

## 3.4: Product and Service Screening

### Successful New Product Development

Start with choosing a successful product design. A new product strategy is important to successful screening. This provides you with a framework. As you can see there is variety in the types of approaches available.

It emphasizes the importance of introducing new products on the market for continuing business success. Its contribution to the growth of the firm and its role as a key factor in business planning have been well documented (Booz, Allen & Hamilton, 1982; Crawford, 1987; Urban & Freeland, 1989). New products are responsible for employment, economic growth, technological progress, and high standards of living. Therefore, successful new product development is important.

New product introductions increased dramatically as the industry became more aware of the importance of new products to business. It has become a challenge for firms as it requires extensive financial and human resources and is time sensitive. The harsh realities are that the odds are against those that do face a failure rate somewhere in order of 25 to 45 percent (Crawford, 1987; Cooper, 2001). For every seven new products introduced, only one succeeds (Booz, Allen & Hamilton, 1982). Despite the extensive research on how to achieve success, new product development still fails at a rate of one half and therefore NPD ranks among the riskiest and most confusing tasks for most companies. As the number of dollars invested in those investments also goes up. It becomes worse as an estimated 46 percent of resources allocated to NPD are spent on products that fail.

The paper identifies the critical success factors (CSF) for each phase in the NPD process, metrics to measure them, and the tools and techniques that can be used. It is based on an extensive review of the NPD literature. The paper is presented as follows. In the next section, we discuss the NPD process, the metrics. Our framework is then described in detail, and we conclude with a discussion of our work.

The NPD process is a sequence of activities that firms go through when developing and launching new products. A new product that is introduced on the market evolves over a sequence of stages: idea, evaluation, development, testing, and launch. This sequence of activities can be divided into three main stages. In effect, as the new product evolves, management becomes increasingly more knowledgeable (or less uncertain) about the product and the market. This leads to a final decision to undertake development or launch. Following this process of information gathering and evaluation can lead to improved product development and launch. The NPD process differs from industry to industry and is adapted to each firm in order to meet specific company resources and needs (Booz, Allen & Hamilton, 1982).

The NPD process captures the relevant stages of the NPD process (Ulrich & Eppinger, 2011; Wind, 2001; Cooper, 2001; Crawford, 1987; Scheuing, 1989). Over the years, the best known of which is the Booz, Allen and Hamilton (1982) model, shown in Figure 1, also known as the BAH model. This widely recognized model appears to encompass all of the basic stages of models found in the literature, interviews, and case studies and, as such, appears to be a fairly good representation of prevailing practices in industry.



Figure 1: NPD (Booz, Allen & Hamilton, 1982)

The NPD process starts with a clear understanding of company objectives and provides focus for idea/concept generation and guidelines for establishing screening criteria. It helps to meet company objectives. The process is designed to determine which ideas are pertinent and merit more detailed study.

the basis of quantitative factors, such as profits, Return-on-investment (ROI), and sales volume. It is demonstrable and producible. It is necessary to verify earlier business judgments.

Companies that have successfully launched new products are more likely to have some kind of formal NPD process and that they generally use a process based on the BAH model, however, we exclude the commercialization stage; while this stage represents an important area of focus in the stages of the NPD process.

Researchers have examined the determinants of NPD success and identified many factors that distinguish successful products from unsuccessful ones. These success factors are termed as critical success factors (CSF): it is imperative to reflect on how one can benefit from each and how one can manage the process. Daniel (1961) and Rockart (1979) proposed that organizations need to identify factors that are critical to the success of that organization. Failure to achieve goals associated with those factors would result in organizational failure. In fact, it is even suggested that NPD itself is a CSF. A well-known fact, the idea is to determine what factors in NPD are essential for success, and how to measure the extent of this success. The NPD process is an innovation – a process whereby new product projects can move quickly and effectively from the idea stage to a successful launch.

To measure the impact of process improvement over time. Metrics can play an important role in helping companies to enhance their NPD process. First, metrics document the value of NPD and are used to justify investments in this fundamental, long term, and risky venture. Second, metrics help Technical Officers to evaluate people, objectives, programs, and projects in order to allocate resources effectively. Third, metrics help managers, and other NPD employees are evaluated on specific metrics, they often make decisions, take actions, and otherwise alter their behavior. If metrics align employees' goals with those of the corporation; wrong metrics are counterproductive and lead to narrow, short-term, risk-averse behavior.

