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# TRAINING PROGRAMME ON

# PROJECT APPRAISAL AND ENTREPRENEURSHIP DEVELOPMENT - 22, 2005

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2005



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PROGRAMME  
ON

**PROJECT  
APPRAISAL  
AND  
ENTREPRENEUR  
ASSESSMENT**  
October 17 – 22, 2005

**READING MATERIAL  
MODULE I**



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## CONTENTS

No.	TOPICS COVERED	Page No
<b>SECTION I</b>	<b>OVERVIEW</b>	<b>1 - 64</b>
	<ul style="list-style-type: none"> <li>▪ Monitoring the Environment</li> <li>▪ Project Selection Consideration &amp; Feasibility Studies</li> <li>▪ Project Formulation &amp; Appraisal</li> </ul>	
<b>SECTION II</b>	<b>MARKET ANALYSIS</b>	<b>65 - 139</b>
	<ul style="list-style-type: none"> <li>▪ Basics of Marketing</li> <li>▪ Market and Demand Analysis</li> <li>▪ How to Choose the Right Forecasting Techniques</li> <li>▪ Four Steps to Fore-cast Total Market Demand</li> <li>▪ Pricing Policy</li> </ul>	
<b>SECTION III</b>	<b>TECHNICAL AND ENVIRONMENTAL ANALYSIS</b>	<b>140 - 172</b>
	<ul style="list-style-type: none"> <li>▪ Key Project Inter-linkages</li> <li>▪ Location and Site Selection</li> <li>▪ Sources of Technology and Its Evaluation</li> <li>▪ Details of Capital Cost of Project and Its Method of Appraisal</li> <li>▪ Environmental Analysis</li> </ul>	

<b>SECTION I</b>	<b>OVERVIEW</b>	<b>1 - 64</b>
	▪ Monitoring the Environment	<b>1 - 15</b>
	▪ Project Selection Consideration & Feasibility Studies	<b>16 - 45</b>
	▪ Project Formulation & Appraisal	<b>46 - 64</b>

## 3.2 MONITORING THE ENVIRONMENT

Basically a promising investment idea enables a firm (or entrepreneur) to exploit opportunities in the environment by drawing on its competitive strengths. Hence, the firm must systematically monitor the environment and assess its competitive abilities. For purposes of monitoring, the business environment may be divided into six broad sectors, as shown in Exhibit 3.1. The important aspects studied in monitoring the key sectors of the environment are as follows:

### Economic Sector

- State of the economy
- Overall rate of growth
- Growth rate of primary, secondary, and tertiary sectors
- Cyclical fluctuations
- Linkage with the world economy
- Trade surplus/deficits
- Balance of payment situation

### Governmental Sector

- Industrial policy
- Government programmes and projects
- Tax framework
- Subsidies, incentives, and concessions
- Import and export policies
- Financing norms
- Lending conditions of financial institutions and commercial banks

**☐ Technological Sector**

- Emergence of new technologies
- Access to technical know-how, foreign as well as indigenous
- Receptiveness on the part of industry

**☐ Socio-demographic Sector**

- Population trends
- Age shifts in population
- Income distribution
- Educational profile
- Employment of women
- Attitudes toward consumption and investment

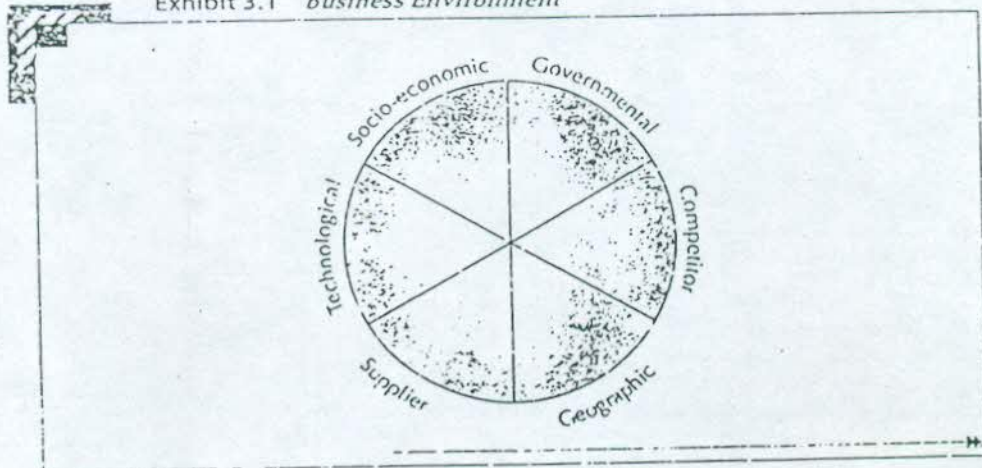
**☐ Competition Sector**

- Number of firms in the industry and the market share of the top few (four or five)
- Degree of homogeneity and differentiation among products
- Entry barriers
- Comparison with substitutes in terms of quality, price, appeal, and functional performance
- Marketing policies and practices

**☐ Supplier Sector**

- Availability and cost of raw materials and sub-assemblies

Exhibit 3.1 *Business Environment*



### ☐ Reasonableness of Cost

The cost structure of the proposed project must enable it to realise an acceptable profit with a price. The following should be examined in this regard:

- Cost of material inputs
- Labour costs
- Factory overheads
- General administration expenses
- Selling and distribution costs
- Service costs
- Economies of scale

### ☐ Acceptability of Risk Level

The desirability of a project is critically dependent on the risk characterising it. In the assessment of risk—a difficult task, indeed—the following factors should be considered:

- Vulnerability to business cycles
- Technological changes
- Competition from substitutes
- Competition from imports
- Governmental control over price and distribution<sup>4</sup>

## ☐ 3.7 PROJECT RATING INDEX

When a firm evaluates a large number of project ideas regularly, it may be helpful to streamline the process of preliminary screening. For this purpose, a preliminary evaluation may be translated into a project rating index. The steps involved in determining the project rating index are as follows:

4. It may be noted here that operational controls have been imposed from time to time on business firms in India. These controls, concerned mainly with production, distribution, price and exports, have been applied to a wide range of industries: steel, aluminium, paper, cement, fertilisers, tyres, trucks, automobiles, pharmaceuticals, textiles, bicycles, sugar, and vanaspati. The present approach of the government—it may be noted that the history of controls imposed by the government reveals a varied and chequered pattern—appears to have three main features: (i) The government is not as control-conscious as it was in the past. This is evident from the relaxation—total or partial—of several controls in recent years. (ii) The government seems to favour partial control. In many cases a part of production is being reserved to be supplied to certain sectors at a fixed, concessional price and the remaining is allowed to be sold at the market price. (iii) In price fixation, the government has shown a better responsiveness to inflationary forces.

- Identify factors relevant for project rating.
- Assign weights to these factors (the weights are supposed to reflect their relative importance).
- Rate the project proposal on various factors, using a suitable rating scale. (Typically a 5-point scale or a 7-point scale is used for this purpose.)
- For each factor, multiply the factor rating with the factor weight to get the factor score.
- Add all the factor scores to get the overall project rating index.

Exhibit 3.3 illustrates the determination of the project rating index. Once the project rating index is determined, it is compared with a pre-determined hurdle value to judge whether the project is *prima facie* worthwhile or not.

