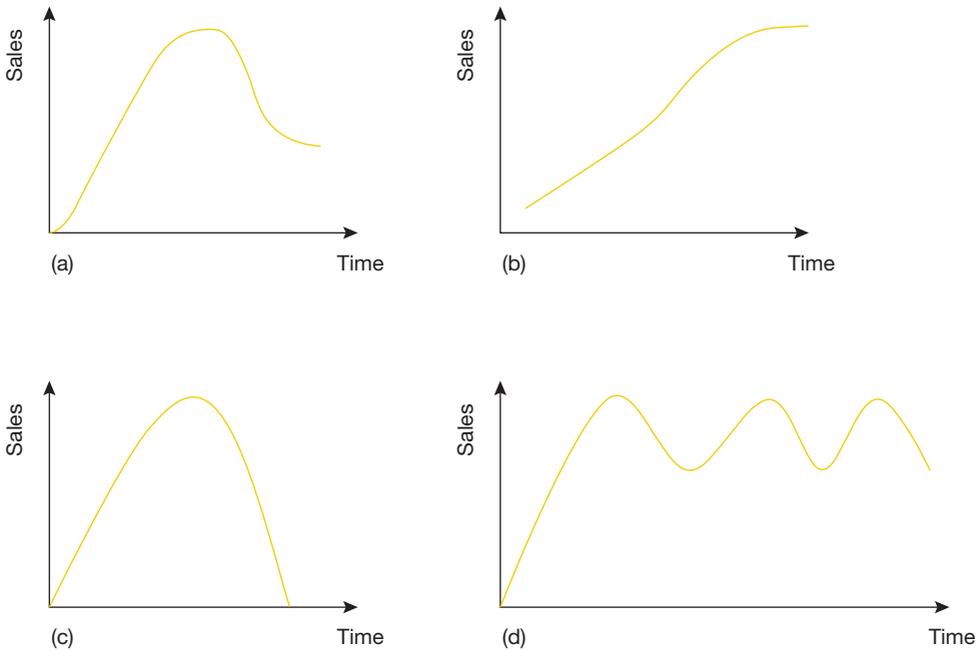


FIGURE 4.3 Alternative product life cycle patterns

in sales as the novelty wears off. Eventually sales decline will stop and the product enters a relatively long period of stability in sales as late adopters purchase the product and early buyers purchase again to become replacement purchasers.

The pattern shown in (b) represents a 'truncated' pattern. Its shape illustrates that there is no introductory period. Sales grow rapidly from product launch. This type of curve may be associated with new products, like petrol-driven motor cars where there is substantial market appeal and little learning is required or risk perceived.

Pattern (c) illustrates a rapid growth in sales, with no introductory stage, followed by an equally rapid decline with no maturity stage. Products that exhibit this shape of life cycle are typical novelty products or fads, such as many children's toys.

Pattern (d) illustrates a cycle/recycle pattern of a succession of product life cycle curves with a relatively short introductory period, rapid sales growth, a short maturity, followed by rapid decline. After this, the process is repeated when a new model is introduced. This pattern is frequently associated with fashion products like clothing or viewing a popular film a number of times.

Different categories (levels) of life cycle

Related to different life cycle patterns we note that there are different categories or levels of life cycle. The same 'product' market may be examined at a number of different levels, giving rise to different categories of life cycle:

- 1 *Product category life cycles*: Examples include the life cycle for washing powders, cars and cigarettes; i.e. the generic product. Product category life cycles may extend over considerable periods of time and may not even exhibit any sign of decline e.g. shoes.
- 2 *Product form life cycles*: Examples are laundry liquid or powder detergents, un-tipped cigarettes or leather shoes. Product form life cycles exhibit shorter cycles than those at the product category level. The S-shaped curve is most prevalent here.
- 3 *Brand life cycles*: Examples are Procter & Gamble's Ariel 'Ultra' washing powder, Ford 'Ka' cars, Gallagher's 'Park Drive' un-tipped cigarettes and Clark's 'big gripper' shoes.

In using the product life cycle for marketing decision making, we must be careful to distinguish between these different levels. Partly owing to criticisms of the product life cycle concept, and based on empirical research, our knowledge about the concept and how to use and interpret it in strategic market planning has improved. There is still controversy surrounding the utility of product life cycles, but like Brassington and Pettit cited earlier, most marketers agree that used with care, tempered by managerial judgement, the concept is of value as a tool of strategic marketing planning.

The product life cycle concept underpins many of the more recently developed tools of strategic market analysis, including some of the 'portfolio' planning tools which we examine in Chapter 14.

IMPLEMENTING PRODUCT STRATEGIES

It is necessary to consider ways in which the decision to choose any of the above options is taken while recognizing the absolute need for new products. If the rate of new product development and launch is not equal to, or better than, the rate of product deletion or obsolescence, the company will become unprofitable and unable to survive. A long-term view of product strategy must be taken. Product strategy is central to all company decisions and should emanate from and support the overall objectives of the company. Because organizations have different, and often multiple, objectives there exists a wide variety of possible product strategies that might be selected to support them. This notion, together with the range of possible product strategies which O'Shaughnessy⁸ suggests, is shown in Figure 4.4.

Summarizing the discussion of product item, product line and product mix decisions, together with the range of possible product strategies as shown in Figure 4.4, it can be seen that product decisions are complex and multifaceted. Product strategies need to be evaluated in relation to both the strengths and weaknesses of the company itself, and to the opportunities and threats that are prevalent and likely in the future. Product strategy involves the management of existing successful products, the elimination of obsolete or non-profit-making ones and the development and introduction of new products. Each of these elements of product strategy is important in achieving company objectives. The pace of change, fierce competition and the product life cycle all heighten the significance of the new product development and innovation process, and it is to this particular aspect of product strategy and management that we now turn.

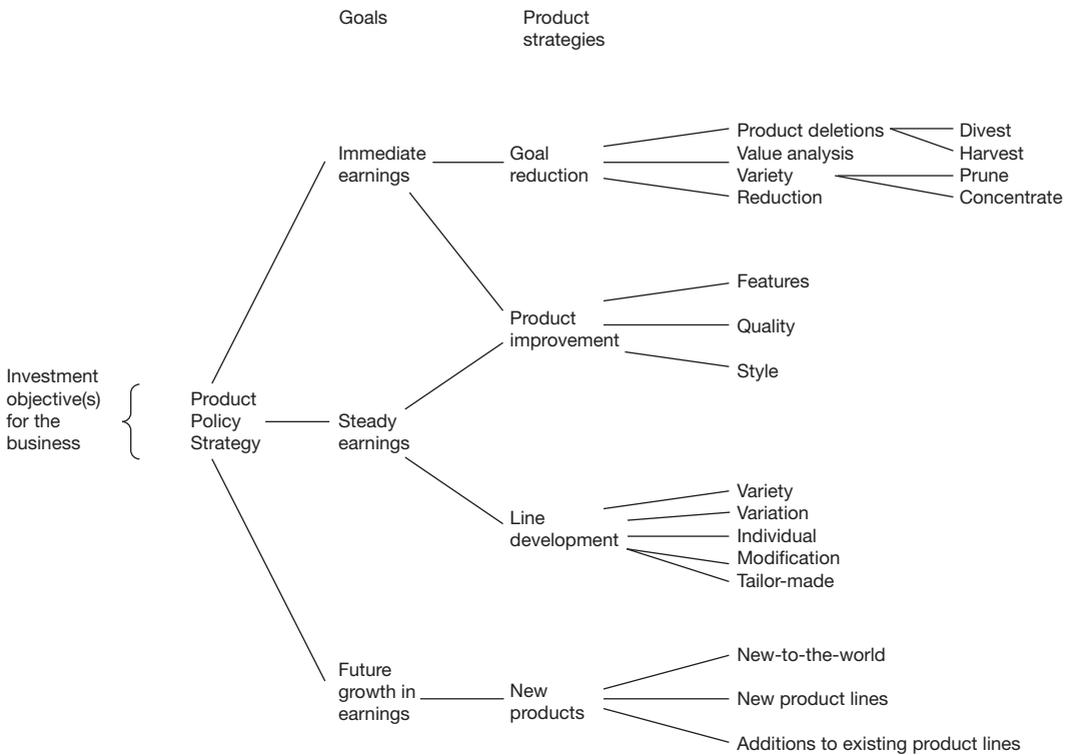


FIGURE 4.4 Company objectives and the range of product strategies

Source: Adapted from O’Shaughnessy, I. (1995), *Competitive Marketing: A Strategic Approach*, 3rd edn, Boston: Unwin Hyman, p. 334.

MANAGING THE PRODUCT LINE: NEW PRODUCT DEVELOPMENT; PRODUCT LIFE CYCLE EXTENSION STRATEGIES

A major use of the product life cycle concept in strategic marketing is in managing the product line and identifying the need for, nature of and timing of product development plans. The premise of this use of the concept is underpinned by the term ‘life cycle’. In the absence of suitable strategies, especially if a company does not take steps to prevent it, the dynamics of the life cycle are such that over time, sales and profits will be eroded and eventually disappear. What is required is a constant programme of carefully planned strategies to ensure that long-run profit and sales objectives are met. In particular, the planner must consciously seek to develop a ‘portfolio’ of products to maintain long-run success. Using the concept in this way means the planner must undertake four steps:

1 Identification of current positions of different company products in their life cycles

The first task of the marketing planner is to locate the respective life cycles positions of the various products the organization markets. Obviously information is vital here. Unless the marketer has accurate and up-to-date information on where products are in their life cycles it is impossible to implement effective product life cycle management. Yang *et al.*⁹ have proposed a life cycle information acquisition and management system. Jain¹⁰ suggests that the following should be analysed for each product:

- sales growth pattern since introduction;
- any design and technical problems that need to be resolved;
- sales and profit history of allied products;
- number of years the product has been on the market;
- casualty history of similar products in the past;
- extent to which customers are becoming more demanding *vis-à-vis* price, service etc.;
- extent to which additional sales efforts are necessary;
- ease or difficulty of acquiring dealers and distributors.

Based on this analysis it is possible to relate the information to known characteristics of each stage of the cycle and pinpoint the position of each product in its life cycle curve, which is difficult as a dip in company sales and profits may be simply a result of poor marketing effort rather than a sign that the life cycle curve has peaked. The next step in the process is more difficult still.

2 Analysis of future sales and profit positions of products in their life cycles

The planner must now attempt to forecast the future shape of the life cycle curve. We examine forecasting techniques in Chapter 12, but critics have suggested that forecasting the life cycle curve is dangerous as the stages can vary enormously in their duration and there are several possible shapes for the life cycle curve itself. The view taken here is to concur with suggestions that forecasting life cycle curves is difficult, but that this should not deter the planner from making some attempt to forecast. After all, planning decisions reflect some view of the future so it is better to make some systematic attempt to predict what this future might be.

Not only must the planner attempt to forecast future sales curves of products, but it is important to forecast the associated profit curves. The relationship generated between product life cycle sales curves and product life cycle profit curves is shown in Figure 4.5.

The profit life cycle lags the sales life cycle for reasons discussed earlier. For example, in the introductory stage of the life cycle, losses and not profits are likely to occur, due to research and design, initial launch costs, etc. In addition, profits are likely to peak in the growth phase, as competition becomes fiercer and prices are cut to remain competitive.

3 Implications of current and future forecast sales and profits curves: 'gap analysis'

Once present and forecast future sales and profits curves have been established, results of this analysis can be compared with future corporate objectives for sales and profits. In particular, we should identify discrepancies between forecast and required sales or profit levels. This 'gap analysis' is illustrated in Figure 4.6.