Focus on one function or another or on the entire NPD process. But no one function is the sole contributor to the process that produces a successful NPD organization, for example, may show constant improvement. In spite of this improvement, however, there may be no improvement in the overall success rate (Beliveau et al., 2002). What is important to measure is the effectiveness of the stages of NPD process in an interdependent fashion. A company that has not improved appreciably over the past 40 years (Crawford (1979, 1992). If companies had reliable metrics, problem areas could be addressed and managers might see the same improvement in their NPD efforts that they come to expect from other companies (Lynn & Reilly, 2000).

## Metrics for stages of the NPD process

For each respective CSFs, metrics, and tools and techniques for measuring progress are explained in detail.

First, set objectives and devise a clear new product strategy (NPS) to meet them (Wind, 1982). The purpose of this stage is to provide a clear strategic business requirements that the new product should comply with, and these are derived from the corporate objectives and requirements. Requirements assign roles to be played by the new products, which in turn are influenced by the needs of the industry (Booz, Allen &

Smith). The goals or objectives for the company's new product program, and should indicate the return-on-investment (ROI) expected from the program. The goals are well-understood. Furthermore, clearly defined arenas, i.e., specified areas of strategic focus, such as products, markets, or geographic areas, and total new product program.

Implementing a clear strategy but also its implementation, i.e., translating the strategy into terms that everyone understands to bring focus to day-to-day activities with other members in the organization. Prior research suggests that companies that recognize the importance of interventional departments will have more successful new products (Cooper, 1999). The role of new products in achieving company goals was clearly defined. If NPS is defined, the related confounding problem is communicating clearly the needs, requirements, resources, and plans for a new product. This communication must take place in multiple forms; however, a well-documented plan and specification must serve as the foundation for the implementation of a clear plan and a strategy for an NPD project is a key requisite for success. Businesses that have a well-articulated NPS

they have 32 percent higher NPD success rates, meet sales objectives 42 percent more often, and meet profits objectives 39 percent

ny's yearly income with the investment in the asset. While the ROI is not too challenging, management should understand how the comparisons can be made for the project under evaluation. A company's ROI proves to be useful in setting the new product goals. If a new product exceeds the resulting benefit, or if the payback affects the corporate bottom line. The aim here is to compare the same pre-established requirement. This long-term metric set by the corporate objectives should be linked with the NPS.

ent the firm needs to navigate to future competitive success (Kaplan & Norton, 1996). BSC translates an organization's strategy into a provides the framework for a strategic measurement and management system. The scorecard measures organizational performance network: financial, customers, internal business processes, and learning and growth. The objectives and the measures of the BSC are performance measures; they are derived from a top-down process driven by the strategy of the business unit. The measures are balanced efforts – and the measures that drive future performance. The scorecard is balanced between objectives, easily quantified outcome outcome measures. Organizations should use the scorecard as a strategic management system, to manage their strategy over the long card to accomplish critical management processes, including communicating and linking strategic objectives and measures.

municated throughout an organization via company newsletters, bulletin boards, videos, and even electronically through groupware. This communication serves to signal to all employees of the critical objectives that must be accomplished if an organization's strategy is to succeed. And measures, they can establish local objectives that support the business unit's global strategy.

rogram should not only be comprehensive but also periodic. Multiple communication tools can be used to launch the BSC program: press releases and newsletters. This initial announcement should then be followed continually, by reporting scorecard and outcomes on bulletin boards. The design of such a program should begin by answering fundamental questions:

strategy?

?

communication strategy?

communication has been received?

strategy. The financial objectives serve as the focus for the objectives and measures in all the other scorecard perspectives. Every measure is financial. The scorecard starts with long-run financial objectives, and then links them to the sequence of actions that must be taken with the goal of finally employees and systems to deliver the desired long run economic performance. Many corporations, however, use identical measures across all business units. This uniform approach is certainly feasible, consistent, and fair since all business unit managers will be evaluated by the same criteria. However, quite different strategies.

idea generation stage begins, where the search for product ideas is made to meet company objectives. The idea generation concerns the search for ideas. After defining the markets and segments based on the NPS it wishes to target, the firm must advance and nurture ideas wherever opportunities exist. As per the study done by Booz, Allen and Hamilton (1982), a firm has to generate at least seven ideas to generate one successful idea. On average, 15.2 ideas must be generated in order to yield 1 success.