Exhibit 3.3 *Construction of a Rating Index*

Factor	Factor Weight	Rating					Factor Score
		VG 5	G 4	A 3	P 2	VP 1	
Input availability	0.25			✓			0.75
Technical know-how	0.10		✓				0.40
Reasonableness of cost	0.05		✓				0.20
Adequacy of market	0.15	✓					0.75
Complementary relationship with other products	0.05		✓				0.20
Stability	0.10		✓				0.40
Dependence on firm's strength	0.20	✓					1.00
Consistency with governmental priorities	0.10			✓			0.30
						Rating Index	4.00

### 3.8 SOURCES OF POSITIVE NET PRESENT VALUE

It is often taken for granted that there is an abundance of positive *NPV* projects which can be identified rather easily. However, note that choosing positive *NPV* projects is akin to selecting under-valued securities using fundamental analysis. The latter is possible if there are imperfections in the financial market that cause a discrepancy between security prices and their equilibrium values (intrinsic values). Likewise, imperfections in real markets (product and factor markets) lead to entry barriers which cause positive *NPVs*. Hence, an understanding of entry barriers is helpful in identifying positive *NPV* projects.

It appears that there are six main entry barriers that result in positive *NPV* projects which are as follows:

- Economies of scale
- Product differentiation
- Cost advantage
- Marketing reach
- Technological edge
- Government policy

**Economies of Scale** Economies of scale means that an increase in the scale of production, marketing, or distribution results in a decline in the cost per unit. When substantial economies of scale are present, the existing firms are likely to be large in size. The more pronounced the economies of scale, the greater the cost advantage of the existing firms.

In order to exploit the economies of scale, new entrants require a substantial investment in plant and machinery, research and development, and market development. Such capital needs serve as an entry barrier. The greater the capital requirement, the higher the barrier to entry. This seems to be especially true in industries like petroleum refining, mineral extraction, iron and steel, and aluminium.

**Product Differentiation** A firm can create an entry barrier by successfully differentiating its products from those of its rivals. The basis for differentiation may be one or more of the following:

- Effective advertising and superior marketing
- Exceptional service
- Innovative product features
- High quality and dependability

**Cost Advantage** If a firm can enjoy cost advantage vis-à-vis its competitors, it can be reasonably assured of earning superior returns. Cost advantage may stem from one or more of the following:

- Accumulated experience and comparative edge on the learning curve
- Monopolistic access to low cost materials
- A favourable location
- More effective cost control and cost reduction

**Marketing Reach** A penetrating marketing reach is an important source of competitive advantage. Two examples illustrate this:

- Avon Products markets its products through a worldwide network of 1,300,000 independent sales representatives. Avon's competitors find it almost impossible to replicate this. Thanks to such a nonpareil marketing network, Avon has been able to earn superior returns in a highly competitive industry.

- The breadth and depth of Hindustan Lever's distribution network is miles ahead of its competitors. Such a marketing reach has contributed to the superior returns earned by Hindustan Lever.

**Technological Edge** Technological superiority enables a firm to enjoy excellent returns. Firms like IBM and Xerox earned superior returns over extended periods of time due to *inter alia*, the technological edge they had over their rivals. On the Indian scene, firms like Dr. Reddy's Laboratory and Hero Honda have substantially outperformed their competitors because of their technological strength.

**Government Policy** A government policy which shelters a firm from the onslaught of competition enables it to earn superior returns. Government policies that create entry barriers, partial or absolute, include the following:

- Restrictive licensing
- Import restrictions
- High tariff walls
- Environmental controls
- Special tax reliefs

A number of firms in India benefited substantially from restrictive government policies which offered considerable protection to them from potential competition, domestic as well as foreign, for many years. The liberalisation measures of recent years have, of course, dismantled, partly or substantially, entry barriers stemming from earlier government policies. Remember that what the government can give, it can also take away.

### 3.9 ON BEING AN ENTREPRENEUR

Many persons have an entrepreneurial urge to set up their own project and be on their own. Hence, it may not be out of place here to discuss the questions every entrepreneur must answer and the qualities and traits of a successful entrepreneur.

#### The Questions Every Entrepreneur Must Answer

According to Amar Bhide<sup>5</sup> the following are the questions that every entrepreneur must answer:

- (i) Are my goals well defined?
  - Personal aspirations
  - Business sustainability and size
  - Tolerance for risk

5. Bhide, Amar. "The Questions Every Entrepreneur Must Answer". *Harvard Business Review*, 1996.

- (ii) Do I have the right strategy?
  - Clear definition
  - Profitability and potential for growth
  - Durability
  - Rate of growth
- (iii) Can I execute the strategy?
  - Resources
  - Organisational infrastructure
  - The founder's role

#### **Quality and Traits of a Successful Entrepreneur**

What qualities and traits are required to be a successful entrepreneur? While it is difficult to answer this question definitively, it appears that a successful entrepreneur has the following qualities and traits:

- Willingness to make sacrifices
- Leadership
- Decisiveness
- Confidence in the project
- Marketing orientation
- Strong ego

**Willingness to Make Sacrifices** A new venture is often plagued with numerous difficulties and unanticipated problems. To nurture it in such an inhospitable environment, the entrepreneur has to be prepared to sacrifice his time, energy, and resources. He must be willing to struggle, sacrificing personal comforts and conveniences, against seemingly endless odds. An entrepreneurial job is not like a typical nine-to-five executive job. It tends to be far more demanding, requiring total commitment—and sometimes, even obsessive preoccupation—on the part of the entrepreneur.

**Leadership** Successful entrepreneurs generally have strong leadership qualities. They are able to inspire ordinary persons to accomplish great feats. Even though outwardly they may show bizarre signs (they may be whimsical, timid, or even cantankerous) they are able to fire people with their zeal. They have the flair for galvanising their team to successfully cope with the challenges and frustrations inherent in a new venture.

**Decisiveness** A fledgling enterprise has to accomplish many things in an atmosphere of uncertainty. Numerous decisions have to be taken in quick succession on the basis of limited information. The firm does not have a history to fall back on or a well-organised data base to rely upon. Unless the entrepreneur is decisive by nature, he would not be able to cope with the enormous burden of decision making. If he procrastinates, he may court disaster. If he dilly-dallies, he may miss valuable opportunities. The fluid situation of a

new enterprise calls not only for an ability to decide quickly but also an ability to revise the decisions to adapt the enterprise to an environment in which it has not established proper moorings.

**Confidence in the Project** An entrepreneur should have unbounded faith in his project. This helps him in instilling confidence in suppliers, creditors, customers, employees, and others. Without unflinching conviction in the project, it would be difficult for the entrepreneur to withstand the failures and frustrations that form the new venture diet.

**Marketing Orientation** A strong marketing orientation is critical to a new venture. An entrepreneur who is skillful in exploiting market opportunities has the best chance of success. Irrespective of the professional guise he wears (whether it be that of an engineer, inventor, production technologist, accountant, or any other), the entrepreneur must have marketing talent. Edwin Land of Polaroid is widely recognised as an ideal example of disguised marketing talent. Land, an engineering genius, had superior marketing skills and perhaps this was the most critical factor in the outstanding success of Polaroid. Land could inspire the technical and financial world, thanks to his marketing abilities. If an entrepreneur lacks marketing skills, he must find a partner who can remedy this deficiency. Otherwise the venture will be severely handicapped because of its inability to exploit the marketing opportunities.