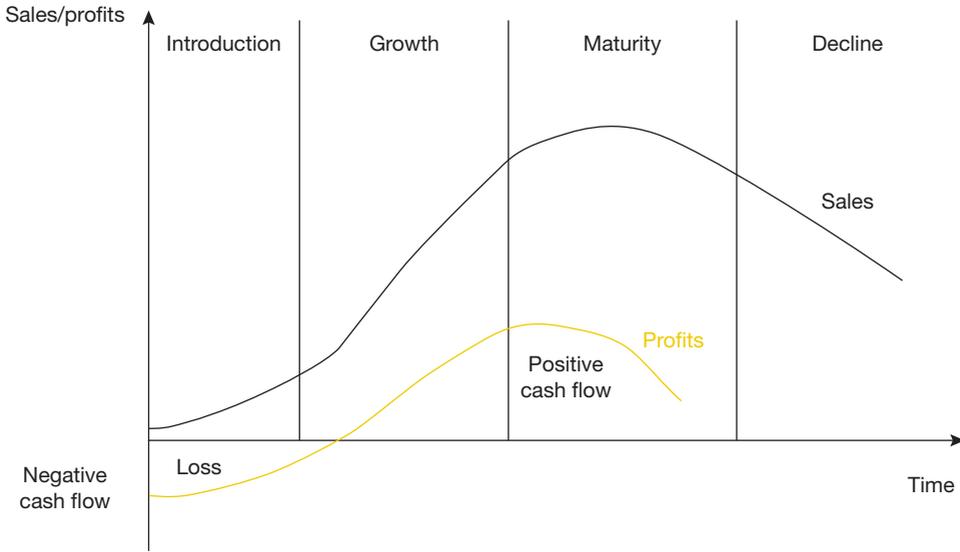


FIGURE 4.5 Sales/profit cycles

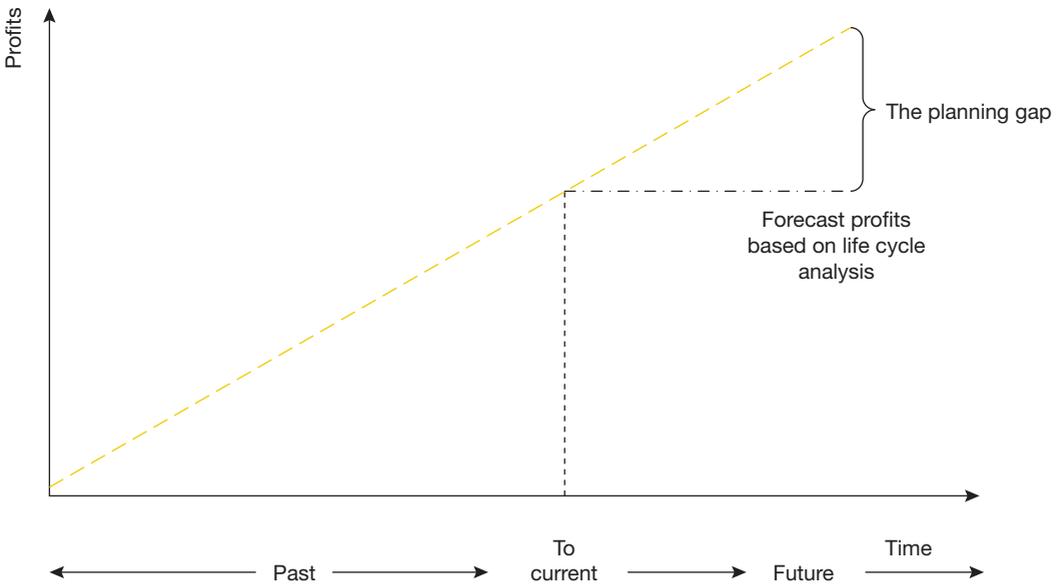


FIGURE 4.6 Gap analysis

Based on current and forecast profit life cycles compared to objectives for future profits, there exists a gap between what is required and what is forecast to be achieved. In the absence of any action to prevent it, projections of future sales and profit life cycles suggest that this gap will grow. Many other factors give rise to such 'planning gaps' such as adverse economic and other environmental trends and increased costs. However, product life cycle analysis will at least enable the planner to assess how much of this gap is attributable to life cycle forces and hence the 'balance' within the product range.

4 Developing innovation and extension strategies

The final step is the delineation and assessment of possible strategies to counter the underlying life cycle dynamics for the product range. In other words, we must determine how any gaps, if forecasted, are to be filled. Forecasted sales and profit gaps can be filled in many ways, e.g. we might determine that part of a profit gap can best be filled by reducing manufacturing costs or by diversification or exporting.

Which of the many strategies likely to be available when we eventually choose is dependent on a set of complex factors, including:

- competitive strengths and weaknesses;
- the nature of the environment;
- managerial attitudes towards risk.

Specifically, we need to consider ways of extending the life cycle of products that are beginning to mature or decline or the need to innovate and introduce new products, which we discuss shortly. As Hines *et al.*¹¹ show, product life cycle analysis provides a useful way of focusing new product development. We conclude our discussion of this use of the PLC concept by considering product life cycle extension strategies. The concept, and anticipated results of product life extension strategies, are shown in Figure 4.7.

Product life cycle extension strategies aim not simply to delay the seemingly inevitable onset of terminal decline, but to initiate a period of further sales growth. As can be seen, this process can be repeated, giving a series of enveloping curves, each one extending sales further. A number of strategies can be used to extend the product life cycle. Kotler and Keller¹² suggest some possible ways of extending the life cycle as illustrated in Table 4.1.

A popular electronic consumer product to hit the market in recent years has been the iPod. This is an example of how the product life cycle for a product/technology can be extended; in this case, from traditional means of recording music. An earlier example was video recording machines that were first launched in the 1970s. Over a period of 20-plus years they penetrated most households. Eventually then, other than replacement sales, the market was virtually saturated by the mid-1990s with comparatively few late product adopters still remaining to come on board. In an effort to revitalize sales, many manufacturers including companies like Sony, Panasonic and Philips looked to new technology to extend the life of their products. The DVD became the replacement technology for the VHS video. Launched in the late 1990s, DVD recorders quickly moved to the maturity stage of the life cycle and the majority of sales are now replacement sales. This technology was superior and offered several consumer benefits over its predecessor technology. Perhaps most

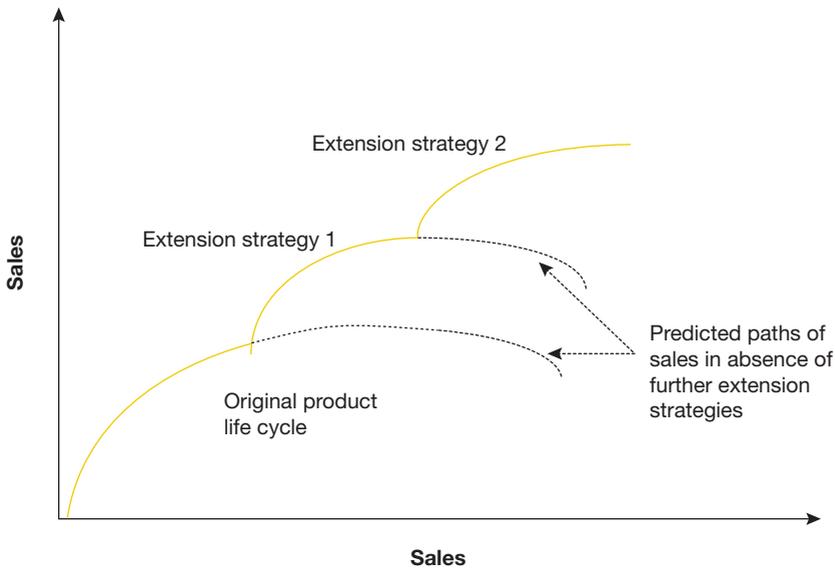


FIGURE 4.7 Extending product life cycles

TABLE 4.1 Life cycle extension

<i>Broad thrust of strategy</i>	<i>Examples of means of achieving it</i>
Expand number of brand users	Convert non-users; Enter new market segments; Win competitors' customers.
Increase usage of the brand by current brand users	More frequent use; More usage per occasion; New and more varied usage.
Product modification to attract new users/more frequent usage	Quality improvement; Style improvement; Feature improvement.
Marketing mix modification	Reduced prices/special offers; Improved penetration of distribution channels; Improved/more intensive advertising and personal selling; Better/improved service.

important of all in the growth of this new technology, was the desire of many customers to appear to be up to date and fashionable by having the latest electronic technology in their home. Not surprisingly, as the DVD recorder reached maturity, a successor technology was developed in the form of digital TV (e.g. the Sky plus product) which is simpler and more convenient for recording programmes. The Sky plus product is not a direct replacement for the DVD recorder as it will not play DVD discs. However, it is likely that it will be increasingly adopted as a convenient alternative for those who simply want to record programmes to watch them later.

SERVICE PRODUCTS

In some economies the service sector is now the largest sector. As we explained, there is no difference between more tangible physical products and their service counterparts with respect to their importance in overall marketing strategy, or in the importance of physical and service products meeting customer requirements. However, service products have characteristics that set them aside from their physical product counterparts and in turn give rise to additional considerations in their marketing.

The term 'service product' encompasses a myriad of different types of products and markets in which they are sold, but essentially a service is intangible involving some deed, performance or effort that cannot be physically possessed by the customer. The most important distinguishing characteristics of services is that they are essentially intangible, are often consumed at the same time and place as they are supplied, and customer and supplier often directly interact during the sale and consumption process. Because of these characteristics we find additional important elements in their marketing that are referred to as the 'extended marketing mix'. In addition to the conventional 4Ps for the marketing of physical products, when marketing service products, an additional 3Ps (making 7Ps in all) are added to the marketing mix. These three additional Ps are:

'People': because of direct contact with customers when marketing services, the service provider's staff, i.e. people, are an important element of the marketing mix.

'Process': in services marketing, how the service is provided is important, e.g. systems for serving customers and dealing with orders take on an important significance.

'Physical evidence': the intangible nature of service products means that customers often use other evidence such as the physical facilities of the service provider, their promotional and other literature as evidence of the potential quality of the service.

We consider special characteristics of service products and additional marketing mix elements in more detail in Chapter 17. Most products have a mixture of both tangible and intangible components. In some cases, the service element of a manufactured product is the most important factor in competitive success as it is the main means of differentiation. In reality, most products have a personal dimension.

NEW PRODUCT DEVELOPMENT AND INNOVATION

We have raised the importance of new product development and innovation, but now reiterate some of the arguments that serve to illustrate the importance of innovation in corporate and marketing strategy.

The pace of technological, market, social and economic change is accelerating. One of the most important implications of this accelerating change for marketing management is the shortening of product life cycles. Successful products stay successful for shorter periods of time. The pace of change is quickening as epitomized by aggressive competitive behaviour. Successful new products are often quickly copied or improved upon by competitors.

In many markets there is competition to speed innovation and new product development. Motor industry sources report that Honda is confronting its competitors by increasing the speed at which it can bring a new product to market. This not only allows Honda to respond to changes in market demand more rapidly, but it enables it to undermine both cash resources and confidence of its competitors by product proliferation. Amongst the best in the car industry, product development times needed to design and launch a new Honda model have reduced from an average of five to six years in the early 1990s to just over 30 months.

Life After Death

Many tend to think of innovation and new product development solely in the context of tangible, manufactured products. These days there is probably more innovation and new product development in service products. A good example is in the area of services available to the bereaved and their relatives.

Let's face it, death is inevitable. One would have thought that every possible service that could possibly be offered to the bereaved and their loved ones would have been thought of years ago. Not a bit of it! New products for the bereaved and their loved ones are constantly being developed. Here are a few:

- You can now be deep frozen at death with a view to possibly returning to life at some point in the future when medical science is more developed.
- If you want to light up people's lives after death, your ashes can now be launched into space.
- Alternatively, if you want to light up a loved one's life here on earth, for a fee your ashes can now be converted into a diamond.
- So your loved ones don't forget you, 'Eternal Space' lets loved ones create a customized online grave website which the bereaved can visit when they like.
- 'Legacy Locker' is a service which enables the pre-deceased to arrange to send messages and important information such as internet passwords and online account information to predetermined beneficiaries in the event of sudden death.

Innovation and new product development are essential to long-term competitive success. There is risk associated with new product development, and a high proportion of new products fail in the marketplace. With so many interpretations as to what constitutes a 'new' product and also what constitutes 'failure', estimates of new product failure rates vary. Taking estimates of new product failure rates we can say they are at least 20 per cent for industrial product companies and 40 per cent for consumer products. Often these estimates are far exceeded. When combined with the high costs and investments of developing and launching new products, this makes this area of marketing risky. Thus it is important that the process is managed effectively. Before we examine the steps in developing and launching new products we need to set the planning framework for innovation and establish the range of innovation activities in which a company can participate. Finally, we need to assess and draw upon a considerable body of research and evidence as to critical factors in managing innovation, which have largely been derived from studies into successful and unsuccessful innovation.