selection of different ideas from which the firm can select the most feasible and promising one(s). A greater likelihood of achieving success with ideas that are effective at idea generation are those that do not focus solely on the first source to generate ideas, i.e. ideas that are generated from all potential idea sources (Crawford, 1997). There is a multitude of sources as well as many different methods to generate ideas. Internal sources (i.e., employees, managers), external sources (i.e., customers, competitors, distributors, and suppliers), and from implementing formal idea generation techniques. Analysis and gap analysis are most commonly employed methods for generating ideas (Crawford, 1997). Customers can be an important source of ideas. The relatively high rate of success for product ideas originated from marketing personnel and customers (Souder, 1987).

idea generation stage as per studies done by many researchers that show that a thorough understanding of customer's needs and wants is vital for new successful businesses and teams that drive winning new products have a dedication towards the voice of the customer. A strong customer focus is a key to success in the idea generation stage. According to Souder's (1987) review of causes of NPD success and failure, he concluded that internally generated ideas are more successful than externally generated ideas.

ed ideas. A relatively high rate of success is achieved for project ideas that originated from marketing and customers as compared to ent.

ade: number of ideas generated from the customer, number of ideas retrieved and enhanced from an idea portfolio, number of ideas is in idea bank. Among all of these metrics, the number of ideas generated from the customer is the most associated with the CSF of resources to customer based idea generation activities, such as focus groups with customers; detailed, one-on-one interviews with al people; the active solicitation of ideas from customers by the sales force; and the development of a relationship with lead users

stent theme for successful product development in studies by Song and Parry (1996) and Cooper (1999). There are many creativity team. Effective methods for enriching the customer based idea stream utilize lead user methodology and ethnographic approaches.

as compared to traditional approaches in which ideas are generated based on customer input and usually collect information on new ers. The lead user process collects information about both needs and solutions from the leading edges of the target market and from : form. The rich body of knowledge collected during this process continues to be useful during the remaining steps of product

market research methodology for studying the customer in relation to his or her environment (Cooper & Edgett, 2008). Researchers : environment to acquire a deep understanding of customer's lifestyles or cultures as a basis for better understanding their needs and nd the documentation are done for traces that people leave as they go about their everyday lives. Since it allows the use of multiple ise – it will always reveal more and provide greater insight. This deeper level of understanding is derived from customer to generate

sed as two different stages in the BAH model, we consider the two stages as one for simplicity of the proposed framework. In the √PS, resources and competition, while in the business analysis stage, ideas are evaluated using quantitative performance criteria. After sources from the idea generation stage, which ideas to pursue will be selected based on the business value they bring. Making a good of the business. The point is that product development costs rise substantially with each successive stage in the NPD process (Booz, lassified as “Go” ideas must be screened further using criteria set up by top management (Cooper & de Brentani, 1984; de Brentani, form that can be accessed by a new product committee. The committee then assesses each idea against a set of criteria, which verify its fit with the company's strategy, objectives and resources. The ultimate result from screening and evaluation is a ranking of NPD the projects that seem most promising (Crawford, 1997; Wind, 1982).

investigation stage that clearly defines the product and verifies the attractiveness of the project prior to heavy spending. According to own that weakness in the upfront activities seriously compromises the project performance. Inadequate market analysis and a lack of full-fledged development effort, and failure to spend time and money on the up-front steps, are familiar themes in product failures. is closely tied to the product's financial performance (Cooper, 1980).

imates become more refined and accurate, companies should continue conducting financial evaluation throughout the NPD process, ential sales and profit projections of the new product are undertaken in order to determine whether these factors satisfy the company's at the product meets the objectives, then the new product concept can move to the development stage. According to Griffin (1997) ed formal financial objectives against which performance was measured. The final component of the business analysis stage is the e next stage and tentative plans are developed for all subsequent stages. This critical stage opens the door to a significant commitment m based on financial analysis which forms the base for the CSF and its metrics proposed for this stage.

business analysis stage as too many new product projects move from the idea stage right into development with little or no early : approach are usually disastrous. Up-front homework includes activities such as financial analysis, undertaking thorough market and and wants, concept testing, and technical and operations feasibility assessments. Solid pre-development work drives up new product to financial performance. All of these activities lead to solid business analysis prior to beginning serious development work. Firms funding and 16 percent of the person-days to these critical up-front homework activities, which is not enough to make a successful conclusion is that more time and resources must be devoted to the activities that precede the design and development of the product.

dominant method used by 40.4% of businesses for performance results is a financial approach, followed by strategic approaches and, return, payback or economic value of the project are determined and projects are judged and rank-ordered on these criterion.

much like a conventional investment decision. The expected commercial value (ECV), net present value (NPV), internal rate of metrics that are proposed as being most useful for measuring the success of the screening and business analysis stage. These metrics ct projects. All metrics have their own advantages and disadvantages. For example, the NPV method ignores probabilities and risk; it nancial goals are important. The ECV depends on extensive financial and other quantitative data. These metrics together give clearer lp select the best project from the group.