**Strong Ego** Setting up a new enterprise is like riding an emotional roller coaster. There are days which bring jubilation and there are days which cause despondency, as the enterprise is buffeted by environmental forces, which tend to have a strong influence on the nascent venture. The entrepreneur needs a strong ego to bear with such ups and downs. To endure periods of adversity and to maintain a proper perspective when events cast a shadow over the enterprise, the entrepreneur needs a strong identity and self-image.

#### **SUMMARY**

- Identification of promising investment opportunities requires imagination, sensitivity to environmental changes, and a realistic assessment of what the firm can do.
- To stimulate the flow of investment ideas, the following are helpful: (i) SWOT analysis, (ii) clear articulation of objectives, and (iii) conducive climate.
- The business environment, which needs to be monitored regularly to identify investment opportunities, may be divided into six broad sectors: economic sector, government sector, technological sector, socio-demographic sector, competition sector, and supplier sector.
- A realistic appraisal of corporate strengths and weaknesses is essential for identifying investment opportunities which can be profitably exploited. The broad areas of corporate appraisal are: market and distribution, production and operations, research and development, corporate resources and personnel, and finance and accounting.

### 2.1.8 LIBERALISATION AND NEW ECONOMIC POLICY:

As mentioned earlier, the New Economic Policy of 1991 contained several measures towards removing the various restrictions with a view to permit the private sector to play a much larger role in the economic and industrial development of the country. While the public sector will continue, several controls and regulations on the private sector have been relaxed and a liberal environment created. The various liberalisation measures include:

- (i) Private sector is permitted to start industries in schedule A, which were earlier the preserve of only public sector.
- (ii) Appendix I of the Industrial Licensing Policy of 1973 which defines industries in which foreign companies and big industrial houses can participate, has been expanded.
- (iii) Allowing private initiative to boost house construction activity
- (iv) Substantially enhancing the role of private sector in hotel industry
- (v) Encouraging private sector to set up power generation plants
- (vi) Relaxing the need for obtaining industrial license to manufacture items, except in very few areas.

The liberalisation measures taken by the government have created new buoyancy for investment in the private sector. Many firms have undertaken, or are in the process of expanding their present capacities and diversification projects. The change in the government's policy of encouraging private sector has seen a significant spurt in investment activity.

### 2.2. SOURCES FOR PROJECT IDEAS

An understanding of the business environment which shows the opportunities available, applicable regulations and controls, incentives and facilities provided, would benefit potential entrepreneurs in identifying promising and beneficial investment opportunities. It is also important to realise that good project ideas, which are key to success, are elusive. Therefore, a variety of sources have to be tapped to stimulate the generation of project ideas.

- (a) Analysis of Industries' performance: An analysis of the capacity utilisation and profitability including break-even analysis of existing industries will indicate promising project opportunities which are relatively risk-free and profitable. Capacity utilisation analysis of existing industries will provide information about the potential for further investment. Such an analysis, regionwise for products with high freight costs will be more useful.
- (b) Analysis of Inputs and Outputs of Industries: A careful analysis of inputs required for various industries may suggest potential project opportunities. Materials, component parts and other supplies procured from far off places involving high transport costs and long duration indicate possible opportunities. Some firms produce internally some components at a high cost. Perhaps these can be produced and supplied at a lower cost enjoying economies of scale. An analysis

of the outputs may indicate opportunities for further processing of output or processing of wastes/byproducts.

- (c) Analysis of Imports and Exports: An analysis of import statistics for the past five years helps in understanding the trend of imports of various materials and the potential for import substitution. Replacing imports with indigenously manufactured materials is beneficial because it improves the balance of payments situation, (ii) it creates employment opportunities, and (iii) it provides market for supporting industries and services. Similarly, analysis of export statistics is useful in knowing the export possibilities of various products.
- (d) Five year plans and Governmental Policies: Government policies and the plan outlays have an important role in the economic development of the country, and they indicate pointers toward investment opportunities in the various sectors of the economy. They also indicate the likely demand for various products and services in different sectors. Government's guidelines to industries, published annually is a valuable source of information to potential entrepreneurs/investors. The guidelines provide information on existing capacities for various items, estimated demand, scope for exports, etc.
- (e) Suggestions of Financial Institutions and Developmental Agencies: State Financial Corporations, State Industrial Development Corporations, and other Developmental Agencies periodically conduct studies and feasibility reports with a view to promote development of industries in their respective states. The above agencies offer suggestions to potential entrepreneurs in identifying potential projects.
- (f) Survey of local resources: A survey or investigation of local resources may indicate opportunities for adding value to locally available materials. Various ways in which value can be added to these materials, the skills of artisans in the locality may suggest products that may be profitably produced and marketed. National Council of Applied Economic Research conducts surveys of various regions in the country throwing light on those regions which have the potential for industrial development.
- (g) Analysis of Economic and Social Trends: An analytical study of economic and social trends may indicate changes in economic trends which provide new business opportunities. Changing family patterns, such as growth of nucleus families are bringing out an increasing awareness of the value of time. As a result demand for products which save time - instant food items, micro-ovens, electric cookers, etc. — is increasing. Likewise, the demand for entertainment products is also increasing. Thus, the growing demand for certain products caused by social and economic changes, offers new project opportunities.
- (h) New technologies: The network of scientific and research laboratories functioning under the Council of Scientific and Industrial Research have developed several new processes and technologies. These offer opportunities for commercial exploitation.
- (i) Emulating consumption patterns from abroad: There are opportunities for setting up projects in areas that are new in our country, but are quite common in many developed countries. Prefabricated houses, fast food restaurant chains, automatic vending machines, Rent-a-car services, etc., are typical examples. The entrepreneurs prepared to take higher risk can look into similar project opportunities.
- (j) Restoring life to sick units: There are thousands of units which are regarded as sick. These sick undertakings are either closed or face the prospect of closure. It is however possible to restore life to many such units through better management, infusion of further capital, and provision of complementary inputs. Sick units, therefore, provide good investment opportunities, these investments have the additional advantage of short gestation periods and marginal efforts to restore life to the sick undertakings which are on the anvil of closure.
- (k) Analysis of Unsatisfied needs of consumers: For a wide range of existing products of daily consumption, it may be worthwhile to analyse whether these products are satisfying the

psychological needs of consumers. Such an analysis may reveal opportunities for investment. Spectrum analysis is used to find out the opportunities; the analysis consists of:

- (i) identifying the key factors influencing the choice of brand products, (ii) positioning the existing brands of the product on a continuum in respect of factors identified earlier, and (iii) Identifying the deficiencies which exist with respect to the psychological needs of consumers.
- (l) International and National Trade Fairs and Industry Exhibitions provide opportunities to know about new products, new technologies/processes, and new developments.
- (m) Stimulate Creativity for generating new product ideas: By thinking along the following lines - modification, rearrangement, reversal, magnification, reduction, substitution, adaptation, combination - new product ideas may be generated.
- (n) Chance factor: Sometimes, just a chance factor may trigger an investment opportunity.

### 3. INITIAL SELECTION OF PROJECTS

A potential entrepreneur can gather a number of project opportunities from the wide variety of sources enumerated in the previous section. Some of the project ideas which appear to be prima facie not promising have to be eliminated.

#### 3.1 PRELIMINARY CONSIDERATIONS

With a view to make an initial selection of project ideas out of several, the following aspects must be considered.