THE MEANING AND SCOPE OF INNOVATION

A way of distinguishing between different types of innovation and innovative activities is in terms of the degree of 'newness' of the product. Seven types of innovation can be classified in this way:

1 Entirely new products

Referred to as '**new-to-world products**', such innovations perform an entirely new function and create new markets. Examples include the microwave oven, the mobile telephone, and Viagra. Such innovations are comparatively rare and pose the highest risks and often incur the highest costs.

2 Improved performance products

These are innovations that improve the performance of an existing function. This type of innovation is more common than the 'new-to-the-world' type, and is often the prime objective of innovation research and development activity. An example is the development of digital photography. 'Improved performance' encompasses a range of different types of innovation. At one extreme, it may involve the development and use of a brand new technology (e.g. digital watches); at the other, it may mean an extension or improvement of the technology currently used by improved design or better materials. An example in this category is the development of the Dyson vacuum cleaner.

3 New application products

A considerable amount of innovative activity involves developing new applications for existing products. The amount of development activity required can vary enormously. In some cases, the technology and product can be applied in a new context with little or no further development, e.g. in the case of the hovercraft, whereas for other products or technologies, widening the scope of application requires substantial research and development work, e.g. in finding new applications for laser technology.

4 Additional functions products

This type of innovation may be used to improve performance or extend functions of existing products. Typical was the addition of Internet capabilities on mobile phones and the ability to access Facebook from one's own mobile phone.

5 *Lower cost products*

This can be seen as a variation on the 'improved performance' product; a new product which performs the same functions as a previous product, but at a lower cost. A lower cost product may enable the marketer to extend applications of the product by reaching more buyers for whom the product was previously too expensive or not cost effective. Innovative activity aimed at reducing product cost is common for many products including computers, pharmaceutical and fashion clothing products.

6 *Restyled products*

Often, 'new products' are no more than an update or change in styling to old ones. This type of innovative activity is prevalent in the car and clothing markets. It is a progressive innovation that generally involves lower costs and risks than 'new-to-the-world' types of innovation. However, such low cost, low risk modifications sometimes turn into major investments carrying high risk which may not have been the original intention.

7 *Repackaged or renamed products*

At the opposite extreme to the entirely new product is the 'new' product which might simply be a result of repackaging, renaming or re-branding. Although requiring careful planning and management, this type of innovation involves fewer management issues than those raised by the development of products which are entirely new. One could argue that such products are not new at all, and should not be treated as innovations. The test of what constitutes a 'new product', and the degree of 'newness' is the extent to which the market (i.e. customers) perceive the product to be new. A repackaged or re-branded product, if perceived as new by the market, is in a sense an innovation and should be marketed as such. Repackaging, renaming and re-branding are tactical aspects of product innovation. They are really part of a 'product regeneration' strategy. Examples in recent years include the re-branding of Mars' 'Snickers' snack product (previously 'Marathon') and the 'repackaging' of British Airways.

We have seen that 'innovation' encompasses a broad spectrum of different types of activity, ranging from development of entirely new products and technologies to repackaging existing ones. It is entirely new products that pose greatest problems in terms of effective management and attendant risk, as shown in Figure 4.8. It is with managing this high risk type of innovation activity that much of what follows in this chapter is concerned.

Having established the variety of innovation activities we now examine some of the issues in the management of innovation, in particular the 'ingredients' in the successful management of innovation, and some of the current issues influencing the future environment for innovation and new product development.

Managing innovations: critical factors

Innovation is crucial to long-term success in an organization, yet the risks are high with significant rates of new product failure. The managerial issues and problems to which this dilemma gives rise are considerable. A combination of the recognized importance of innovation and the high risk of failure has meant that this area of company activity has attracted substantial attention and research in recent years. Much of this has focused on attempts to look for empirical evidence that can establish

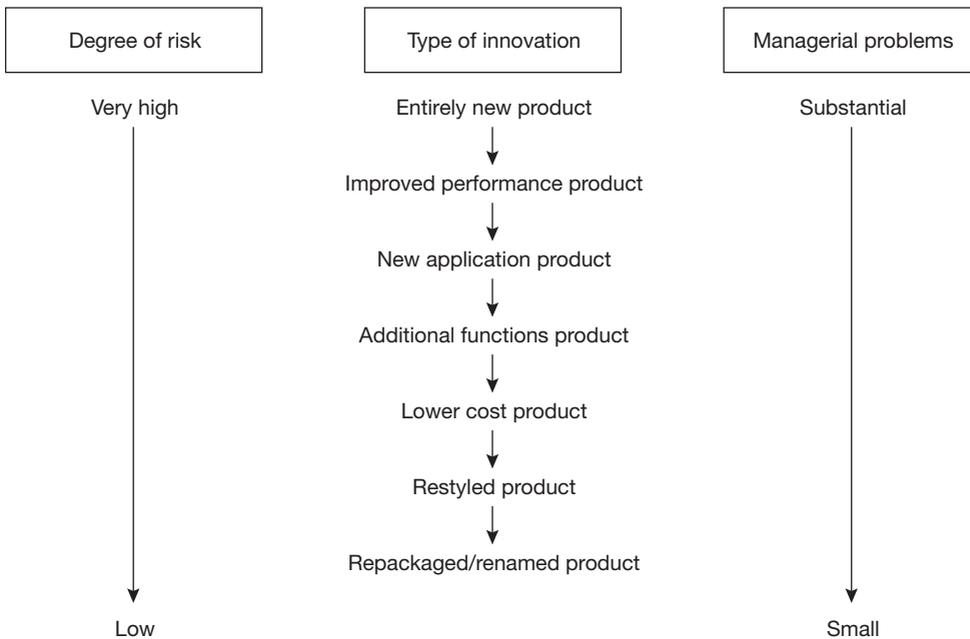


FIGURE 4.8 The continuum of product innovation

the key ingredients in the successful management of innovation. There are no ‘recipes’ for certain success, but research has been instrumental in establishing some of the critical factors in the process. By way of example, we have outlined a selection of research programmes in this area, together with a brief summary of their findings.

Successful product launches

Morley’s¹³ study of over 2,000 new product launches was very comprehensive. It found that only one in seven of the new product launches researched could be considered successful when considering sales and market share. Those that were successful exhibited the following characteristics compared to their less successful counterparts:

- sustained heavy promotion during the first three months of launch;
- more extensive and rigorous market research;
- less reliance on exaggerated claims for the new product to consumers;
- more awareness and receptiveness to distributors’ needs and wants;
- use of a well-known company and/or brand name.

Conclusions drawn about successful new products were very much along the lines of what one would expect. For example, it is understandable that new products with a well-known company or

Project SAPPHO

One of the earliest systematic studies of success and failure in new product development was Project SAPPHO. Under the direction of Cyril Freeman¹⁴ at the University of Sussex, an extensive and detailed research programme was designed to investigate the key factors for success in innovation. Twenty-nine pairs of similar innovation project were examined; in each pair, one project was successful and the other a comparative failure. Using a carefully designed statistical analysis, Freeman and his team were able to establish a pattern of factors which appeared to distinguish between success and failure in the various pairings. Project SAPPHO found that the successful innovator tended to be distinguished by the following five elements:

- 1 Successful innovators had a much clearer idea of user needs.
- 2 Successful innovators put much more effort into marketing their innovations – not just at the original idea stage by looking for gaps in the market, but throughout the process of development and launch.
- 3 Successful innovators paid much more attention to the development stage of their innovations than those innovators who failed. This often meant that the development work proceeded more slowly, but it was more effective.
- 4 Successful innovators were much more willing, and indeed able, to use outside help and advice in developing their products. However, most tended to perform more of the practical development work in-house.
- 5 Successful innovators were distinguished by a high degree of commitment to their innovations. Usually a senior manager with substantial activity in the organization was in charge of the successful innovation in each pair.

brand name that are heavily promoted stand more chance of success than their lesser-known weakly promoted counterparts. However, a finding from his study regarding successful new products is perhaps more surprising, namely that prices for successful new products tended to be above average for the sector.

Amongst the most difficult markets in which to succeed with new products is the grocery, particularly the luxury foods, market. Despite this, Ben and Jerry's brand of ice creams, which is not the cheapest of product ranges in this product category on the market, continue to be extremely successful. The brand's marketers have refused to be drawn into a price war against competitors and continue to support the brand's positioning at the top end of the marketplace to good effect.

Service products like HeartSWell Lodge, in Plymouth, are models of social and financial success. It opened in August 2001, having been funded by charitable donations. It provides support to families of complex high risk patients, yet it is run on business lines. Many units in the main hospital use the facility for carers of their patients in paediatrics, trauma, neurosciences and the hyperbaric oxygen centre.

The McKinsey Report

A slightly different approach to investigating innovative success of new products is exemplified by a report from McKinsey & Co.¹⁵ which sought primarily to establish the essentials of a well managed company. They found certain factors associated with the success of a number of firms acknowledged as being leaders, especially in product innovation. The ten companies selected in the study were International Business Machines, Emerson Electric, Texas Instruments, McDonald's, Hewlett-Packard, Johnson & Johnson, ZM, Digital Equipment, Procter & Gamble and Dana.

The eight key factors for success McKinsey found were:

- 1 a bias towards action;
- 2 simple line and team staff organization;
- 3 continued contact with customers;
- 4 productivity improvement via people;
- 5 operational autonomy and the encouragement of entrepreneurship;
- 6 simultaneous loose and tight controls;
- 7 stress on one key business value;
- 8 an emphasis on sticking to what it knows best.

A summary of critical factors in successful innovation

These studies are a sample of empirical research done in this area. What emerges from these and other studies is that there are a set of critical factors in successful innovation which point the way to key areas for managing this activity. A summary of these ingredients is that offered by Twiss,¹⁶ who lists seven critical factors:

- 1 a market orientation;
- 2 relevance to the organization's corporate objectives;
- 3 a source of creative ideas;
- 4 an effective project selection and evaluation system;
- 5 effective project management and control;
- 6 an organization receptive to innovation;
- 7 commitment by one individual or a few individuals.

He points out that there will be cases where innovations succeed in spite of poor management, but absence of one or more of the above factors is more likely to lead to innovative failure. Evidence suggests that companies seem to be learning to manage the process of new product development, especially the idea generation and screening stages, more effectively than in the past.

The future environment for new product development

In a résumé of the future for new product development, Crawford¹⁷ isolated four sets of factors or trends that will influence the future for new product development:

- 1 reduced reward factors;
- 2 increased cost factors;
- 3 increased difficulty factors;
- 4 positive market factors.

Reduced reward factors: Crawford argues that a number of trends will tend to reduce the rewards (and the incentive) for product innovation in the future:

- the increased use of segmentation, and therefore smaller markets;
- the increased speed of competitive response, and therefore reduced period of price advantage;
- shorter product life cycles.

All these factors serve to make innovation less rewarding (financially) for the innovator.

Increased cost factors: The increased pace of technological progress has increased costs of pioneering new technologies and products. Some of the more advanced technologies are beyond the resources of many individual companies. We are thus likely to see a much greater use of collaborative developments between companies or companies and government in the future.

An example of company collaboration on new product development was the development of the Advanced Photo system (APS) technology. The costs and risks of developing this technology were considered so great that collaboration between otherwise competitor companies comprising Kodak, Nikon, Canon, Minolta and Fujifilm took place.

An example of competitor and government collaboration for new product development is the development of the European Airbus which involved companies and governments in four European countries (Spain, Germany, France and the United Kingdom) forming a consortium to develop this product.

Increased difficulty factors: These are tending to increase the uncertainty and level of difficulty associated with innovation:

- There are more government regulations pertaining to new technology.
- The patent process is slow and not very reliable. For example, the average length of time to process a patent in the UK is three years. Moreover, it is notoriously difficult to establish patentability for a new invention. James Dyson was beset with problems of this kind when he invented and tried to patent the technology of his Dyson vacuum cleaner. Even if a patent is granted the responsibility for pursuing patent infringements lies with the patent holder and not the Patent Office. Pursuing alleged patent infringements is costly and time consuming.