### ss Analysis

metrics and how they measure the financial performance of each project are explained below.

cs to maximize the value or commercial worth of the project, subject to certain budget constraints, and introduces the notion of risks value or commercial worth of each project to the corporation. The calculation of the ECV is based on a decision tree analysis and ject, the probabilities of both commercial success and technical success, and both commercialization costs and development costs. t in terms of its expected financial returns from the perspective of the company's overall commercial strategic objectives. In order to project is determined projects are rank ordered accordingly.

g proposed capital investments involves summing the present values of cash outflows required to support an investment with the ations of the project. The inflows and outflows are discounted to present value using the firm's required rate of return for the project. d to yield a return in excess of the required rate; if the NPV is zero, the yield is expected to exactly equal the required rate; if the NPV quired rate. Hence, only those projects that have a positive or zero NPV meet the criterion for acceptance.

actly equates the present value of the expected after-tax cash inflows with the present value of the after-tax cash outflows. Once the matter to compare it with the required rate of return to decide whether or not the project is acceptable. If the IRR equals or exceeds the projects is also a simple matter. Projects are ranked according to the IRRs: the project with the highest IRR is ranked first and so on.

value of the after-tax cash inflows to the outflows. A ratio of one or greater indicates that the project in question has an expected yield ility index is a measure of a project's profitability per dollar of investment. As a result, it is used to rank projects of varying costs and . Projects are rank-ordered according to this productivity index in order to arrive at the preferred portfolio, with projects at the bottom ect ideas are carefully screened, and that the business analysis is carefully carried out, these metrics are certain to help select projects ojects in the firm's pipeline in terms of business objectives.

uct conform to company objectives, the new product team can move on to the development stage, which is made up of activities that p and test marketing. The interaction between the program and project manager is no longer one of selling or buying the concept, but within budget, and to the required specifications.

committed during this stage with 40 percent of total NPD time (Cooper, 1999). In the development stage, business case plans are for success at this stage to move through development to launch as quickly as possible and to ensure that the product prototype or s, which requires seeking customer input and feedback throughout the entire development stage. It is important to gain competitive on as possible and it also minimizes the impact of a changing environment. Thus, as the product proceeds from one step of the should reassess the market, position, product, and technology in order to increase chances of delivering a successful product (Cooper, functions in particular should collaborate because, while marketing can express the needs of customers, R&D has the capacity of ty. Therefore they should work together to ensure the product meets customer requirements. Cross-functional teams are widely used lems efficiently by coordination of resources and ideas. Customer input and feedback is a critical activity throughout development, ed development toward a correctly defined target.

much that is unexpected can occur during this time frame. The market may change partway through development, making the original id. Customer requirements may shift, rendering the original set of product specifications obsolete. Competitors may introduce similar rket environment. These and other external changes mean the original product definition and justification are no longer valid.

apon and yields competitive advantage; it means that there is less likelihood that the market or competitive situation has changed by quicker realization of profits Cooper (1993, 1999, 2001). Companies that develop products quickly gain many advantages over their

iation, leadership reputation with consumers, lower development costs, and accelerated learning (Cooper, 2001). Therefore, the goal importantly, fast development minimizes the impact of a changing environment. If the development time can be reduced from eighteen narily greatly reduced that makes the need to reduce the time during the development stage. Most firms have reduced product verage reduction being about the one-third. In short, the challenge here is to shorten development time so as to minimize the chances

out development stage, both to ensure that the product design is right and also to speed development toward a correctly defined target. e prior to development may not be enough to resolve all the design problems during development (Cooper, 1999). Customer feedback and honest customer input during the development phase. Seeking customer input should become an integral part of the design team

e start to completion of the development stage, i.e., the length of time to develop a new product after passing business case stage to d end point vary from one company to another, and may also vary from one project to another within the company. How quickly the ns stated earlier, and as such, it is imperative that the team measures their progress according to time.

