

Product Design and Process - An Insight



Production & Operations

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M.VENNILA

PG Student, Department of Management Studies, Periyar Maniammai University, Thanjavur

A.ANU RADHA

PG Student, Department of Management Studies, Periyar Maniammai University, Thanjavur

ABSTRACT

Product design and process development is a vital part of the product development project, combining product, process, market and consumer research. These multi-disciplinary activities are completely interconnected and form a highly creative part of the project. The knowledge base is very wide, although sometimes there is little depth to parts of it. With the introduction of computers and the greater basic knowledge becoming available, it is now developing into a technological process with a strong consumer base element. Consumers are an integral part of product design, and are included in the testing of the prototype products. At the end of product design, a factual feasibility study has to be produced from this mass of information. Therefore, product design needs to be systematically planned and controlled, while still allowing space for creative behaviour. Three test factors in product design are consumer acceptability, technical feasibility and costs; these must be considered at all stages of the design.

INTRODUCTION

Product design takes a long time and a great deal of effort. It is important to target the design programme to minimize time and costs and to plan for it to be successfully completed within allocated resources. Time is very much of the essence, the minimum compatible with optimal development. In a product design plan, there are many activities to be first recognised and then coordinated; some activities are worked in sequence, some in parallel. In particular, multidisciplinary activities are focused in the same direction and coordinated in time. The master plan coordinates the various people and their mini-projects in an overall time and resource plan so that the product design can be controlled.

ANALYSIS

The first task in product analysis is to become familiar with the product! What does it do? How does it do it? What does it look like? All these questions, and more, need to be asked before a product can be analysed. If you focus on these key areas, you are well on your way to successfully introducing new products into the market and increasing your revenues and profits. It is important to know how the design has been made user-friendly and any marketing issues - these all have an impact on the later design decisions.

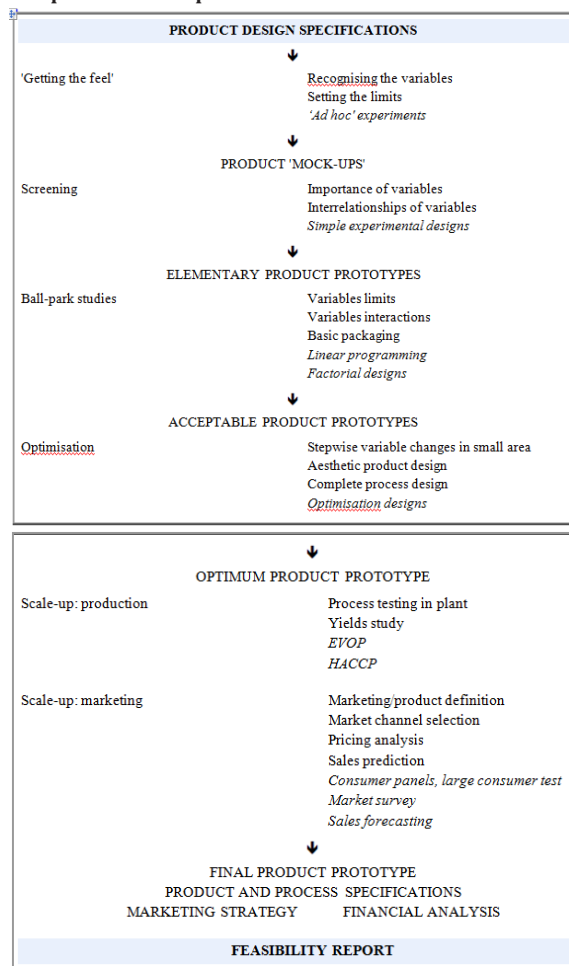
PRODUCT DESIGN

Design comes from the combined effect of all elements in a product. Colour tone, shape and size should direct a person's thoughts towards buying the product. Therefore it is in the product designer's best interest to consider the audiences who are most likely to be the product's end consumers. Keeping in mind how consumers will perceive the product during the design process will direct towards the product's success in the market.

PROCESS OF DESIGNING A PRODUCT

The design activities are grouped into steps: 'getting the feel', screening, ball-park studies, optimisation and scale-up of production and marketing, leading at the end to product and process specifications, marketing strategy and financial analysis. This allows control of the design process as the consumer, product and process activities are coordinated into small mini-projects with specific objectives

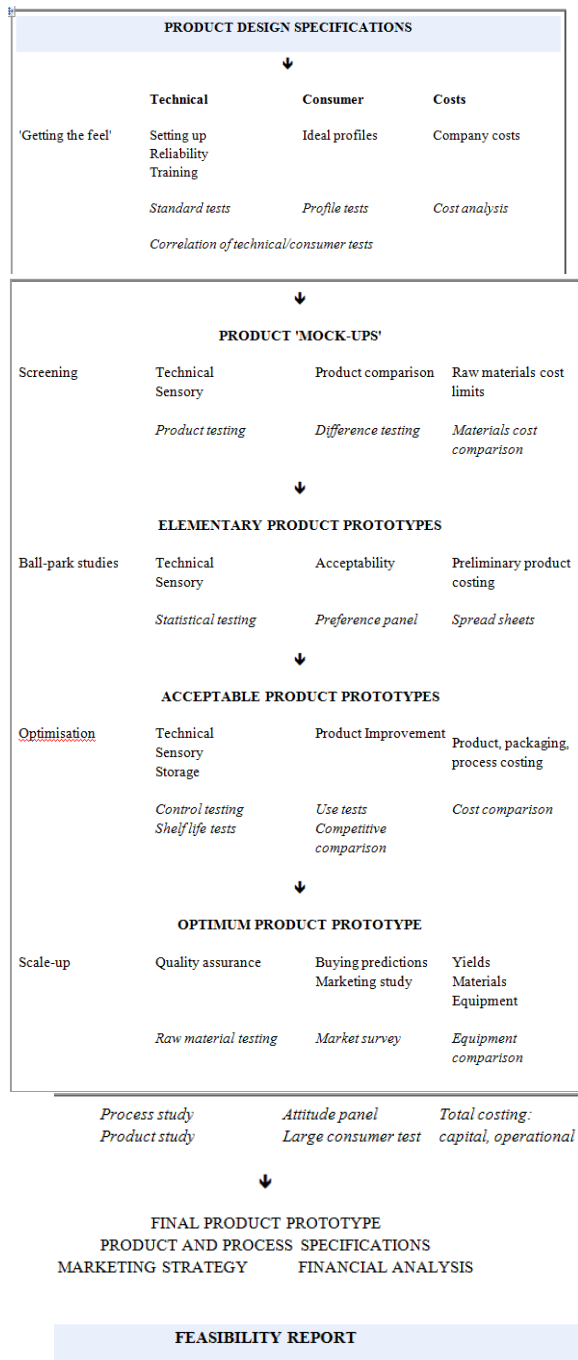
Activities and experimental techniques in product design and process development