- (a) Match with the entrepreneur profile: The project idea must match with the entrepreneur's interest, personality, and resources. The real opportunity, according to Murphy, has three characteristics: (i) it fits with entrepreneur's personality - it squares with his abilities, training, and proclivities, (ii) it is accessible to him, and (iii) it offers him rapid growth and high return on investment.
- (b) Fit with National priorities: The project idea must fit with national priorities and government's regulatory framework. For this, the following questions have to be addressed.
  - (i) Whether the project idea is in tune with national priorities and goals?
  - (ii) Whether the project idea violates any environmental regulations?
  - (iii) Whether the foreign exchange requirements for the project can be accommodated?
  - (iv) Whether the licence, if required, can be obtained?
- (c) Availability of inputs: With a view to assess the reasonable availability of resources and inputs for the project, the following questions must be answered:
  - (i) Are projects's capital requirements within limits?
  - (ii) Can the technical know-how for the project be obtained?
  - (iii) Are raw materials required for the project available at reasonable price indigenously? If not, are there any problems in importing them?
  - (iv) Can power supply for the project be obtained from external sources and captive sources? There has been chronic shortage in India of certain key inputs like power supply, foreign exchange, and important raw materials; and fluctuating supplies of agricultural raw materials like cotton, jute and oil seeds. However, in recent times, the situation has improved with respect to power supply, foreign exchange availability, and supplies of basic industrial materials.
- (d) Market size: The market size should be sufficient enough to offer satisfactory sales volume to support production. In addition, there should be rapid growth potential and high return on investment. The market size and its adequacy have to be examined with reference to the following factors:
  - (i) Total present domestic market, (ii) Competitors and their market shares, (iii) extent of export market, (iv) quality-price profile of the product among the competing products, (v) the system of sales and distribution, (vi) likely increase in consumption, (vii) barriers to the entry of new units, (viii) economic, social and demographic trends favourable to increased consumption, and

(ix) patent protection.

Apart from few exceptions, the trend by-and-large, indicates growing demand for many products. This trend will continue because of the low per capita consumption levels in our country. The demand for many products, fortunately, is not at the expense of demand for some other products as in developed western countries.

- (e) Cost: The cost of the proposed product/service must enable it to realise an acceptable profit with a competitive price. For this, the following factors have to be carefully analysed: (i) costs of input materials; (ii) wage costs; (iii) factory overhead expenses, (iv) general administration expenses; (v) selling and distribution expenses, (vi) service charges and (vii) economies of scale.
- (f) Risk: The risk associated with a project is a critical component in determining the desirability or otherwise of the project. Assessing the risk is a very difficult task, and the following factors have to be considered: (i) vulnerability to business cycles, (ii) technological changes; (iii) competition from substitutes, (iv) competition from imports, and (v) governmental control over price and distribution.

The government introduced a wide range of controls relating to production and distribution for a number of industries. Since mid-eighties, there has been a change in the attitude of the government with regard to controls. In the last three years, many of these controls have been relaxed.

The initial selection of project opportunities on the basis of the factors discussed above are applicable to both existing companies as well as new entrepreneurs. An existing company can do a more intensive analysis of its resources and environment and identify specific project opportunities on the basis of its existing activities. An existing company which seeks to identify new project opportunities should undertake and evaluate its strengths and weaknesses and the opportunities and threats in the external environment. Such an analysis should focus on the following issues:

- (a) Internal financial resources available for investment on new projects, after taking into account the need for replacement expenditures, increase in working capital, repayment of borrowings, and dividend obligations, and the extent to which financial resources can be raised externally for the new projects.
- (b) Production facilities currently available, technological capabilities existing with the company, in-house research and development, and new technological collaborations that can be tied-up.
- (c) Sources of raw materials and their reliability, adequacy of power supply and other utilities, transport and communication facilities.
- (d) present cost structure of existing products and their contribution to profitability
- (e) Market share, distribution network, and the company's image in the market place.
- (f) Resourcefulness and competence of top management, age profile of middle and top executives, employee motivation level and the state of employer-employee relations.
- (g) Effect of the regulatory legislation on the company and the opportunities available to the company.
- (h) Likely changes in governmental policies with respect to industrial licensig, private sector, foreign exchange control, collaboration or tie-up with foreign companies, and import and export policies.
- (i) Evolving new technologies and new methods/processes of production, and their likely effect on the cost structure of company's products.
- (j) Anticipated growth in world and national economy, and major sectors - agriculture, industrial, transport, communications, etc. - of the national economy.
- (k) Likely changes in the structure of competition.
- (l) Possible substitutes likely to emerge and changes in consumer tastes and preferences.

### 3.2 STRATEGIES FOR IMPLEMENTING PROJECT IDEAS

The above analysis will provide the basis for the corporate strategy to be followed and indicate the major thrust areas. These may include expanding the capacity of the existing product range, vertical

integration, diversification in related areas, and mergers. Each of these are briefly described below:

- (a) Increasing capacity of current product range: Increasing the capacity of existing product range is more appropriate, when a growth in market size is anticipated, or an increase in the market share for the company is expected. An increase of capacity in such cases has several positive aspects: familiarity with technology, production methods, and market conditions; lower capital cost due to the existence of surplus capacity in certain sections of the factory; lower overhead costs per unit because of increased production volume. It is also important to guard against market saturation, and the risk of over dependence on the current product range. For example, five years ago there has been considerable demand for video cassette recorders (VCR). But in the last two years, with the entry of cable operators offering a wide range of TV programme (e.g., Star TV, Jain TV, Zee TV, etc.), not only there has been a market saturation for VCRs but even a reduction in demand for this product. Those who expanded the capacity for VCRs, anticipating a growth in demand have suffered.
- (b) Vertical Integration: There are two types of vertical integration - backward and forward. Backward integration is the setting up of facilities for the production of raw materials and components required for the current operations of the company. For example, polyester filament yarn is required for the manufacture of synthetic textiles. So, if a synthetic textile unit sets up a plant to produce polyester filament yarn, it is a case of backward integration. If a company's current product(s) is used as input for the manufacture of a product, it is called forward integration. For example, a company manufacturing forgings may set up a plant to manufacture automotive axles, for which the forgings are used as the input material. Both backward and forward integration, provide greater stability to the existing as well as proposed operations, brings about better co-ordination between the supplying and consuming units, and enhances the market power of the combined units, and enhances the market power of the combined entity.
- (c) Diversification: Companies generally prefer to add to their current product range by adding related products. For example, Bajaj Auto Ltd., currently producing two-wheelers and three-wheelers is planning to diversify to produce four-wheelers (passenger cars). Such diversification in related areas has the advantage of achieving economies in the procurement of materials and components, better utilisation of certain common production facilities, benefit to all products from the company's image in the market, and using a common dealer/distribution network.
- (d) Mergers: A recent example of merger is that of TOMCO with Hindustan Lever Ltd. Mergers take place with a view to derive tax advantages from the accumulated losses of one or more of the merging units. The other possible advantages of merger are economies of scale, reduction of inefficiencies, rapid growth, and reduction of risk through diversification. Since there are obvious advantages, it is worthwhile for a company looking for project investment opportunities to search for a possible candidate company for acquisition, which gives the above benefits.