- Society has become more critical of constant innovation with its emphasis on 'newness', often at the expense of tradition, examples being consumer-oriented initiatives to bring back 'real ale' and 'real cheese'.
- Managers are increasingly being urged to produce short-term results rather than the long-term commitment which much innovative activity requires.

Positive forces: A number of factors will tend to promote the progress of new product development in the future:

- Despite the reaction towards new products and technologies, markets, customers are still responsive to them.
- Linked to this, profit opportunities from successful new product development are still large.
- In general, managers are now better trained to cope with uncertainties associated with innovation.

Strategies for innovation

Later we shall look at the stages in new product development, from idea generation to commercialization and launch. The first prerequisite for developing and launching new products is to determine the overall strategic approach to innovation and its use within corporate strategy. Twiss¹⁸ distinguishes the following possible strategies for innovation:

- 1 offensive strategy;
- 2 defensive strategy;
- 3 licensing strategy;
- 4 **interstitial strategy**;
- 5 market creation strategy;
- 6 **maverick strategy**;
- 7 acquisition of personnel;
- 8 acquisition of companies.

We now examine these to see what is involved in the variety of corporate approaches to innovation strategies:

1 Offensive strategy

This strategy can be high risk, but with high potential pay-off. It requires an effective research and development department, also a positive marketing element that recognizes new market opportunities that can rapidly change new product ideas into commercial products. This type of strategy is usually undertaken by larger players and often occurs in an industry dominated by a small number of major companies. An example of an organization which practises this approach to innovation is Apple who are often at the forefront of new technologies.

2 Defensive strategy

This is the opposite of an offensive strategy: it is a low risk, low pay-off strategy. The company offering it needs an established market share, and has to be able to maintain profit levels through

low manufacturing costs even when price competition is intense. At the same time, the company must possess appropriate technological ability to react swiftly to technological advances by competitors. This approach is best suited to companies whose strengths are in marketing rather than research and development. An example is IBM, which uses its well established corporate credentials and service and quality levels rather than competing at the edge of technological development.

3 *Licensing strategy*

A licensing strategy is also known as 'absorptive strategy'. This allows the company to make profits by buying technological innovations of another company, so reducing the need for an effective in-house research and development department. There is little to gain from discovering what can be obtained from another source more cheaply. Licensing out your own technology to competing companies also has its advantages. It may reduce the company's market share in the long run, but licensing fees can be obtained from the sale of an innovation which competition would eventually develop and match itself. Pilkington's have used licensing strategies very effectively and profitably with their 'float glass' production technology. The Dutch company, Philips have also pursued a strategy of licensing to good effect. Philips has a strong technology and innovation base and the company has been responsible for many of the most successful 'new-to-world' products. Examples of Philips' inventions range from the cassette tape through to the laser disc. Leading consumer goods companies throughout the world, including Sony and others, have licensed Philips' technologies, and as is the intention with licensing, to the benefit of both parties.

4 *Interstitial strategy*

This strategy aims to avoid direct competitive confrontations. Instead, the company analyses existing market leaders to discover their strengths and weaknesses and related gaps in the market. This technological strategy fits in with a more general 'niche marketing' corporate strategy, and it is applied usually by smaller companies in a large and expanding market. The Wharfedale speaker company, famous for producing very high quality speakers, have always sought to avoid challenging their often much larger competitors, instead concentrating their new products on those segments who seek professional quality sound reproduction.

5 *Market creation strategy*

The company may be in the position to create a completely new market because of technological advances facilitating the development of entirely new products. This strategy has the advantage of there being little initial competition and it can be very profitable. Sony established a whole new market when they developed their then revolutionary 'Walkman' product.

6 *Maverick strategy*

This strategy is one that is applied to a product, which owing to technological advances, reduces the total market size for the old product. It allows a company to apply new technology to someone else's market, so benefiting their own company, but harming others in the market with a subsequent reduction in total market size. This type of strategy will succeed in the long run only if the company follows its maverick strategy with an offensive strategy to retain its technological lead over the competition. An example of a company pursuing a maverick strategy for a product range is

Procter & Gamble's range of 'Fairy' brand products. Most of the products in the 'Fairy' cleaning product range are claimed to be much more effective in their cleaning properties than those of competitors. This means much less of the product is needed for each cleaning operation, and although initially more expensive, is claimed to be much better value.

7 *Acquisition of personnel*

Rather than licensing to gain a competitor's innovations, a company could try to 'poach' the opposition's personnel. This strategy is not wholly ethical, although it is a low cost method of acquiring technology and can prove to be fruitful. A further problem is the fact that such personnel will tend to rate low on loyalty and will probably be equally likely to leave your company if they are given a better offer elsewhere.

8 *Acquisition of companies*

An alternative to acquiring personnel is to acquire a whole company through takeover or a merger. Some small companies are highly creative, entrepreneurial and strategically offensive. They do, however, have limitations regarding research and development funds, and may not be effective in production and marketing. This makes them attractive and easy targets for large companies who are less likely to create such innovation and adopt such offensive strategies themselves. The takeover of an already established small company can be much less of a risk to a large company than trying to develop the technology itself.

As we can see from this typology of innovation strategies, there are a number of alternatives for achieving innovation objectives. In fact we can now add another strategy which has emerged in recent years, namely, a **guerrilla marketing strategy**. This is a strategy that relies on imagination rather than a large marketing budget. Guerrilla marketing tactics target customers in unexpected places which makes the idea of what is being marketed memorable. Such tactics involve public relations stunts, giving the product away in public places and using mobile digital technologies to engage customers and create a memorable event.

Clearly, innovation strategies have a major bearing on the focus of new product development and the means of achieving product innovation. The selection of appropriate innovation and new product development strategies will depend on many factors, including company, competitor and customer considerations. However, a key input to innovation strategies and decisions is technology itself, and in particular the way that technology is developing and likely to change in the future. No discussion of innovation, particularly the formation of innovation strategies, would be complete, therefore, without some consideration of technological forecasting.

TECHNOLOGICAL FORECASTING

The allocation of corporate funding to innovation is an investment decision that commits resources now with a view to a return in the future; yet that future is likely to be different from the circumstances that pertain today, particularly with respect to the nature of future technologies. The pace of technological change and the high risk and costs of developing new products mean that technological forecasting is essential.

What to forecast?

The first issue is the question of what we need to forecast. As with any forecast – the weather, the economy or sales forecasts – the purpose is to improve decision making. A technological forecast might be used to make better decisions in the following areas:

- levels of research and development spending;
- overall innovation strategy – offensive vs. defensive;
- allocation of resources to specify innovation programmes for technological investment.

To help in such innovation-related decisions, the decision maker ideally needs to know the answers to the following:

- 1 'What will be the nature of future technology as it relates to my business?' A *qualitative* aspect.
- 2 'What will be the performance level of future technology?' A *quantitative* aspect.
- 3 'What time-scale are we talking about; when will it happen?' A *temporal* aspect.
- 4 'What is the assessment of the likelihood of events described in the above questions?' A *probability* aspect.

The information that answers these questions provides means the decision maker is in a stronger position to make informed decisions about innovation.

Techniques of technological forecasting

The techniques of technological forecasting are numerous and what follows is a brief description of the more frequently used categories, together with an indication of their merits and drawbacks, as a more detailed overview of forecasting and its implications for marketing planning is provided in Chapter 12.

Trend extrapolation is one of the simpler techniques that consists of using past technological trends to predict future levels of performance in a technology. Imagine that we are concerned to predict likely levels of future performance in computing technology, where 'performance' is measured in terms of 'speed of calculation'. The first step is to ascertain what the past trend in this performance parameter has been, plotting past trends in this performance over time. As with the time series analysis method of sales forecasting, the performance figures over a time period will fluctuate, but beneath this is a trend which the forecaster wishes to know in order to apply the forecast. If improvements in technological performance do not follow a trend then it is not possible to forecast the future using past performance, but there is considerable evidence to show that technological progress does tend to follow a regular pattern when performance is plotted over time. The essence of the extrapolation technique is illustrated hypothetically in Figure 4.9.

In using trend extrapolation for technological forecasting, careful consideration should be given to:

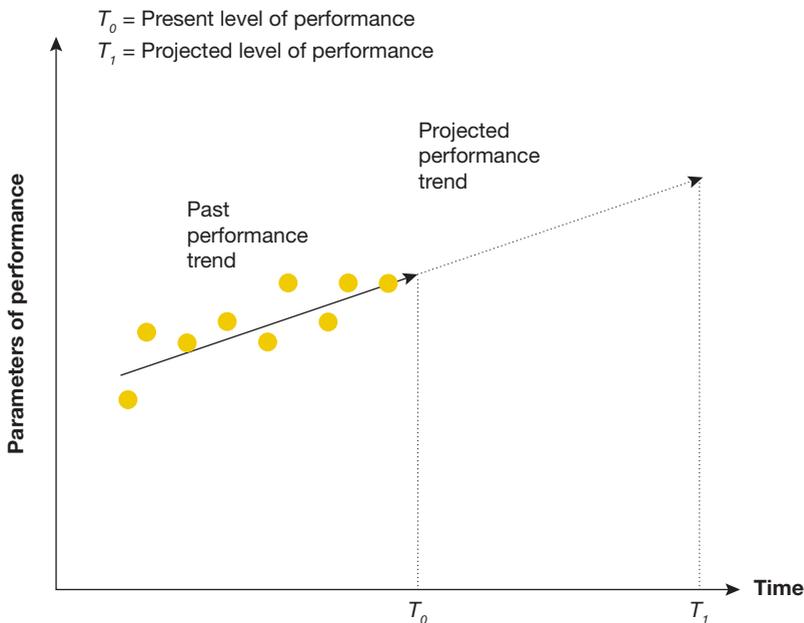


FIGURE 4.9 Trend extrapolation forecasting

1 *Selection of the parameter of performance*

Care should be taken to ensure that the performance characteristic selected is one which truly does represent the 'correct' measure of 'functional' performance, i.e. one that is not technology specific and is related to the needs of the marketplace.

2 *Sufficient and accurate historical data*

As with any forecasting technique that relies on past data to predict the future, forecasting accuracy relies on both the quantity and quality of this past data.

3 *Factors which may cause discontinuities in the shorter-term trend*

While there may be substantial continuity in the long-term progress of technological performance, in the shorter term there can be substantial discontinuity. The race to put a man on the moon by the end of the 1960s hastened the development of many technologies, as increased resources were devoted to this single aim.

Overall, the merit of technological forecasting is that it is relatively straightforward to understand and apply. The major disadvantage is that it provides only the quantitative and temporal aspects of information on new technology that the decision maker requires.

Delphi forecasting: here the forecaster recruits experts in the technology, and using a questionnaire, solicits their opinions as to likely future technological developments. The questions may relate to matters of a technological breakthrough (such as new developments in pollution-free engines or the treatment of cancer). Respondents may also be asked to predict likely time-scales, levels of performance, and estimates of probability.

A Delphi forecast is normally ‘played’ in a number of rounds. Once the original (first round) questionnaires have been circulated and completed, the results are summarized and then re-circulated to respondents who are then asked to reconsider their forecasts in the light of summarized results. The questions themselves may become more pointed as a result of feedback. The rounds of questioning continue until a consensus emerges or sufficient useful information is available to make effective innovation decisions. Respondents do not meet face to face (as in a committee). Therefore, any ‘bandwagon’ effect of majority opinion is eliminated.

The advantages of Delphi relate to the fact that it can provide information about all areas in which the decision maker is interested. The major disadvantages are associated with difficulties in designing an unambiguous set of questions, and the selection of the panel of experts.

Scenario writing first became known through the work of ‘think tanks’ such as the Hudson Institute in the United States. Now many companies have such ‘think tanks’ where a team of experts is responsible for forecasting possible future technological developments based on a wide-ranging technological and environmental analysis. A number of potential scenarios are generated, each one being considered further with respect to probabilities and implications. Scenarios considered highly probable, and with a significant projected impact on the organization (e.g. a future technological or market threat) may form the basis of a research and development programme.