ing of representatives from the various functions involved in product development, usually including members from marketing, R&D, g, as needed). The most effective development teams also involve suppliers in the early stages of development, and frequently rely on (Clark & Fujimoto, 1988). Cross-functional teams have replaced a more functional approach in which each team relinquishes project gineering team hands-off to the manufacturing team). This paradigm requires frequent communication between functions represented ccess. Cross-functional teams are essential for timely development, improving design quality, and lowering development costs. Cross- 1 individual design engineers work together with individual marketers or process engineers to solve joint problems in development. ng level. It rests on the foundation of tight linkages in time and in communication between individuals and groups working closely termines the extent and effectiveness of integration in the design and development of the product (Wheelwright & Clark, 1992).

embers are committed, or dedicated, to the project. Since project team members' time commitments are typically spread across a mental managers are vying for team members' time, team members are often on and off development projects. This creates a this stage that it is crucial to have a team with dedicated team members. A dedicated, accountable team leader- that is, not doing too time, and held accountable for the result.

taken concurrently (rather than sequentially), thus more activities are undertaken in an elapsed period of time. The purpose is to s well as manufacturing capabilities and to do so in the shortest possible time. However, due to the need for prerequisite information, overlapped with minimal risk. Therefore, the degree of parallelism must be measured to ensure minimal downstream risk.

s a qualitative in-process metric which ensures as much as possible that the final design meets customer requirements. This requires entire development stage and thus the customer becomes an integral part of the design team to overcome technical problems that arise re development stage. Customer needs and wants assessment must be a vital and ongoing activity throughout development, both to eed development toward a correctly defined target.

iber of tools and techniques to reduce development times that are consistent with sound management practice.

l in predicting the end date of the said project as well as in tracking the progress of a project. It works in the following way: when a otted against the date the prediction was made. By assessing dynamic time to market, the team members will get an early warning of illy be taken by the team to maintain schedule integrity. Thus projects are kept on schedule to achieve timely product development.

of the team as a working group and it is a function of length of time that a team has worked together in a past or present project embers are attracted to the team and motivated to remain in it.

lel rather than doing them sequentially. By overlapping activities, the cycle time, i.e. the total time taken to complete the product market, can be greatly reduced. Overlapping activities saves time due to 1) parallel processing of activities, 2) better and more timely communication earlier and throughout the team. This metric serves as an indicator of the degree of concurrency in the process. In es, the higher the degree of concurrency and the shorter is the development time. A lower number of overlapped activities indicates a lso indicate opportunities for improving the process to achieve objectives.

1 validation of the entire project: the commercial viability of the product, its production, and its marketing (Cooper & Kleinshmidt, 1993). Testing is being conducted throughout the development stage. Information obtained during testing is used in developing the product. This usually decreases the chances of failure in launch, since it has the capacity of revealing flaws that could cause market failure (Urban & von Hippel, 1988). That a test phase that is customer oriented is the critical factor – whether it is done and how well it is executed – is significantly affected by the types of testing, i.e. concept testing, prototype/development testing, and test marketing, should be conducted in this stage (Cooper (1993), 1993). Testing should not be solely restricted to this stage; it must be conducted throughout the NPD process (Ulrich & Eppinger, 2011).

One of the aims here is to see whether a product with the attributes called for has been produced. It must be proven that claimed attributes exist.

To gauge whether the product is acceptable to the customer, to measure the customer's level of interest, liking, preferences, and intent to purchase, and features of the product to which the customer responds. Not only must the product work right in the lab or development environment, but it must also work right when the customer uses it. The product must excite and, indeed, delight the customer; who must find it not only acceptable but also desirable. In short, the customer reaction must be sufficiently positive so as to establish purchase intent.

Product performance is usually measured in such ways as testing physical features, perceptual attributes, and those aspects of an offering that create the benefits; they are typically a focal point of NPD. Perceived benefits are the best predictors of success with customers because they represent customer-oriented perceptions but are still close enough to supplier-oriented features to be useful to the developer. Validation and user testing techniques are used to gather data on product performance. These primary research techniques are used throughout the NPD process, these are the types of research results necessary to make final critical decisions and reduce the risk of possible failed products.