#### 4. TAXONOMY OF PROJECTS

Projects can be classified in many ways: (i) national and international projects, (ii) industrial and non-industrial projects, (iii) projects classified according to level of technology, (iv) projects classified according to size, (v) projects according to type of ownership, i.e., public or private sector (vi) projects classified according to purpose such as balancing, replacement, maintenance, expansion, or diversification. Each of these are briefly discussed below:

##### 4.1 NATIONAL AND INTERNATIONAL PROJECTS

International Projects are projects set up by large industrial houses or Government undertakings in other countries. Just as Indian Companies invite the collaboration from foreign companies to set up plants, in the same way Indian entrepreneurs extend their entrepreneurial skills outside the country's borders to set up plants in the host country. It is the case of Indian companies operating as multinational companies in

projects are usually undertaken with a view to achieve not only higher revenues through value addition, but also eliminate or minimise inefficiency due to under-utilisation of capacity in some production units.

#### 4.6.2 MODERNISATION PROJECTS:

Plants set up several years ago require modernisation for various reasons. First, the plant has outlived its utility, leading to higher maintenance expenditure just to keep the plant functioning. As a result, the operating costs increase and the product may cease to be cost effective. Second, the production/process technology keeps changing and improving. To remain competitive and produce at reasonable price, the company cannot afford to continue with obsolete technology. Thus, modernisation becomes inevitable for any firm to take advantage of the new technologies/processes, new input materials, production methods etc. A recent example is the TISCO's modernisation project undertaken a few years ago. The modernisation may allow improvements to the product by adding some new features. The main consideration, however, for undertaking modernisation projects is to continue in the business and compete effectively.

#### 4.6.3 REPLACEMENT/MAINTENANCE PROJECTS:

Replacement/maintenance projects are similar to modernisation projects, but their scope and magnitude is relatively small compared with the latter. While modernisation project usually covers the entire plant, replacement project covers only a part of the plant. For example, in an electricity power generation plant, the replacement of a turbine is a typical example of replacement project. Replacement of major equipment(s) in a plant becomes necessary when the equipment suffers from obsolescence. The consideration for undertaking replacement projects is the desire to maintain the same or better level of operational efficiency.

Maintenance projects slightly differ from replacement projects. When certain equipments are subjected to major overhaul lasting several weeks, there will be some loss of production. But the overhaul of equipment is essential; otherwise the equipment may breakdown or cause more serious damage. Such major overhauls are treated as maintenance projects, because they involve several activities requiring co-ordination between different departments and people, procurement and use of materials and equipment, etc. An outstanding example of maintenance project is the relining of blast furnace in an integrated steel plant. The lining inside the furnace consisting of ceramic bricks, which can withstand high temperature, have to be replaced every few years and a new set of ceramic bricks laid inside the furnace. This relining work takes a few months and requires the efforts of several departments - General Maintenance, Electrical Maintenance, Mechanical Maintenance, Piping, etc. The entire work has to be co-ordinated and organised similar to a project. The application of the project management tools and techniques to blast furnace relining has reduced the total time for relining work, thereby reducing substantially the downtime of blast furnaces. Both replacement and maintenance projects must be undertaken to maintain production at acceptable efficiency levels.

#### 4.6.4 EXPANSION PROJECTS:

A company may seek to enlarge its plant capacity with a view to produce a larger volume of its current product range. Projects undertaken with this aim are considered as expansion projects. An important consideration for undertaking expansion projects is the intention of the firm to meet an anticipated growth in demand for the product or to increase its market share for the product. Expansion projects can be of different types. For example, a foundry producing iron and steel castings may expand by setting up a machine shop and structural shop. The machine and structural shops use the iron and steel castings produced in the foundry. This is one type of expansion. A firm which depends on electric power to a large extent as in the case of aluminium manufacture, may choose to set up a captive power plant for assured supply of electric power, when external sources of power supply become unreliable or inadequate. Thus, where a firm seeks to set up facilities for producing products or services, which constitute the critical inputs for its products, are also considered as expansion projects. In these cases, the main consideration for undertaking the expansion project is to assure the supply of critical inputs.

#### 4.6.5 DIVERSIFICATION PROJECTS:

A company may seek profitable investment opportunities in altogether new areas. When it undertakes a project to enter into a new area, it is called a diversification project. In 1960s, the tobacco giant, India Tobacco Company Ltd., (ITC) entered the hotel business, a new area which is totally unrelated to its traditional business of tobacco manufacture. In USA, General Motors, the auto giant, entered the information services industry. We have a similar example in our own country: TELCO, the truck manufacturing company, has entered the information products industry. The product, TURBO ANALYST, a CASE (Computer Aided Software Engineering) tool, produced by the information products division of TELCO is marketed both in India and abroad. Recently, another truck manufacturing unit, Ashok Leyland has entered the business of power generation. It is currently engaged in setting up a 1000 MW power project at Visakhapatnam. There are number of examples to show that companies have diversified from their traditional fields. Brooke Bond India Ltd., traditionally in the business of producing and marketing tea and coffee, has entered the business of food processing. The major consideration for diversifying is to spread its investment resources and risk and increase its revenues from the different areas where investments have been made.

Each of the above types of projects have a specific purpose, and appropriate considerations as explained earlier are applied for making investments on those projects.

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#### 24 Projects: Planning, Analysis, Selection, Financing, Implementation and Review

Exhibit 2.2 Elementary Investment Strategies, Principal Motivations, and Likely Outcomes

Investment Strategy	Principal Motivations	Likely Outcomes		
		Profitability	Growth	Risk
Replacement and modernisation	<ul style="list-style-type: none"> <li>- Quality improvement</li> <li>- Cost reduction</li> <li>- Maintenance (and enhancement) of competitive power</li> </ul>	High	Moderate	Low
Capacity expansion	<ul style="list-style-type: none"> <li>- Ability to serve a growing market</li> <li>- Familiarity with technology and market</li> </ul>	High	Moderate	Moderate
Vertical integration	<ul style="list-style-type: none"> <li>- Cost leadership</li> <li>- Greater stability for existing and proposed operations</li> <li>- Greater market power</li> </ul>	High	Moderate	Moderate
Concentric diversification	<ul style="list-style-type: none"> <li>- Improves utilisation of resources</li> </ul>	High	Moderate	Moderate
Conglomerate diversification	<ul style="list-style-type: none"> <li>- Limited scope in the present business</li> </ul>	Moderate	High	Low
Divestment	<ul style="list-style-type: none"> <li>- Inadequate profit</li> <li>- Poor strategy</li> </ul>	High	Low	Low

## PROJECT SELECTION CONSIDERATIONS AND FEASIBILITY STUDIES

The focus of this Study Note is on the following topic areas:

- . Project investment considerations at macro level
- . Setting up sectoral priorities for investments
- . Microlevel considerations in setting up projects
- . Project analysis and feasibility studies
- . Preparation of detailed project reports.

In the economic arena, the most basic choice that all countries must face in allocating resources is between current consumption of products and services and investment in future growth. In developing countries like India, the choice has to be made under conditions of deplorably low, often subsistence, level of consumption of a large proportion of the population and the urgent need to invest in the hope of achieving higher living standards. When the choice is in favour of investment for future development, it is absolutely necessary that the scarce resources are deployed to secure maximum benefit. Packaging these investments into projects, whether in public, private or joint sector, through the disciplined project approach can be a very effective means towards this end.