Relevance trees are used systematically to explore all possible routes to achieving given stated technological objectives. The process starts by defining the desired objectives and then tracing backwards to determine possible viable routes for achieving the objective, and the implications for research and development. A simple example is shown in Figure 4.10 where the stated objective is

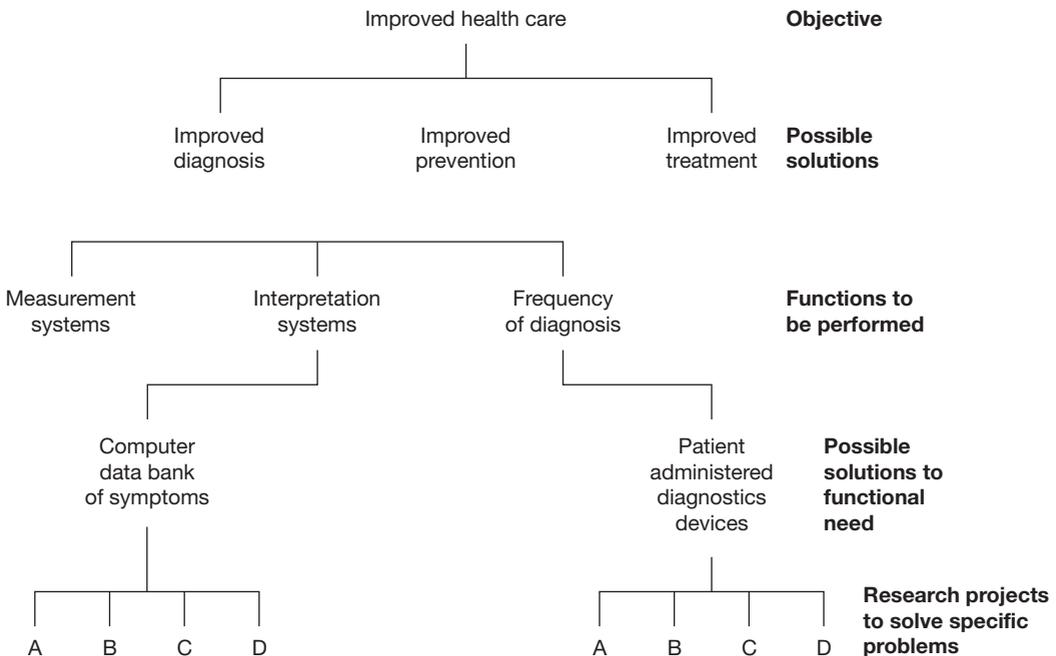


FIGURE 4.10 A relevance tree for improved health care

‘improved health care’ by a computer company that is involved in this market. A complete relevance tree will be much more complex than this simplified version.

The relevance tree approach can be used:

- to explore the feasibility of various technological decisions;
- to establish the optimum research and development programme according to feasibility, cost and timing considerations;
- to determine and select between detailed research projects.

These are a few of the techniques of technological forecasting. Our discussion has been brief in what is a specialist area in terms of strategies for innovation. Technological forecasting remains somewhat under-utilized in innovation planning, especially in Europe. The techniques have their limitations, but in the future more and more companies are likely to have to use them if they are to cope with an uncertain technological future.

DEVELOPING AND LAUNCHING NEW PRODUCTS

So far we have set the background to new product development decisions. Not all innovation strategies involve in-house development of new products, but where this route is selected evidence on successful new product development suggests that a systematic approach is essential. The following sequence of steps in new product development was originally suggested by the American consultants, Booz, Allen & Hamilton following research they conducted initially in 1968 and followed up in 1981. It is still in widespread use in marketing textbooks today. This enables us to outline some of the key marketing issues involved at each stage of developing a new product:

- idea generation
- idea screening
- concept development and testing
- strategy development
- business analysis
- product development
- market testing
- commercialization
- launch

Idea generation

Good ideas are the life blood of new product development. This raises the question: ‘What constitutes a “good idea”?’ Evidence on the mortality rates involved in developing new products means that we need a lot of ideas before we are likely to find one that constitutes a winner. Two key aspects are involved in increasing the number of ideas for new products, namely:

- 1 an effective scanning process for new ideas which systematically collects ideas for possible new products from the widest range of sources possible;
- 2 the use of the techniques of 'creativity' to encourage idea generation.

Product screening for new ideas

Screening should encompass both internal company sources and external sources. The most obvious sources are those departments charged with this responsibility that include:

- technical departments i.e. mainly research and development and design departments;
- the marketing department;
- in some organizations, the new product development department.

In some ways it is sources of ideas outside of the above departments that represent some of the richest and frequently untapped sources of new product ideas such as:

- **Employees** There are usually many with substantial potential for being helpful as sources of new product concepts. Sales personnel are an obvious group, but so are manufacturing, customer service, packaging and persons who use the products. They need to be told that their ideas are wanted, and mechanisms must be constructed to gather these ideas. Employee suggestion systems turn up ideas, but the most useful suggestions come from employees whose work brings them in contact with the customers and their problems. Salespeople know when a large order is lost because a company's product is not quite what the customer wanted. Complaint-handling departments become familiar with consumers' use of products.
- **Customers** are a productive source of new product concepts and improvements as these are users of the firm's products or services. Many approaches are used to gather consumer ideas, but the most popular are street and mail surveys, continuing panels and special focus groups.
- **Resellers** Depending on the industry, brokers, manufacturers' representatives, industrial distributors, large jobbers and large retail firms may be worthwhile information sources. Many manufacturers' agents are so skilled that they serve as industrial advisers to their clients.
- **Suppliers/vendors** Large suppliers near the beginning of the production chain often provide advice to their customers, e.g. many manufacturers of plastic housewares are small and look to the large plastic firms for advice. Virtually all producers of steel, aluminium, chemicals, metals, paper and glass have technical customer service departments who give advice to their customers.
- **Competitors** Competitors' activities are of interest, and their products may be an indirect source of a leap-frog or add-on new product. Leaf¹⁹ suggested a five-step approach to studying competitors' products:
 - 1 Purchase the competitive product.
 - 2 Tear down the product, literally: i.e. remove every nut, bolt and weld, and get back to the basic pieces.
 - 3 Reverse engineer the product: while tearing down the product, figure out drawings, parts lists and manufacturing methodology.

- 4 Build up the costs: using available labour, material and overhead costs, estimate exactly what it cost the competitor to make.
- 5 Establish economies of scale: given known and estimated production runs combined with selling prices, estimate the competitor's profits.

■ **Miscellaneous** Among the other sources of new ideas are:

- consultants
- advertising agencies
- market research companies
- universities/colleges
- research laboratories
- governments
- printed sources.

Appropriate records for all ideas put forward, but not used, should be kept for future reference. Although we have been concerned to discuss ways of generating more ideas for new products, it is important to note that quality as well as the quantity of ideas matters. The ideas need to be relevant to overall corporate objectives and strategies.

Product innovation charter

Crawford²⁰ has suggested the notion of a 'product innovation charter' to ensure that idea generation is conducted within this framework. The charter specifies, as a prelude to idea generation, the goals of new product development, the product/market areas to which new product development should be aimed, and the corporate objectives towards which the new product development programme should contribute.

Risks in new product development

Product screening is a preliminary assessment of ideas with a view to determining which should be dropped and which retained for potential development. Screening is a means of increasing the quality of managerial decisions, since selection based on judgement is more likely to result in two sorts of error:

- 1 A *drop-error* is failing to develop an idea with potential. Losses due to such errors are difficult to quantify.
- 2 A *go-error* occurs when the company lets a poor idea proceed to further development and commercialization.

New product screening methods are used to reduce the risk, but are nevertheless imperfect since there is always an element of judgement. The use of pre-specified screening criteria and product idea rating systems, i.e. a formal screening approach, can help. We now discuss the most frequently used screening techniques.

The simplest form of screening technique is the use of a checklist of all criteria to be taken into account in evaluating the product, i.e.:

- corporate objectives, strategies and values;
- marketing criteria;
- financial criteria;
- production criteria.

Each of these broad areas is broken down into a number of marketing sub-criteria for evaluation:

- extent of clearly defined market need;
- estimated size of market;
- estimated product life;
- competitive position;
- estimated launch costs.

A development of the checklist approach is the use of either **profiling**, or **merit number systems**. Here the criteria to be used for assessment are given a numerical weighting according to their judged relative importance. Each new product idea is then scored against each of the pre-established criteria, say on a 1 to 10 basis, with 1 being a poor score and 10 the highest (i.e. a strong product idea). Scores and weightings are then multiplied to give an overall score for the product idea. A profiling system uses exactly the same approach but the weighted total scores against each criterion are presented in the form of a visual profile for each new product idea.

High Profile

Screening new product ideas is inevitably subjective. Consider the breakfast cereals company which has come up with five different ideas for a new breakfast cereal, but can only afford to develop one. At a senior management meeting called to discuss the relative merits of each product the following managers are asked to select their favourite product from the five proposed and give their reasons.

- 1 The marketing manager chooses product **one** because he feels it would generate most sales.
- 2 The accountant chooses product **two** because it has the highest forecast profit margin.
- 3 The production manager chooses product **three** because it is easiest to produce using existing machinery.
- 4 The human resource manager chooses product **four** because in his view it is 'greener' than the rest in terms of the ingredients it contains.
- 5 The managing director liked product **five** best because it tasted nicest.

With so many different views and reasons, how would one decide which product to choose? By listing each criterion used by each manager (sales potential, profit margin, ease of production, greenness and taste), we can then ask each manager to score each new product, against each criterion. The score for each can then be represented in a simple bar chart for each product. The product with the highest visual profile wins the day.

The benefit of such formal systems is that they force assumptions (and prejudices and vested interests) about new products into the open. They also induce systematic and sometimes more objective, appraisals of new product ideas, where over-enthusiasm and excitement can blind management to potential dangers.

Although we have discussed screening as the second stage in new product development, screening effectively takes place throughout the development of a new product, right up to (and after) launch. The idea of preliminary screening is to spot 'no win' products early, before development resources are wasted. Effective screening requires the consideration of a wide number of criteria. It is important to have a wide range of viewpoints and skills from different functions in the organization. Analysis of past failures points to over-enthusiasm of either research and development or marketing as a prime cause of 'go-errors'.

Concept testing

Crawford suggests a number of functions of **concept testing**. It tries to identify sure losers that can be eliminated from further consideration. Presuming the concept is acceptable, the company must then obtain an estimate of the sales that the product would enjoy. This has brought some contention amongst researchers to the subject.

He states that the most common format for gathering respondents' reactions on their likelihood of purchase form is a five-point scale:

- 1 definitely would buy;
- 2 probably would buy;
- 3 may or may not buy;
- 4 probably would not buy;
- 5 definitely would not buy.

It is customary to combine the number of people who answered that they probably or definitely would buy and to use that number as an indication of group reaction. This is called the 'top-two-boxes' figure.

It is not particularly important whether precisely that many people would or would not buy the product. In the first place, the product that will eventually be offered will almost certainly be different from the description offered in the interview, as much development and further testing needs to be done. However, if the company doing the research has an inventory of percentages from past studies, the figure from the current study may provide a good indicator.

Research methods in concept testing

However the specific data is presented, methods used for analysis are conventional:

Personal interviewing can be done by a one-to-one interview survey or by focus group where a creative researcher approaches a group of people in a controlled situation with a concept statement that is discussed or refined. The focus group technique is a powerful tool in the new product development process and in the hands of a skilled researcher can be used to achieve in-depth understanding of consumer behaviour, attitudes, perceptions and reactions to new product concepts

Arising from the importance of concept testing, many researchers use a sequenced system of interviewing. Here they start with several focus groups, themselves in a sequence from exploratory to confirmatory. Then for consumer products the testing is carried over into individual interviews in shopping arcades or homes; for industrial interviewing, people involved in the buying decision are interviewed on site. This research method is constructed differently to fit each situation.

Telephone interviews Using modern computer-based interviewing technology, this method is quicker and cheaper and is tending to replace traditional in-home personal interviews. It is also useful for obtaining more superficial background information. However, telephone focus groups are not very effective.

Mail Portfolios of concepts can be mailed to potential users, although sample selection and response can pose a problem because of its low response rate. This is more successful when a mail test of a new product concept is combined with a telephone follow-up.