Whether the customer is willing to purchase the tested product or not and to gauge whether the product is acceptable to the customer. Customer performance, customer satisfaction (Like/Dislike), and the preference score to determine the nature of the competitive situation. It is nonetheless to record the basic likes/dislikes of the customer early before the product gets launched into the market. Based on the findings in the product.

Product assembly is the final product that will be manufactured and sold, and is often called system testing and usually takes place in-house. The product performance requirements and design specifications have been met. The validation test is normally conducted late in the development process when most design goals have been met. This includes usability, performance, and robustness. Validation tests normally aim to evaluate actual production version and so activities should be performed in full. It is probable that the validation test is the first opportunity to evaluate the product, although elements may have been tested individually already. Thus, the product should be as near to representing the final item as possible. Also included within validation tests will be any formal evaluation required for certification, safety or legislative compliance.

Validation is based on measurement of performance. Normally, this is carried out against some benchmark of expected performance or criteria set by the customer, speed, accuracy or rate of use, but should always be quantified. Issues such as desirability may be measured in terms of preference or satisfaction. Any failures to comply with expected performance logged and appropriate corrective action determined.

Product testing, and in some cases, this testing must precede product shipment. This is not to be confused with marketing customer testing, where the product is not yet available. The purpose of testing is to understand how the product performs in the end-user environment. Customer testing can be simulated in laboratories, where use is isolated from users' mistakes, competitive trashing of the concept, and objections by competitors. Products that are entirely new to the market should receive beta testing because there is no base of data on which to base the product.

Beta testing can range from rigorous to nonexistent. In the first case, the developer closely monitors and follows up the beta test with in-house staff or the second case the developer may simply contact the customer by phone or has an group or individual contact to ask for opinions on how the user feels the same toward the prototype as toward the verbal concept discussed earlier in the NPD stage. The results of the testing are used to show the areas where the product is deficient, and is therefore a critical stage to be considered in the development process.



## s and techniques for NPD

successful NPD discussed in the previous sections are all summarized in the framework proposed in Table 1.

or	Metrics	Tools and Technique
	Return on Investment	Financial Analysis
Strategy	Degree of Communication	Balanced-scorecard as a Communication Tool
Idea Generation	Number of Customer Focused Ideas Generated	Lead User Methodology
		Ethnographic Approach
	Expected Commercial Value (ECV)	Financial Method of evaluation
	Net Present Value (NPV)	
	Internal Rate of Return (IRR)	
	Productivity Index (PI)	
	Development time	Team Cohesiveness
	Degree of functional integration	Dynamic Time to Market
	Degree of team commitment	Degree of Parallelism
	Concurrency of activities	
	Degree of design effort on real customer priorities	
7	Product Performance	Validation Testing
e	Customer-Perceived Value	User and Field Testing

### es of NPD Process

are essential for success for each stage, metrics which can be used to measure the performance of those factors, and tools and n the framework. As a preliminary proposed framework, we believe that any complex NPD project that follows this framework will

nge for companies. Many companies are aware of the major role new products must play in their future and quest for prosperity: lize, restructure and redesign their NPD practices and processes for better results.

D firms should have a clear and well communicated new product strategy. These firms should have well defined new product arenas ful businesses and teams of NPD have a dedication towards the voice of the customer. It is critical that firm should gather as many come from customers so that the firm can be in a position to design and develop winning new products. Up-front homework prior to found to be a key factor in a firm's success. The quality of execution of the predevelopment steps – initial screening, preliminary is closely tied to the products financial performance. Firms should try to shorten the development time so as to minimize the chances igned when the product comes into the market. It is important to verify and validate product performance requirements and design re launching the product into the market via validation and user field testing.

id attempted to identify ways in which firms can improve their performance when developing new products, mainly through the study ere identified through an extensive study of the practices and performance of successful firms presented in the NPD literature. The generally defined for the overall development process, rather than specifically addressing each stage. To overcome this problem, this ?presumably, no other study to date has developed such a framework, which can be crucial for NPD success.

additional useful information both to firms finding CSF and measuring product development success as well as to academics opportunity exists in implementing or testing the proposed framework. This would be useful to do over the longer term both among the research to determine the impact of this research on both practice and research.



