



Unit 1 Topic 2

Food plant design process

2.1 Introduction

The design process on all projects follows the same stages of development. However the extent and detail of the activities behind each stage are different with every project. There are a number of different industry formats for mapping the stages in the engineering process. A sequence that provides a simple fit with plant design activities is outlined in Figure 2.1. This is based on the overall project involve estimation of plant and/or equipment/s capacity, process scheduling and proper layout so as to meet special requirements and needs to be focused on these. The following are the few aspects that make the food industry as a unique.

2.2 Feasibility study

The basis for the success of the design of any food processing plant is a comprehensive feasibility study and evaluation. The feasibility study involves an analysis and evaluation of the design concept from all the relevant angles. The study provides an immediate indication of the probable success of the enterprise and also shows what additional information is necessary to make a complete evaluation. It gives an insight in to: requirements of human, financial and material resources; plant and machinery, technology; and economic gains or profitability of the proposed venture.

The feasibility analysis involves a certain number of stages during which various elements of the plant design are prepared and examined to arrive at appropriate decision. The feasibility study can, therefore, be seen as a series of activities culminating in the establishment of a certain number of study elements and documents, which permit decision making. Identification stages, preliminary selection stage, analysis stage and evaluation and decision stage are the important stages.

2.3 Project idea

2.3.1 Identification stage:

Once a product idea occurs, the starting point of analysis is the establishment of the objectives to be attained. The objective may be to prove that it is possible and desirable to manufacture a certain product or group of products, to add a piece of equipment to the existing plant or to utilize certain resources.

The ideas for new products or diversification can be generated in an informal and spontaneous manner from customers, distributors, competitors, sales people, and others, or the entrepreneur can rely on a systematic process of idea generation.

Two key approaches for product identification and selection could be:

- a) Look for a need and then the product to satisfy that need, or



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b) Find a product idea and then determine the extent of the need.

2.3.1.1 Looking for a need:

Venture ideas can be stimulated by information which indicates possible need. This approach requires access to data and considerable analysis. However, if the perceived need is real, the product idea has a better than average chance of leading to a successful venture. The need may be one now being served inefficiently at high cost, or it may be presently unserved. The second implies that a considerable amount of creative design and development may be required to arrive at a product that appears to satisfy the need. The following is suggested for identification of the need.

- Study existing industries for backward and forward product integration to indicate input and output needs
- Analyse population trends and demographic data for their affect on the market
- Study development plans and consult development agencies for development needs and venture opportunities.
- Examine economic trends in relation to new market needs and opportunities.
- Analyse social changes
- study the effects of new legislations in relation to creation of new opportunities

2.3.1.2 Finding a product:

Each of the preceding suggestions for idea generation centres on the recognition of a need in order to arrive at a product idea. The suggestions that follow are product oriented. They are intended to stimulate product ideas which may meet one or more of the criteria previously discussed. Their use should result in a large number of ideas which can be subsequently examined with regard to need. The following list should be useful in conducting such an exercise.

- investigate local materials and other resources for their current utilization pattern, utilization potential and convertibility into more value added products
- examine import substitutions for indigenous production
- study local skills for production and marketing of value added products
- study implications of new technologies for improvement of existing products or to create / produce new ones
- study and analyze published sources of ideas

2.4 Preliminary screening of ideas:

By following the above approaches, it should be possible to develop a long list of potential venture opportunities. Obviously, it would not be realistic to conduct a detailed feasibility analysis for each idea.



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What is needed is a preliminary screening to eliminate the many ideas that have little or no hope for success and to provide, if possible, a rank-ordering of the remaining few. The screening can be conducted as two-phase process. In the first phase venture ideas are eliminated on a go/no-go basis. A "Yes" response to any of the following should eliminate the idea from further consideration.

- Are the capital requirements excessive?
- Are environmental effects contrary to Government regulations?
- Is venture idea inconsistent with national policies, goals and restrictions? Will effective marketing need expensive sales and distribution system?
- Are there restrictions, monopolies, shortages, or other causes that make any factor of production unavailable at reasonable cost?

2.5 Comparative rating of product ideas

After elimination of unattractive venture ideas, it is desirable to choose the best of those remaining for further analysis. Various comparative schemes have been proposed for rating venture ideas. In this section, factors that should be considered and some possible ranking methods are examined. For a product idea to lead to a successful venture, it must meet the following four requirements:

- a) An adequate present market for raw and finished product/s
- b) Market growth potential
- c) Competitive costs of production and distribution
- d) Low risk in factors related to demand, price, and costs

2.5.1. Present market: The size of the presently available market must provide the prospect of immediate raw material purchase and product/s sales volume to support the operation. Sales estimates should not be based solely on an estimate of the number of potential customers and their expected individual capacity to consume. Some factors that effect sales are:

- Market size (number of potential customers)
- Product's relation to need
- Quality-price relationship compared to competitive products
- Availability of sales and distribution systems and sales efforts required
- Export possibilities

2.5.2. Market Growth Potential: There should be a prospect for rapid growth and high return on invested capital. Some indicators are:

- Projected increase in need and number of potential customers



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- Increase in customer acceptance
- Product newness
- Social, political and economic trends (favourable for increasing consumption)

2.5.3. Competitive costs of production and distribution: The costs of production factors and distribution must permit an acceptable profit when the product is priced competitively. The comparative rating process should consider factor likely to result in costs higher than those of competitive producers should:

- Costs of raw material inputs
- Labour costs
- Selling and distribution costs
- Efficiency of production processes Patents and licenses

2.5.4. Risks involved: Obviously it is impossible to look into the future with certainty, and the willingness to assume risk is the major characteristic that sets the entrepreneur apart. However, unnecessary risk is foolhardy and, while it may be difficult or impossible to predict the future, one can examine, with considerable confidence, the possible effect of unfavourable future events on each of venture ideas. The following factors should be considered.

- Market stability in economic cycles
- Technological risks
- Import competition
- Size and power of competitors
- Quality and reliability risks (unproven design)
- Initial investment cost
- Predictability of demand
- Vulnerability of inputs (supply and price)
- Legislation and controls
- Time required to show profit
- Inventory requirements

For purposes of preliminary screening, these factors can be subjectively evaluated.