PRODUCT TESTING

Product testing is an integral part of the product design and process development.

Testing activities and techniques in product design and process development



PRODUCT FORMULATION

Many products are made by combining raw materials in specific proportions in formulation, and research on the effects of various formulations on product qualities is common in product design.

In systematic formulation there are five steps:

- Set the product qualities required,
- Find data for the raw material compositions, qualities and costs,
- Determine limits on the raw materials and the processing variables,

- Use quantitative techniques: linear programming, experimental designs, mixture designs,
- Use product profile tests and technical tests to relate product qualities to changes in formulations.

PROCESS DEVELOPMENT:

The following steps are involved in process development of a product:

Step 1: Generating

Utilizing basic internal and external SWOT analyses, as well as current marketing trends, one can distance themselves from the competition by generating ideologies which take affordability, ROI and widespread distribution costs into account. During the new product development process, keep the system nimble and use flexible discretion over which activities are executed. You may want to develop multiple versions of your road map scaled to suit different types and risk levels of projects.

Step 2: Screening the idea

With your list of potential new product ideas, you need to decide which ideas to pursue and which to discard. Consider your competition, your existing products, their shortcomings, and the needs of your market. Draw on the customer needs list you have developed, and the areas for product improvement you have identified.

Develop a set of criteria to evaluate your ideas against. Your criteria might include:

- most prominently identified customer needs
- product improvements most needed
- the benefits to your target market
- the technical feasibility of the idea
- the level and scope of research and development required
- the profitability of the idea. What is its potential appeal to the market? How would you
- the resources it will require in development
- the marketing potential of the idea
- the fit with your business profile and business objectives.

Step 3: Testing the Concept

Concept testing is most often used in concept development to test the success of a new product idea before it is marketed. Concept analysis is often used as one step in the process of providing proof of the concept. Concept tests provide the direction and guidance necessary to identify and communicate key product and service benefits and uses, as well as product specific implementations such as packaging, advertising, sales approaches, product information, distribution, and pricing.

Step 4: Business Analytics

During the New Product Development process, build a system of metrics to monitor progress. Include input metrics, such as average time in each stage, as well as output metrics that measure the value of launched products, percentage of new product sales and other figures that provide valuable feedback. It is important for an organization to be in agreement for these criteria and metrics. Even if an idea doesn't turn into product, keep it in the hopper because it can prove to be a valuable asset for future products and a basis for learning and growth.

Step 5: Beta/Marketability Tests

Arranging private tests groups, launching beta versions, and then forming test panels after the product or products have been tested will provide you with valuable information allowing last minute improvements and tweaks. Not to mention helping to generate a small amount of buzz. Wordpress is becoming synonymous with beta testing, and it's effective. Thousands of programmers contribute code, millions test it, and finally even more download the completed end-product.

Step 6: Technicalities and Product Development

Provided the technical aspects can be perfected without alterations to post-beta products, heading towards a smooth Step seven is imminent. The production department will make plans to produce the product. The marketing department will make

plans to distribute the product. The finance department will provide the finance for introducing the new product.

Step 7: Commercialize

At this stage, your new product developments have gone mainstream, consumers are purchasing your good or service, and technical support is consistently monitoring progress. Keeping your distribution pipelines loaded with products is an integral part of this process too, as one prefers not to give physical (or perpetual) shelf space to competition. Refreshing advertisements during this stage will keep your product's name firmly supplanted into the minds of those in the contemplation stages of purchase.

Step 8: Post Launch Review and Perfect Pricing

Review the NPD process efficiency and look for continuous improvements. Most new products are introduced with introductory pricing, in which final prices are nailed down after consumers have "gotten in." In this final stage, you'll gauge overall value relevant to COGS (cost of goods sold), making sure internal costs aren't overshadowing new product profits. You continuously differentiate consumer needs as your products age, forecast profits and improve delivery process whether physical, or digital, products are being perpetuated

PACKAGING DEVELOPMENT

Packaging design at this stage concentrates on the packaging of the individual product; the outer packaging research is only related to decisions regarding size and to the protection required during distribution. The design of the packaging for the individual product is based on the needs of the consumer and the requirements of product preservation and protection in the product design specifications, but it also considers the process and the distribution, as well as the needs of retailers and the environment. The graphic design is usually carried out during the commercialisation stage together with the promotional artwork, but consideration needs to be given to any printing and display needs in the selection of the packaging and the materials to be used.

CONCLUSION

The product and process specifications, the product analysis, product consideration and formulation gives an excellent information for a feasibility study and for the evaluation of the product before the very expensive step of commercialization is attempted.

REFERENCE

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