The Internet is being increasingly used in researching new product concepts. The obvious advantage here is speed of response, but in addition its interactive nature allows new product concepts to be explored with a wider range of potential customers (Schribowsky *et al.*²¹).

Information gathered concept testing

Exactly what information should be gathered in a concept development study is a function of the situation, but several general issues are suggested by researchers:

- current practice in the category – for a new concept in an established product field, one would want to know how customers responded to the old product;
- attitudes towards current options – one would want to know not only what respondents like about what they are getting now, but also their opinions on the options they reject;
- any specific experience prior to this time that seems relevant to the concept about to be discussed;
- do respondents understand the concept?
- reactions to the concept – such information can run deep, including product positioning, hidden thoughts, probable uses visualized, reactions of others to the idea, further information wanted about it and possibilities of breakdown when using the product;
- changes the respondent would make in the concept, even if only in vague verbal form;
- comparative data to be used relating this idea to others previously studied. Purchase intentions come in here, but so do other scorings like how the concept compares with those currently on the market.

Advantages and limitations of concept testing

The advantages of concept testing are:

- 1 It can be undertaken quickly and easily, well before prototypes are available.
- 2 It provides invaluable information for later decisions about the product, e.g. applications, user types and preferred attributes.

- 3 Proven market research technology exists.
- 4 It is confidential since small samples are taken and most concept particulars can be restricted.
- 5 Bad ideas can be easily detached particularly if there is one clear reason for this being so.
- 6 Such research permits gaining an understanding of buyer thinking, misunderstanding and prejudices.
- 7 Segments and positioning can be developed in tandem with the concept.

Weaknesses are:

- 1 There are many opportunities for misunderstanding new items – newness, vague concepts and multiple attributes. Ziegler²² suggests that one of the problems might be that traditional concept-testing techniques may not be effective for researching many of the new technology-based products now coming onto the market.
- 2 People find it difficult to react to entirely new concepts without a learning period.
- 3 Testing occurs long before marketing, so many variables in the situation may change by the time the product is marketed. People are asked to be judges and endorsers which is hypothetical.
- 4 Considerable interview skill is required, especially in focus groups, although it looks deceptively simple. Thus there can be a degree of misinterpretation.
- 5 Certain attributes cannot be measured in a concept test, e.g. rug texture or softness produced by using a fabric conditioner.
- 6 It is difficult to establish the validity or reliability of a concept test.

Concept testing for new products can be particularly difficult when the new product is unlike anything else on the market. In this situation it is difficult for consumers to have any frame of reference against which to judge the concept. The Red Bull drink product was completely different to any of its predecessors on the market. Products like this require careful attention to the context and application of concept testing techniques.

Marketing strategy development

If the results of the concept testing stage are encouraging, the next step in the new product development process is the formulation of preliminary marketing strategy plans for the product launch which include:

- preliminary marketing objectives;
- delineation of possible market targets;
- product positioning strategies;
- preliminary marketing mix decisions;
- preliminary budget estimates.

By now, the new product will have progressed to the stage where it is possible to more precisely assess its likely sales and profit potential. At this stage, few resources may have been committed to the project. However, the stage is rapidly being approached where further progress may involve

substantial investment – including, for example, investment in pilot plant and the development of prototypes.

Before a decision can be made about the product development stage, a detailed analysis of the business potential of the new product is required. If these results are satisfactory, the stages of product development and market testing, preceding market launch, can take place.

Business analysis

As far as possible, a company must be sure that the launch of a new product will contribute to the profitability of the firm. For this reason the company should conduct an analysis of the likely financial outcome as a central issue in the 'go'/'no go' decision.

The approach to business analysis is to compare alternative new projects, with each other or some in-company standard, using criteria that give indications of future profitability. Like screening, business analysis is a process and not an event. Business analysis involves estimation of likely sales and profit levels. This stage precedes development of the product itself, so in later stages, particularly in test marketing, initial estimates of the business potential of the new product are likely to become firmer as information on which to base the estimates becomes clearer. Product development will also enable more accurate cost estimates to be made, including direct and investment costs. Business analysis and test marketing can thus be thought of as a continuation of the screening process carried out earlier in the development of the product.

Business analysis requires that estimates be made for the product in three areas:

- 1 **Sales estimates** should include, in volume and value terms, estimates of likely total market potential, estimates of company demand and time-scales, i.e. the pattern of sales which will vary according to whether the product is a singular long-term purchase, bought infrequently, or frequently purchased like food. Forecasting sales for new products is notoriously difficult. For example, sales of the first Sony 'Play station' were said to be nearly four times those forecast by the company.
- 2 **Cost estimates** are easier to make than sales estimates. However, such estimates can sometimes be highly inaccurate. The Concorde aircraft was estimated at £250 million and eventually cost £2,000 million. All costs need to be estimated, including direct costs, total investment costs and overhead costs. It is important to estimate the timing of costs to plan cash flow. It is wise to build a substantial contingency element into the estimation of both fixed and variable costs to reduce the impact of under-costing a new product development.
- 3 **Margins, profits, return on investment and cash flow** Once sales and cost estimates have been made we can estimate the financial aspects of performance. Not only should absolute profits be estimated, but so should the return on investment. Conventional investment analysis techniques such as discounted cash flow and calculation of payback periods are appropriate here. Companies like IBM require their new products to earn a minimum return on investment. Using return on investment measures not only enables different new product proposals to be evaluated, but also allows comparison of investment in new products with other alternative uses of company funds.

Payback period is defined as the time required to repay the initial investment, which is calculated by summing predicted successive yearly net profits until the original outlay is exceeded. Provided accurate information is used, this technique is quick and simple. However, it does not take into account the likely life of the product and cannot be an adequate measure of profitability.

Return on capital is defined as the percentage annual net profit to the net assets employed in the product. The analysis is applied to each year of the forecasted life cycle and provides a means of direct comparison with alternative investment options. Account is then taken of the changing value of money over time.

Discounted cash flow is a technique that takes into account the time value of money by effectively weighting the value of cash flows by an amount that depends on when they occur in relation to the initial investment, i.e. money received during the early part of the life cycle is considered more valuable than that received years later. This technique has gained universal acceptance as a means of investment appraisal as conventional capital investment appraisal techniques give insufficient evidence to allow the decision maker to take the development decision to the next logical stage.

There is significant difference between venture capital required to set up the development and working capital requirement needed to maintain necessary levels of marketing activity after the launch stage, so projections for working capital needs are vital. It is also essential to consider financial pressure that new product introductions can have upon the liquidity position of the company. There is a lagged effect during market development that can place a company in severe liquidity crisis, attributable to the rate of growth.

Survival through innovation, growth and competitive advantage is an interactive triangle, bounded by time. Financial implications of innovation and new product development necessitate an understanding of start-up capital and working capital needed to stay in business. It is vital that a cash budget is developed to forecast incomes and expenditures pertaining to the new project that impact on the company's entire product portfolio.

Pre-tax profits, i.e. the bottom line, and return on capital invested are goals for achievement. The means of their attainment is through an effective budgetary control system with concurrent variance analysis based on the forecasted cash needs of the project to survive and achieve growth. Cash flow forecasting is therefore essential.

Margins can be eroded through an inability accurately to determine costs and cost behaviour in relation to output. A comprehensive understanding of fixed and variable costs in relation to projected levels of performance is vital to establish a financial control climate within which the new product development process can be nurtured. Absolute profits can be disappointing in the short term. Therefore, objectives have to be set clearly in relation to the time horizons of the development plan to monitor progress towards targeted profits. Attention to these aspects of financial control is advised to provide a balance between marketing enthusiasm and the requirements to achieve and maintain a stable financial position for the new enterprise.

Product development

If business analysis points to a favourable decision, the next major step is product development which is where costs tend to rise substantially. Once a physical product e.g. a prototype, has been

developed, further testing, both technical and consumer, should be carried out. Even at this stage an objective and critical view needs to be taken about further investment in the product.

Test marketing

This is the penultimate stage before full scale commercialization and launch. Here, the new product is tested in a way that involves consumers purchasing in a normal shopping situation, or in the case of a more durable product, being tested in an environment in which it is finally used (usually in the home). This process is conducted towards the end of the development process when the concept, product and marketing strategy are at a refined stage. The objective of the test marketing exercise is reduction of risk in any subsequent decisions that are made. The need for this research is to reduce the risk of a costly mistake in a national launch.

In an unusual context for new products, an embarrassing launch in recent years was that of British Airways' new tail fin designs. British Airways felt it was time to move away from the traditional red, white and blue British flag logotype design on their aeroplane tail fins, replacing them with a series of ethnic and abstract designs designed to appeal to a more cosmopolitan and global flying public. The result was subsequently felt to be a public relations disaster and it was universally disliked, especially by the then Prime Minister, Margaret Thatcher, who very publicly placed her handkerchief over the new tailfin design while being videoed for a news programme with a model of a British Airways plane carrying the new logo. The concept had been researched, although it would have been difficult to conduct true test marketing in this situation, but a small-scale roll-out of the new designs would probably have quickly established that consumer reaction to them was unfavourable.

The argument in favour of test marketing is that it measures consumer behaviour in a real situation. The results give an indication of overall consumer response to the marketing mix, whereas product testing measures only individual aspects. Test marketing also removes a major problem in product research, which is that the consumers know that they are being studied, and this alters responses accordingly.

By definition, the exercise takes place in an area substantially smaller than that covered by the entire market. Choice of area is dependent on the nature of the product. Since the objective is to create a scaled-down version of the national launch, test markets for products developed by major companies in the consumer field generally take place in areas defined by the target market coverage. Test marketing is a theme to which we return in Chapter 12.

Increasingly, companies are looking to cut costs and time-scales of market testing by using laboratory test or simulated market tests. In industrial product markets, product user tests and dealer tests are commonplace.

Commercialization

The final stage of new product development is 'commercialization', or bringing the product to the market. If the company goes ahead with commercialization, it is likely to begin to incur its highest costs, involving as it does investment in plant and production and marketing costs. As a consequence care and planning is required if the product is to succeed: many otherwise excellent products have failed because of an inadequately managed launch phase.

Amongst key questions to be addressed at the launch stage are:

■ *When to launch?*

Timing of new product launches is critical: too early and the market or product may not be ready; too late and the opportunity may have passed or a competitor has arrived in the market.

■ *Where to launch?* (coverage)

A major decision at the launch stage is the geographical coverage of the launch e.g. should it be on a local/regional basis first or national or even international? This decision involves selection and timing of areas for the launch. In some cases it pays to go first for the more profitable segments of the market only. In others, circumstances will dictate an all-over launch attack to cover the whole market simultaneously. Critical to this decision are company resources and the existence or absence of competitors i.e. how quickly might they move in?

■ *How to launch?* (launch plans)

By this stage a detailed plan of attack for the launch should be drawn up, including sales forecasts, budgets, allocation of resources and detailed timings. Most important at this stage is an understanding of target markets and the processes of **diffusion** and **adoption**.

These key issues must be resolved at the launch stage right as they provide the platform on which the product's future performance will be built. As Green *et al.*²³ have shown, changes to the product's competitive position after entry may be very difficult and expensive to achieve. Because of this, they have developed an 'Entry Strategy Performance Model' as shown in Figure 4.11 which attempts to capture what they feel are some of the key determinants of performance for a new product and which must be considered at the entry and commercialization stage.

Diffusion and adoption of innovations

The adoption process relates to the stages that every prospect for a new product has to pass through in terms of their buying perceptions i.e.:

- awareness;
- interest;
- evaluation;
- trial;
- purchase.

These are important processes, particularly in marketing communications. If a prospect has already passed through the awareness stage of adoption, then advertising copy must seek to encourage interest in the product or brand.

Individuals differ in their attitudes towards new product acceptance. Of particular relevance to the new product market are the 'innovator' and 'early adopter' categories that are shown in Figure 4.12. By definition these are the first to adopt new products and services and so represent prime market targets (Munnukka²⁴). Little evidence has emerged to support the notion of a generalized attitude to innovativeness as it tends to be product specific, although if a company can identify likely innovators within a product market, initial marketing programmes should be targeted at this group.