## Section 5, Part 3: Following a Product Development Process”

evaluated for appeal to the marketplace. Once you have identified that users may want or need a particular type of product or service, to satisfy that want/need. The product development process provides a systematic way to approach this often-complex issue. By the end of this reading you will be able to outline the stages of new product development.

business analysis, technical development, manufacturing, testing, and commercialization.

ment

### KEY POINTS

- Ideas for new products can be obtained from customers (employing user innovation), the company’s research and development department, competitors, focus groups, employees, salespeople, and more.
- The object of idea screening is to eliminate unsound concepts prior to devoting resources to them.
- The focus of the business analysis is primarily on profits, but other considerations, such as social responsibilities, may also be involved.
- Manufacturing planning must consider how to secure the availability of required funds, facilities, and personnel at the intended time, as well as the methods of coordinating this effort.
- Test marketing is the final step before commercialization; the objective is to test all the variables in the marketing plan including elements of the product.

### TERM

- Focus GroupA group of people, sampled from a larger population, interviewed in open session for market research or political analysis

### FULL TEXT

#### New Product Development Process

There are several stages in the new product development process—not always followed in order:

##### Idea Generation

Generating new product ideas is a creative task that requires a specific way of thinking. Ideas for new products can be obtained from customers (employing user innovation), the company’s R&D department, competitors, focus groups, employees, sales people, corporate spies, trade shows, or through a policy of Open Innovation. Formal idea generating techniques include attribute listing, forced relationships, brainstorming, morphological analysis, and problem analysis.

##### Idea Screening

The second step in the product development process is screening. It is a critical part of the development activity. The object is to eliminate unsound concepts prior to devoting resources to them. The screeners must ask at least three questions:

1. Will the customer in the target market benefit from the product?
2. Is it technically feasible to manufacture the product?
3. Will the product be profitable when manufactured and delivered to the customer at the target price?

##### Business Analysis

After the various product ideas survive their initial screening, very few viable proposals will remain. Before the development of prototypes can be decided upon, however, a further evaluation will be conducted to gather additional information on these remaining ideas in order to justify the enormous costs required. The focus of the business analysis is primarily on profits, but other considerations, such as social responsibilities, may also be involved. Management must:

- Estimate the likely selling price based upon competition and customer feedback.
- Estimate sales volume based upon size of market.
- Estimate profitability and the break even point.

## Technical and Marketing Development

A product that has passed the screening and business analysis stages is ready for technical and marketing development. Technical development involves two steps. The first is the applied laboratory research required to develop exact product specifications. The goal of this research is to construct a prototype model of the product that can be subjected to further study. Once the prototype has been created, manufacturing-methods research can be undertaken to plan the best way of making the product in commercial quantities under normal manufacturing conditions. This is an extremely important step, because there is a significant distinction between what an engineer can assemble in a laboratory and what a factory worker can produce.

While the laboratory technicians are working on the prototype, the marketing department is responsible for testing the new product with its intended consumers and developing the other elements of the marketing mix. They must ask the following questions:

1. Who is the target market, and who is the decision maker in the purchasing process?
2. What product features must the product incorporate?
3. What benefits will the product provide?
4. How will consumers react to the product?
5. How will the product be produced most cost effectively?
6. What will it cost to produce it?

Marketers must then prove feasibility through a virtual computer-aided rendering and rapid prototyping, and test the concept by asking a sample of prospective customers what they think of the idea.

## Manufacturing Planning

Assuming that the product has cleared the technical and marketing development stage, the manufacturing department is asked to prepare plans for producing it. The plan begins with an appraisal of the existing production plant and the necessary tooling required to achieve the most economical production. Compromise between attractiveness and economy is often necessary. Finally, manufacturing planning must consider how to secure the availability of required funds, facilities, and personnel at the intended time, as well as the methods of coordinating this effort.

## Marketing Planning

It is at this point that the product planner must prepare a complete marketing plan—one that starts with a statement of objectives and ends with the fusion of product, distribution, promotion, and pricing into an integrated program of marketing action.

## Test Marketing

Test marketing is the final step before commercialization; the objective is to test all the variables in the marketing plan including elements of the product.

## Commercialization (often considered post-NPD)

At last, the product is ready to go. It has survived the development process, and it is now on the way to commercial success. How can it be guided to that marketing success? It is the purpose of the life cycle marketing plan to answer this question. Such a complete marketing program will, of course, involve additional decisions about distribution, promotion, and pricing.

## Unit 3 Discussion, Part 1

#1

Considering the importance of product selection, review each development and selection tools provided in this unit. Do a web search to identify at least one additional method for development or screening. How might you use these tools together to make a selection choice between three good ideas? Does one method appear more useful than the others? Why?

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