### 1. INVESTING IN PROJECTS - ECONOMIC CONSIDERATIONS

Economic development, of which investing in projects is an integral part, is a long, slow, and often painful process of learning from experience. Investing in development through projects is subject to all the vicissitudes and constraints that hamper development generally. Development projects take very long time, several years to prepare and implement. Throughout this period, project managers must confront and deal with the scarcity of human skills and material resources that are synonymous with underdevelopment, with a chronic shortage of funds, and with shifts in political support. They must operate within fragile economic systems that are exposed to global forces of inflation and recession and to the unpredictable forces of nature.

Project management is therefore highly demanding, and it seems to demand most from countries with the least capacity to respond. It is more difficult, but at the same time more important, to manage projects well when there is little or no cushion to absorb the effects of unsound policies, weak public administration, or inefficient project management. This is true of all types of projects, whether they are for infrastructure development or for the manufacture of capital goods or consumer products, but particularly of those intended to alleviate poverty and raise the living standard of large numbers of people.

Fortunately, the rewards from project investments are commensurate with demands or expectations. When they are managed well, investments in projects pay high dividends. Project investments have become one of the most potent instruments for promoting economic growth. By setting investment priorities within a national and sectoral plan strategy, getting the policies right, and combining investments on projects with technical assistance to train people and strengthen the organisations, the project approach leads any country to move rapidly towards economic development.

Successfully managing a project is as much an art as a science. From our own early experiences and the experiences of those countries, especially the newly developed countries in South East Asia and Far East, we can identify many of the ingredients of success as well as many of the pitfalls. Developing countries like ours, can profit from this experience and thereby telescope the learning process. International financial institutions like World Bank, which provided assistance for development projects in various developing countries have documented the experiences. A review of those experiences reveal certain things which seem to be very obvious. They read like little more than the dictates of commonsense. But to say that something is obvious does not mean that is simple. They are simple to understand, except for some financial evaluation techniques like discounted cash flow, but not simple to put into practice. If people have not learnt lessons

from these experiences, it is not because of irrationality or obduracy, but due to a powerful constellation of forces which make things what they are and serves as a formidable obstacle to change. More over, economic development is a long-term process; when governments change frequently, the continuity of effort that is a sine qua non of development is soon broken. Even in reasonably stable political conditions, the civil servants are often and understandably preoccupied with more pressing and immediate problems. They are more likely to suffer the short-term political penalties of policy changes such as raising the prices of basic commodities than to reap any political rewards from their long-term benefits.

To give an example of the difficulty of implementing a simple lesson of experience; it is generally accepted that developing countries should use the technology most "appropriate" to their circumstances. What are these circumstances? They usually include a surplus of low-cost, unskilled labour and a shortage of capital - facts which suggest that relatively labour-intensive technologies should be adopted. Prima facie, the point seems obvious: no government would knowingly or willingly espouse "inappropriate" technology. Yet, in many cases, the technologies chosen and adopted are clearly unsuitable to their circumstances.

The reason why this happens is that foreign consultants/technical advisors recommend the technology with which they are most familiar. Also, local engineers, if educated or trained abroad, or the heirs of a colonial legacy, are likely to show similar bias in favour of advanced technology. Often times, they also presume that what is modern is also the best. Special interest groups may favour a particular technical approach, while those who would benefit most from some other approach may be either unaware of the choice or politically disenfranchised. Deep-seated customs and traditions may favour certain solutions and make others unacceptable. Economic policies that tend to overprice labour (through minimum wage or other legislation) or underprice capital (through subsidised interest rates or an over-valued currency) may send distorted signals to decisionmakers. A simple lack of knowledge or reluctance to experiment may restrict the range of choice. In a way, bilateral lending agencies are themselves responsible for the problem. When a donor country ties up the aid to the supply of equipment, a policy which is widely practised and it is also deplored, then freedom to choose an appropriate technology may be compromised. It is therefore not surprising that a simple lesson like the selection of appropriate technology may prove far from simple to apply.

The investments in projects for development, can be considered in terms of management of investment projects at the national level, sectoral level, and at the individual project level. There are certain aspects of project investments which require better attention of the management; some of these are not getting prices right, not providing adequate recurrent funds to operate and maintain project investments, not regularly evaluating completed projects, and so on. These aspects, which apply to investment planning at the national, sectoral, and project level, appear to constitute a formidable agenda for many officials in developing countries. It is for each official, knowing the local circumstances, to establish priorities for action at any time. Progress may often be slow and partial but responding to changing circumstances, combining rational economic choice with informed political judgment, avoiding the more egregious mistakes, and maintaining a steady pace are the best way to keep the country on the path to sound economic development.

## 2. MANAGEMENT OF INVESTMENT PROJECTS AT NATIONAL LEVEL

*In a very broad sense, the management of projects takes place at three levels: (i) At the national level, where national investment plans are formulated, priorities among sectors are established, and the macro economic frame work of policies for economic growth are laid down. (ii) At the sectoral level, where priorities for investment within each sector are determined and the issues and problems affecting the development of the sector are considered. (iii) At the project level, where individual projects are identified, prepared, and implemented and attention is given to their technical, economic, financial, social, institutional, and other dimensions. Project management work is in fact a continuous process; decisions or actions affecting individual projects may take place at each of the three levels simultaneously and in inter-active ways.*

### 2.1 INVESTMENT PLANNING FOR DEVELOPMENT

At the national level, the surge of enthusiasm for comprehensive development planning was

followed by disenchantment with its limited accomplishments. The association between a comprehensive planning effort and sustained economic growth was almost absent. The elaborate and data-intensive models employed are unable to cope with the complexity and rapid change that characterise the process of development; also, most developing countries did not have the administrative capacity to implement comprehensive plans. The technical and administrative deficiencies of comprehensive planning proved to be inherent in the process and, therefore, unlikely to be overcome by more strenuous efforts to improve the planning machinery.

Planning is, therefore, being directed increasingly towards new goals. A country covering a wide political and economic spectrum no longer relies upon on positive commands and negative controls to carry out a long-term plan with input and output targets for all sectors of the economy. Instead, it follows a strategy that focuses on two elements: a macro economic framework of policies to spur economic growth and elicit desired behaviour from both public and private entities; and a public sector investment program that allocates scarce resources to high-priority public needs. The countries that managed these two tasks effectively achieved success in economic development.

The macroeconomic framework, - comprising fiscal, monetary, exchange rate, wage, and trade policies - affects all aspects of economic behaviour, including resource allocation, capital accumulation, balance of payments equilibrium, and, ultimately the pace of economic growth. No single set of policies, and no specific institutional arrangements for managing those possible are universally applicable. The appropriate policies are very much a function of the natural and human resources, level of development, and development strategy and objectives.

## 2.2 PRICING POLICY

Pricing policy is central to any policy framework. Many of the macroeconomic policy variables such as interest rates, wage rates, and exchange rates, are prices. Whether determined in free markets, or established by a central planning agency, or modified by government intervention, prices strongly affect a country's rate and pattern of development. The importance of "getting the prices right" is therefore a fundamental lesson of development. The basic rule for pricing to obtain the most efficient use of an economy's resources is to set the price of each product or service at its marginal cost. This is the principle which is achieved under free competitive market. Moreover, in the pricing of public sector products and services - power, water, transport, etc. - public undertakings must take into account not only the objective of economic efficiency, but also other objectives such as achieving a more equitable distribution of income or generating additional revenue. These considerations may justify departure from a rigorous marginal pricing rule and may warrant a carefully designed intervention in the market to achieve both social and economic objectives. It is important that such intervention be devised to make use of market forces rather than to supplant them.