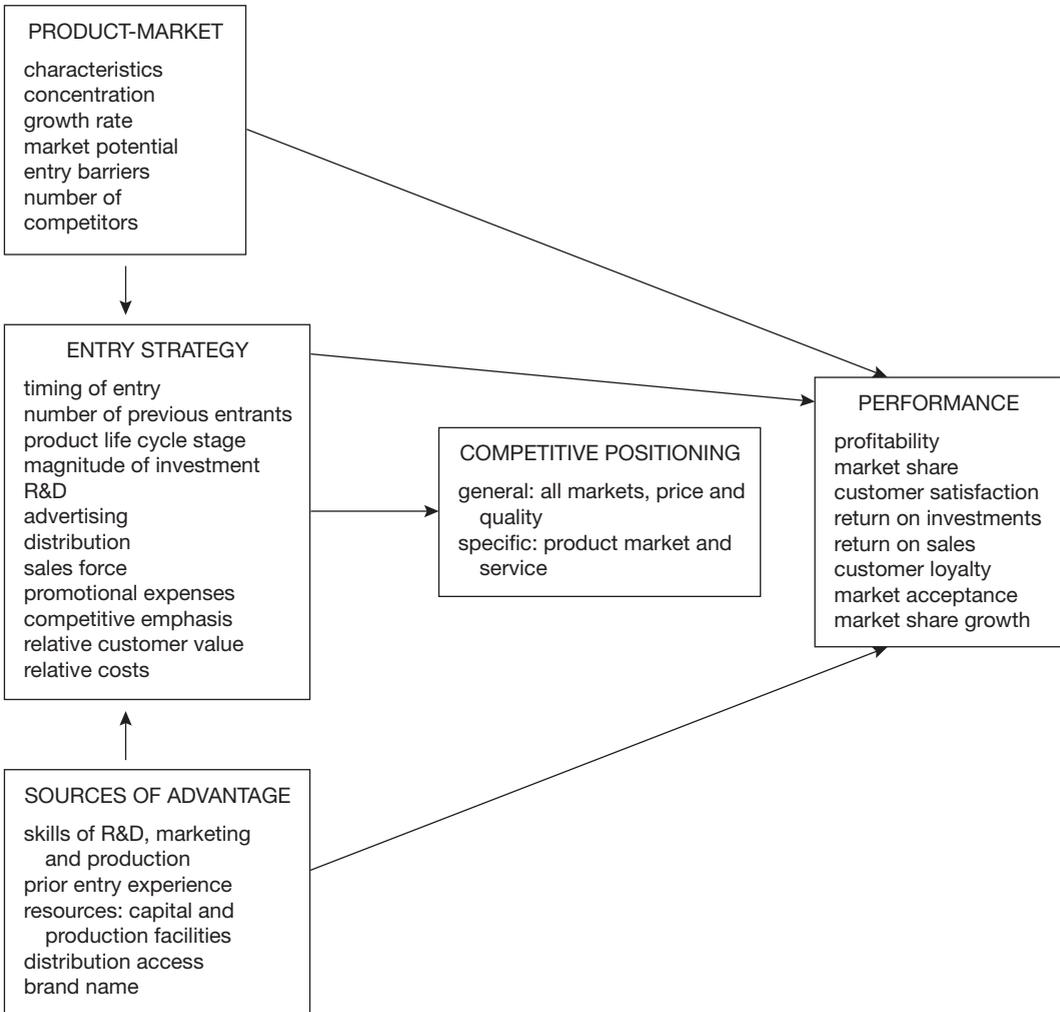


FIGURE 4.11 An entry strategy performance model

Source: Green, D., Barclay, D.W. and Ryans, B. (1995), 'Entry strategy and long-term performance conceptualization and empirical examination', *Journal of Marketing*, October, 59(4): 6.

Consumers can be grouped into five 'adopter categories', each of which has distinct characteristics, so specific strategies need to be formulated that suit individual needs of each group at a given time. The marketing of a product should be seen in as many dimensions as possible e.g. the 'early majority' will require a specific approach to advertising, pricing and distribution. Competitors will be employing the marketing mix in a similar way and will, in turn, create market conditions that require decisions and action of a strategic nature, which in this case should be relevant to the 'growth' stage of the product life cycle (see also Figure 4.2).

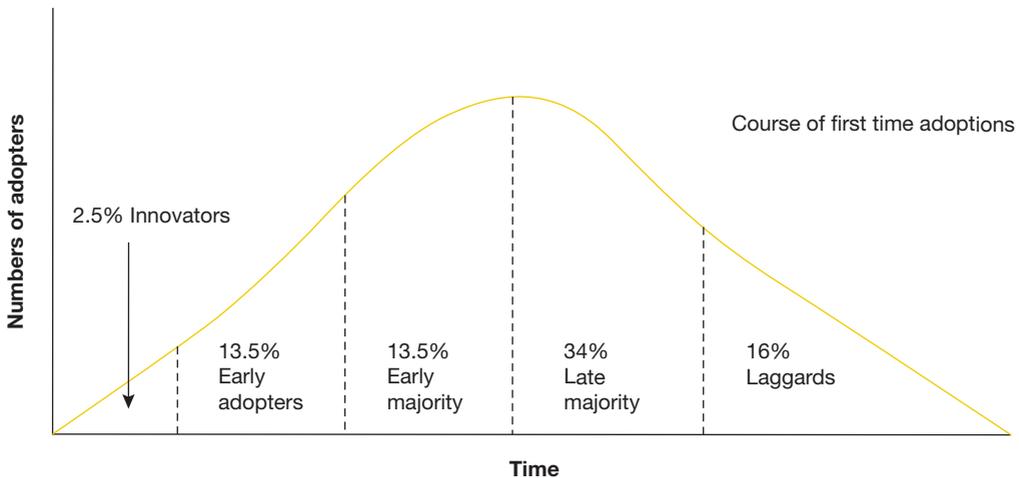


FIGURE 4.12 Adoption theory

Source: Rogers, E.M. (1962), *Diffusion of Innovations*, New York: Free Press, p. 162.

The following typifies customer characteristics in each group:

- Innovators are more adventurous risk takers and purchase early because it is exciting.
- Early adopters are the opinion leaders who purchase after careful analysis, but are willing to take a reasonable risk. Later adopters tend to look to them for a lead.
- Early majority are more averse to risk and represent those who deliberate more and try it after others have tried it. They tend to be better educated and better off than later categories.
- Late majority consumers need contagion and reassurance about the benefits of the product, and will not try it until it is well established and respected customers have adopted it. At this stage the product will have reached the maturity stage of the product life cycle.
- Laggards are traditional and do not see any urgent reason to change. They tend to be older and of lower socio-economic status and not so well off as earlier categories.

Diffusion processes relate to the speed and extent of take-up of a new product. In most circumstances the new product marketer is interested in securing the widest adoption at the highest rate. Clearly, diffusion is related to the adoption process of individual customers, but five particular product characteristics tend to favour a more rapid and extensive adoption and diffusion process:

- *Relative advantage:* The greater the perceived advantage of the new product to customers, the faster it will diffuse.
- *Compatibility:* The greater the extent to which the new product is compatible with existing customer lifestyles, values and uses, the faster it will diffuse.

- *Complexity*: The more complex the new product is to understand or use, the slower will be its rate of diffusion.
- *Divisibility*: The better the ability of the new product to be tried or used on a limited scale before full commitment, the faster it will tend to diffuse.
- *Communicability*: The easier it is for the advantages or features of the new product to be demonstrated or communicated by early purchasers to other potential purchasers, the faster will be the rate of diffusion.

New product development and innovation

In an area of marketing that is characterized by change, in recent years a number of key developments have taken place regarding the management of new product development and innovation. In part, these developments reflect improvements in our knowledge regarding key factors in managing this process more successfully. In part, they reflect changes in the competitive and market environment. Some of the more important of these developments are now discussed.

Design and new product development

Design of a product is a major source of product differentiation in a competitive marketplace. The importance of design in new product success has long been recognized by some, but not since the 1930s has design been so strategically used to gain advantage in the marketplace. Block²⁵ suggests that distinctive design can render older competitors obsolete. He suggests that more durable product designs can have an impact on both users and non-users for many years. To be durable, a product design does not have to be complicated; a good product design is one that satisfies the needs of the customer and makes a product eye-catching in the marketplace. A company recognized for its design skills, which are a major facet of its marketing success, is the Apple Corporation.

As well as helping to differentiate a company's products from those of competitors, the design process determines product attributes such as functional capabilities and product lifespan. Price²⁶ shows how the life cycle cost of a product is significantly influenced by how it is designed and this affects ease of manufacture and serviceability. Simplifying design results in benefits like reduced costs and marketing benefits of improved quality and potentially shorter product development lead times. Lee and Sasser²⁷ have suggested that the total cost of producing and delivering a product is determined by the design. At the time of design completion only 5 per cent of the budget for new product development may have been spent, but 80 per cent of the remaining budget has been committed.

How products are designed has changed significantly in recent years. Customer-focused designs have replaced the expensive, slow, product-oriented, engineer-dominated design processes of the past. Neff²⁸ proposed that **quality function deployment (QFD)** be introduced to ensure customers' ideas are incorporated into the product design process from the outset. Marketing has the responsibility of relating customer requirements to technical departments including design, so in a well run organization marketing research should be used to evaluate the marketability of new designs at an early stage. Customer requirements should be translated into technical requirements at each stage of product development, but it is at the early design stages that they are most important.

Competitive benchmarking is also an approach that can be used to ensure that proposed new product designs improve on those of competitors in aspects which have greatest importance and value to customers. The effect of QFD requires far-reaching changes in how a company operates with respect to design and new product development. In essence it requires different functional groups to interact simultaneously, to identify and solve problems through greater teamwork and communication, particularly between marketing and design functions. An example of how QFD can be used in new product design and development is outlined by Lockomy and Khurana.²⁹ In particular, they stress the significance of the role of QFD in integrating functions horizontally through the process of design and new product development as illustrated in Figure 4.13.

In the diagram we can see that quality function deployment starts at the beginning of the process of new product development, and as explained, centres on identifying customer needs. QFD then helps translate these needs through each stage of the design and development process including manufacturing and production. The idea is to ensure that customer needs and wants remain paramount in each and every successive stage of the process right up to and including production. It is suggested that one of the key advantages of implementing a system of QFD is that ‘a pioneer’

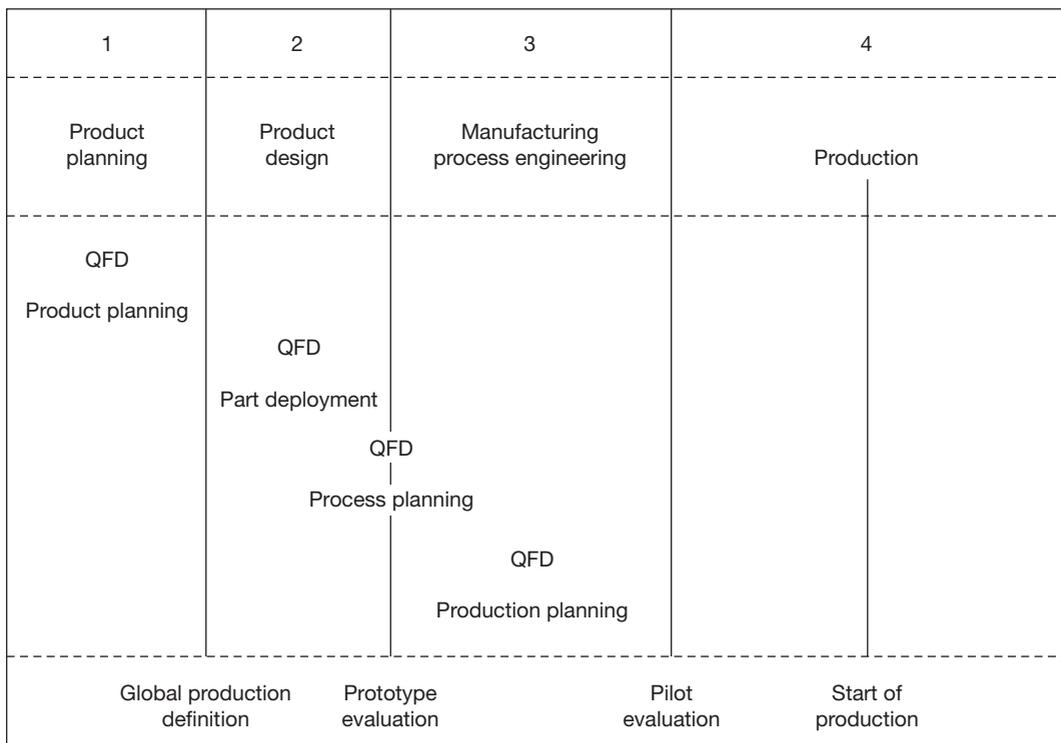


FIGURE 4.13 Product development cycle and quality function deployment (QFD) key events

Source: Lockomy, A. and Khurana, A. (1995), ‘Quality function deployment in new product design’, *International Journal of Quality and Reliability Management*, 12(6): 75.

in a market can charge premium prices in the early years of a product's life cycle, and then use process improvement initiatives to generate savings in later years.

Overall, effective management of the design process is essential if products are to compete successfully in the marketplace. Most companies realize this and have elevated their design function to a more important role in the process of innovation than was afforded in previous years.

Speed and flexibility in the new product development process

With competitive environments changing rapidly to meet changes in markets, technologies, and user needs, product life cycles have become shorter. There is an increased premium on speed and flexibility in managing new product development. Because of this, companies have sought to find ways of improving their performance with respect to these attributes and the most important development in this respect has been to move from the traditional sequential approach to product design and development to one which is characterized by shorter, overlapping phases between the different stages of new product development and with interaction and feedback from cross-functional and multi-functional areas. Takeuchi and Nonaka³⁰ suggested a holistic approach to new product development where several phases of development overlap as shown in Figure 4.14.

The process in Figure 4.14 (a) represents the traditional sequential process of new product development with each functional area completing its part in the process independently before passing the project on to the next department in the sequence. For example, the first department might be R&D with ideas for a new product. These ideas are then passed onto, say, the design

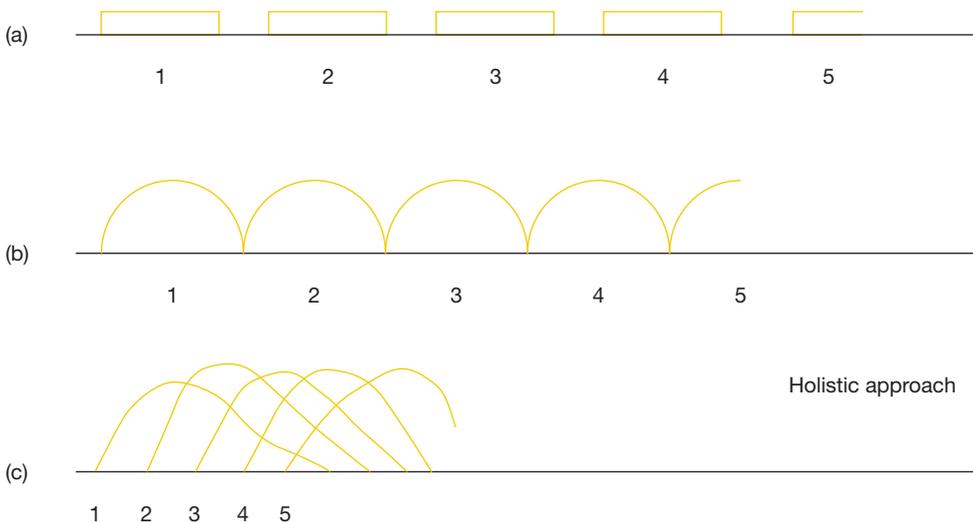


FIGURE 4.14 Sequential (A) versus overlapping (B and C) phases of new product development

Source: Adapted from Takeuchi, H. and Nonaka, I. (1986), 'The New Product Development Game,' *Harvard Business Review*, 64(1): 139.

department who translate them into a preliminary design. The design is then passed to production to manufacture and finally the marketing department comes up with plans for marketing the new product. This is a slow process as work on one stage cannot take place until the previous stage has been completed and 'signed off'. In the process shown in (b) we are beginning to see some overlap between the stages. Each stage is still managed independently and in sequence, but there is beginning to be communication between one department and the next in the process. In (c) the stages overlap. There is teamwork and communication. Responsibilities for each stage are still divided, but work on production and marketing plans might begin earlier; indeed, while R&D and design work is still ongoing. Clearly, this reduces the amount of time needed for developing new products.

With the sequential approach to product development, the new product goes through each phase in a step-by-step manner, moving from phase to phase only after all requirements of each phase have been completed. The 'Type B approach' shown in Figure 4.14 has moved from the traditional sequential approach to a process where development overlaps at the borders of each phase. The final truly holistic approach shown in Type C is where the different phases of product development run together. This inevitably means an end to functions being specialized, where marketing examines customer needs, engineers produce designs and production builds the product. This Type C process is akin to running a relay race with each function passing the baton from one to another, rather the new product development process being organized around multi-functional teams who take charge of the product development process, developing products, manufacturing processes and marketing plans simultaneously to collapse time. The increased speed of product development to which this gives rise can represent a major source of competitive advantage. For example, Ray³¹ cites the case of Canon. In the early 1980s Canon's top management set an objective of reducing product development cost and time by 50 per cent. Ultimately, Canon reduced its development costs by 30 per cent and achieved its objective of reducing time to market by 50 per cent. This enabled Canon to increase its market share by 10 per cent over a ten-year period. Similarly, when Yamaha threatened Honda's leadership in the motor cycle market, Honda unleashed 30 new motor cycle models within a six-month period, effectively thwarting the Yamaha threat.

Similarly, Brassington and Pettit³² cite the example of Renault. By bringing all new product development activities for a new model into a 'technocentre', Renault reduced the time and the costs of new product development. They suggest that costs for Renault have been cut by up to 25 per cent and development times for new products reduced from nearly eight years to just three.

Inter-company collaboration in new product development

As products become more complex, design and manufacturing requires more resources, so some companies are turning towards collaboration when developing new products. Each collaborating company concentrates on activities that reflect their competencies so the product development process is shared between the different members of the supply chain. Collaboration is increasingly being promoted as an effective strategy in dealing with some of the more complex aspects of product development. Littler and Leverick³³ suggest that collaboration offers a means to secure access to technologies, skills and information, to share costs and risks of product development and again reduce the time taken to develop products. Styles³⁴ contends that pooling resources and capabilities can

generate synergistic growth between organizations in terms of developing a current product or service, or through the creation of an entirely new venture. Collaboration between different companies for new product development has been increasing in recent years in addition to licensing, joint ventures and strategic alliances. This is particularly the case for new technology and high cost/high risk products.

A successful example of a strategic alliance between companies to develop new technology and products was that described earlier in this chapter, where co-operation between Kodak, Fujifilm, Minolta, Nikon and Canon led to the development of the Advanced Photographic System (APS). This was a new type of film that was easier to use, load and change than conventional 35mm and other format films. These companies combined to share development costs up to the point where the technology was proven. They then went their separate ways in developing specific products and features on cameras incorporating the new technology. The technology would probably never have been developed unilaterally by individual companies in the industry.

THE INTERNET AND NEW PRODUCT DEVELOPMENT

Internet technology allows a more flexible approach to the process of innovation as the marketer can involve customers in the process. This means that the Internet provides a basis for the introduction of the quality function deployment process referred to earlier. The interactive nature of the Internet enables the marketer to solicit customer participation in the product development process and at the same time reduce development times.

New IT systems have enabled Toyota to make constant and rapid improvements to its design processes, meeting the racing team's requirements to redesign up to 15 per cent of the car in only two weeks between Grand Prix races to continually improve speeds and road-holding abilities. Intel-based servers have enabled faster, more accurate simulations and design calculations to optimize racing car aerodynamics, processing virtual tests significantly faster than on the old legacy RISC-based platform, and have delivered a marked reduction in car development time.

The following represent some of the ways in which increased flexibility and customer involvement are achieved in new product development using the Internet:

- A database can be used to identify key innovators in the market. The company can then communicate with the selected customers to gain information about their particular needs and the implications of these for the concept of the product.
- Product concepts and customer response to these can then be fed into the design process and outcomes in the form of design options can be evaluated directly and immediately with customers.
- Ultimately, as product development progresses, customer needs can be integrated with technical solutions using both the Intranet and the Extranet to integrate the process and to encapsulate customer response as the project evolves.

Implications for marketing in relation to the Internet and developments in IT are important and discussion here is introductory. We consider this development more fully throughout the rest of the text and more specifically in Chapters 9, 10 and 17.

SUMMARY

Product decisions lie at the core of marketing strategy development. Product management starts with the management of existing products and includes decisions about product items, product lines and the overall product mix.

In relation to innovation and new product development, the logic of the product life cycle provides the imperative for a constant search for new products. In short, companies must innovate or face decline. However, new product development is inherently risky. We need to be aware of the critical factors in successful innovation and follow systematic steps in the new product development process.

The importance of new product development in today's competitive environment has caused companies to look at ways in which product development and innovation process can be improved. Because of this, in recent years we have seen several significant developments in this area of strategic marketing. In particular, companies have recognized the importance of the design function in new product development and in particular the importance of relating design to all the elements of new product development from manufacturing through to final marketing of the product. Similarly, there has been considerable focus on how to reduce product development times, in particular through more effective teamwork and better sequencing through the new product development process. The increased cost and problems of new product development have led many companies to enter into collaborative ventures with other members of the supply chain to develop new and improved products. The Internet is important in new product development as it helps speed up and qualitatively improve the process by facilitating consumer interaction and responses throughout the new product development process.

KEY TERMS

Product item	108	Trend extrapolation	134
Product line	109	Delphi forecasting	135
Product mix	110	Scenario writing	136
Line depth	110	Relevance trees	136
Line width	110	Screening	138
Product life cycle	111	Profiling	140
Gap analysis	119	Merit number system	140
People	123	Concept testing	141
Process	123	Diffusion	147
Physical evidence	123	Adoption	147
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Guerrilla marketing strategy	133		

CASE STUDY

Novelty Creations

Howard Boothroyd is disappointed. His company, Novelty Creations, has just withdrawn from its latest venture after three unsuccessful months of trying to market a new product.

The company markets a range of novelty 'lifestyle' products using a direct mail brochure and the Internet. Products marketed include a rainwear range for dogs and cats, an automatic odour protection device for bathrooms and 'make-your-own' birthday card kits. In its outdoor collection it markets a range of garden lights in the shape of garden gnomes and self-erecting clothes dryers. It has over one hundred individual personal items including nose-hair clippers, blood pressure monitors and earwax removal systems.

The company is always looking for new product ideas as the essence of keeping sales moving is novelty and interest. The product just withdrawn after three months in the brochure, and slightly longer on the website, was an extended toenail clipper whereby a person could clip their toenails without having to bend down. Not all new products succeed, but Boothroyd's problem is that this is the tenth recent new product failure and he is worried that the company is losing direction.

New product ideas come from an in-house team consisting of Boothroyd and two other directors. All are from technical backgrounds. Customers are not consulted at the stage of

idea generation as it is felt that they would be unable to grasp many early stage concepts. Idea generation sessions take place on the last Friday of every month and usually result in about ten new ideas being put forward and discussed. As the major shareholder of the company, Boothroyd takes it upon himself to select which, if any, of these ideas should be taken further with a view to including them in the product portfolio. He uses his own judgement in this screening process as he feels that the growth of the company is down to his 'feel' for the market.

Once a product idea is selected, Boothroyd and his team find someone who can make the product and it is then incorporated in the brochure and on the website. He believes that the best test of a product is whether it sells or not and for this reason no marketing research is conducted before its inclusion in the product portfolio. Once the product is launched, a small sample of customers are contacted randomly and asked to complete a questionnaire regarding their views on this product and other company products.

Boothroyd is seriously concerned about recent product failures and is wondering if a different and perhaps more systematic approach to developing new products might be appropriate. He is looking for advice about what the company might be doing wrong and how it might improve its new product development procedures.

CASE STUDY QUESTION

Evaluate the company's approach to new product development and suggest how the company might improve its success rate for future new products.

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