In many developing countries, a persistent and massive distortion of prices has resulted from a multiplicity of government interventions, many of them poorly conceived or mutually incompatible. These distortions have reduced the efficiency of investments and slowed economic growth. The countries that have enjoyed relatively high growth rates are those that have managed to avoid significant price distortions.

They have: (a) Avoided an overvalued exchange rate (b) Maintained the rate of effective protection for manufacturing industry relatively low and uniform among products (c) Underpricing of agricultural products and other disincentives to farmers is avoided. (d) Interest rates and the price of capital positive in real terms is maintained (e) Wages increases not justified by rising productivity are avoided (f) Cost recovery principle is applied in the pricing of infra-structure services. (g) High inflation is prevented.

In the recent decades, many developing countries demonstrated how critical the proper management of this inter-connected system of prices and incentives is for economic progress. Further, the effects of macroeconomic policies are felt with full force at the project level. Thus, another fundamental and vital lesson is that it is virtually impossible to have good projects in a bad policy environment.

### 2.3 PUBLIC SECTOR PROJECT INVESTMENTS

In formulating public sector project investments, detailed and overly sophisticated forecasting exercises have generally proved counter-productive because of inadequate data and limited understanding of how sectoral investments and outputs are linked. Analytical efforts should, therefore, concentrate on designing investment programs in key infrastructure sectors. Where the market alone cannot guide investment decisions, and on checking the consistency of these programs with the likely requirements of the productive sectors. The government has to be selective; it can effectively address only the most important public investment projects at any one time.

It is also advantageous, as experience has shown, to combine the public investment programme with indicative forecasting for the private sector. There should be much more co-ordination and consultation between the departments of government as well as between government and the private sector. The government must also develop the capacity to respond quickly to changing events by modifying their policies and programmes. This requires a much improved database and information flow as well as centralised responsibility for policy coordination.

Setting up priorities for investment projects among sectors - the attention to be given to health, education, or housing projects relative to the productive or infrastructure sectors - is particularly difficult and ultimately entails political choices. Economic analysis can make only a limited contribution to this process, but it may still be crucial in clarifying the costs of alternatives and providing data on which informed judgments can be based. In establishing investment priorities within a sector, cost-benefit analysis can be very helpful in improving choices.

The following considerations, learnt from experience, are worthy of attention in the formulation and implementation of public sector investment projects.

- (a) It is important to ensure that the investment plan is not too ambitious given the available resources. There is a widespread tendency to underestimate the cost of implementing specific projects and the time required. When too many projects are started at the same time, available skills are scattered, project implementation is slowed, and economic and financial returns from the investments are reduced.
- (b) New projects should not be started at the expense of adequate funding for those projects already under way. Completion of ongoing projects, if they are still justified given the incremental costs and benefits, should have a high priority for funding, as should the operation and maintenance of completed projects.
- (c) The "free" resources left after the needs of ongoing and completed projects have been met should be calculated. This makes possible rational decisions about how much funding can be devoted to new projects.
- (d) Planning bodies have to strengthen their project appraisal skills to make greater use of cost-benefit analysis to identify and eliminate projects with low rates of return.
- (e) Investment plans have to be flexible so that they can be modified as circumstances change. In addition, a "core programme" of investments should be identified so that cuts in programmes made necessary by a short fall of resources can be determined by priorities established in advance. Another useful technique is to have a rolling investment program - usually a three-year program - that is updated annually or more frequently if circumstances warrant.

The budget of the government is the principal administrative instrument for translating public investment programs into concrete action. But the link between the two needs to be made much stronger, especially in developing countries. A consolidated public sector budget is essential for the government to obtain a full picture of both resource mobilisation and expenditure. When such a budget is prepared, it will reveal whether public funds are being invested in activities or in proportions that are not in accord with public sector investment programme, and whether a substantial redirection of resources is desirable. A government must also be concerned with fulfilling its budgetary responsibilities, such as:

- (a) Organisation and location of the budget and planning functions
- (b) Budget classifications that

will facilitate planning and management and improve the integration of budget appropriations with the investment programme (c) Monitoring and evaluation of the budgetary outcome, with emphasis on the accomplishment of programmes and projects in addition to the traditional concern for financial propriety.

Even when investment requirements are appropriately matched with financial resources, two budgetary shortcomings have adverse effects on projects. First, budgets often fail to provide sufficient recurrent funds to operate and maintain projects once the investment phase is over. Second, tight central budgetary controls, by frequently delaying the provision of funds to project managers, have plagued the implementation of investments. There is a clear need to give spending agencies greater operational freedom to carry out their assigned tasks. The corollary - that spending agencies should be held more accountable for results - has encouraged the search for new system, such as program and performance budgeting, which seek to make evaluation of results an integral part of the budgeting process. Implementation of such systems has proved difficult; experience, however, suggests that the way to more effective budgetary management is probably through careful identification of specific problem areas, followed by adaptive and evolutionary change, rather than through the large scale import and installation of new systems.

### 3. SECTORAL INVESTMENT PROJECTS

Sectoral analysis bridges the gap between the macroeconomics of national level investment management and the microeconomics of individual projects. It is indispensable for resolving questions of choice, of priority, and of interrelations among projects. Compared with the elaboration of theories and models for national investment planning or of cost-benefit analysis and other techniques for project analysis, theoretical and practical guidelines for conducting sectoral analysis are much less developed. Nevertheless, many sectoral issues are amenable to analysis, analytical capability is growing with experience.

Sectoral analysis is clearly useful to external lending institutions in guiding project selection and design. The World Bank has helped it to introduce in many developing countries. Sectoral analysis is no less important to officials of ministries and operating agencies in developing countries, who can understandably lose sight of the broad objectives, needs and priorities of a sector amid the day-to-day tasks of administering regulations and managing crises.

*Sectoral analysis serves several purposes:*

- (a) It provides a better understanding of development policies and issues in the sector. This is useful both in enhancing the contribution that the sector can make to the overall strategy for economic development and to the planning of public investment, and in ensuring that the framework for sector policy, no less than that for macroeconomic policy, is conducive to sound project work.
- (b) It makes possible the determination of investment priorities in the sector, which guide the identification and selection of specific projects.
- (c) It evaluates the capacity of the principal institutions in the sector to implement desired policies, programmes and projects.

Most sectoral analysis falls into one of two broad categories: comprehensive surveys of an entire sector (or important subsector) and special studies of particular topics within a sector. Because the former tend to yield a low return for the heavy investment of manpower and other resources, governments are generally well advised to devote most of their sectoral work to a programme of sharply focussed special studies of high-priority issues. Much painful experience argues for keeping the reports on these studies brief and concise, in line with their operational purposes. Good sectoral analysis requires that qualified staff and other resources be made available for long periods, and this, in turn, requires that there be sustained commitment from high-level authorities. When these are not forthcoming, the quality of project work also suffers.

Each of the main sectors has distinctive characteristics as well as differing objectives and development issues. The sectors share three basic areas for action: policy improvement; institutional strengthening; and better selection, design, analysis, and management of investment projects.

### 4. THE PROJECT CYCLE

It is convenient to think of project work as comprising several distinct stages, commonly referred to

collectively as the project cycle. The idea of a cycle underscores the point that the stages are closely linked and follow a logical progression, with the later stages providing the basis for a renewal of the cycle. The principal stages of the cycle are the identification of a project; its design, preparation and appraisal; its implementation; and its evaluation once the investment phase has been completed.

#### 4.1 PROJECT IDENTIFICATION

The project cycle begins with the identification of project ideas that appear to represent a high-priority use of a country's resources to achieve important development objectives. The identification and preliminary screening of project ideas is a critical part of the process. Decisions made at this stage, either explicitly or by default, have a far-reaching impact on the final outcome of the project. It is particularly important at the outset to consider as wide a range of alternative approaches as feasible. All too often, project ideas are put forward and accepted without adequately weighing alternative, and possibly cheaper or more effective, means of achieving the same objectives. Whether the result of vested interests, political pressures, or simply lack of information about viable options, the consequences are the same: opportunities lost at this stage can seldom be recaptured. There is no substitute for being right in the first place.

Explicit attention should be paid defining a project's objectives at the earliest stage and to ensuring that all of the parties concerned, including external lending agencies, agree on those objectives and on the strategy for achieving them. The intended beneficiaries of the project must be consulted when their participation in designing and implementing the project is important to its ultimate success. Failure to reach an understanding about objectives and to secure a firm commitment from all those concerned has often generated friction later and resulted in poor project implementation. A project can be considered to have passed the identification stage when:

- (a) Major options and alternatives have been identified and some initial choices made
- (b) The principal policy issues affecting project outcome have been identified and appear to be amenable to solution
- (c) The project options selected are likely to be justified, given rough estimates of the expected costs and benefits
- (d) It appears that the project will have adequate support both from the political authorities and from the intended beneficiaries
- (e) The prospects are reasonable that adequate funding will be available from local, and if needed, external sources
- (f) A specific plan for preparation of the project has been established.

#### 4.2. PROJECT PREPARATION

**Feasibility Studies** The next stage is project preparation. It involves undertaking a feasibility study for all but the simplest and most routine projects. As the term implies, its purpose is to establish the feasibility or justification of the project, both as a whole and in its principal dimensions - technical, economic, financial, social, and so on. Each dimension must be analysed both separately and in relation to all the others. This is done in a series of approximations that test different technical approaches for their economic benefit and financial viability. The purpose of the analysis is not to determine whether a particular idea is good enough to proceed with, but to arrive at the best one possible under the circumstances. Although the feasibility study should be designed with due regard for cost, this is not the place to skimp; if done well, the study is bound to pay for itself many times over through cost savings or increased benefits.

##### 4.2.1. PRE-FEASIBILITY STUDY :

The formulation of technical-economic feasibility study is a costly and time-consuming task, although such a study enables a definite decision to be made on the project. So, before assigning funds for detailed feasibility study, a preliminary assessment of the project idea must be made in a pre-feasibility study. The main or principal objectives of preliminary study are to determine whether:

- (a) The investment opportunity is so promising that an investment decision can be taken on the basis of the information elaborated at the pre-feasibility stage

- (b) The project concept justifies a detailed analysis by a feasibility study
- (c) Any aspects of the project are critical to its feasibility and requires in-depth investigation through functional or support studies such as market surveys, laboratory test, pilot plant tests etc..
- (d) The information is adequate to decide that the project idea is not either a viable proposition or attractive enough for a particular investor or investor group.

A pre-feasibility study should be viewed as an intermediate stage between a project opportunity study and a detailed project analysis or feasibility study, the difference being primarily the detail of the information obtained. Accordingly, it is necessary even at the pre-feasibility stage to examine broadly the economic alternatives of:

- (a) Market and plant capacity - demand and market study, sales and marketing, production programme, and plant capacity
- (b) Material inputs
- (c) Location and site
- (d) Project engineering - technologies and equipment, and civil engineering works
- (e) Overheads - factory, administration, and sales
- (f) Manpower - labour and staff
- (g) Implementation
- (h) Financial analysis - investment costs, project financing, production costs, and commercial profitability.

When a project opportunity study is conducted in respect of an investment possibility, the pre-feasibility stage can be dispensed. It can also be by-passed when a sector or resource opportunity study contains sufficient project data to either proceed to the feasibility stage or determine its discontinuance. A pre-feasibility study is, however, conducted if the economics of the project are doubtful unless a certain aspect of the study has been investigated in depth by a detailed market study, or some other functional study, to determine the viability. Short-cuts may be used to determine minor components of investment outlay and production costs but not to determine major cost components. The latter must be estimated for the project as a part of the pre-feasibility study, but it is not necessary to depend solely on firm quotations.

An outline of the pre-feasibility study is shown in Annexure I.

#### 4.2.2. SUPPORT OR FUNCTIONAL STUDIES:

Support or functional studies in industrial programming cover one or more but not all aspects of an investment project and are required as prerequisites for, or in support of, prefeasibility, and feasibility studies, particularly large scale investment proposals. The support studies can be classified as follows:

- (a) Market studies of the products to be manufactured, including demand projections in the market to be served together with anticipated market penetration
- (b) Raw material and input studies, covering present and projected availability of raw materials and basic inputs to the project, and the present and projected price trends of such materials and inputs
- (c) Laboratory and pilot plant tests, which are carried out to the extent necessary to determine the suitability of particular raw materials
- (d) Location studies, particularly for potential projects where transport costs are significant and a major determinant
- (e) Economies of scale studies, which are generally conducted as part of the technology selection studies. These studies are commissioned when several technologies and market sizes are involved, but the problems are confined to the economies of scale and do not extend to the intricacies of technology. The principal task of these studies is to evaluate the size of plant that would be most economic after considering alternative technologies, investment costs, production costs and prices. The studies normally take several plant capacities for analysis and develop the broad characteristics of the project, computing results for each capacity size
- (f) Equipment selection studies, which are required when large plants with numerous divisions are

involved and the sources of supplies and the costs are widely divergent. When very large investments are involved, the structure and economics of the project depend heavily on the type of the equipment and its capital and operational costs; even the operational efficiency of the project is a direct function of the selected equipment. Where standardised costs cannot be obtained, equipment selection studies become imperative as a support to technoeconomic feasibility studies.

The contents of the support study vary, depending on the nature of the study and the projects under consideration. Since it relates to a vital aspect of the project, the conclusions should clearly provide direction to the subsequent stage of project preparation.

Support studies are undertaken before commissioning a pre-feasibility or feasibility study when, for instance, a basic input may be a decisive factor in determining the viability of a project and the support study may show negative results. Support studies are commissioned separately but simultaneously with a pre-feasibility or a feasibility study when detailed work required for a specification function is too involved to be undertaken as part of the feasibility study. A support study is undertaken after completion of a feasibility study when it is discovered in the course of the study that it would be safer to identify a particular aspect of the project in much greater detail although the preliminary evaluation may begin later. The cost of support study must relate to that of the feasibility study as one purpose of such studies is to economise during the feasibility stage.

#### 4.2.3 FEASIBILITY STUDY:

A feasibility study must provide a base - <sup>technical</sup> <sup>economic</sup> <sup>financial</sup> <sup>social, etc.</sup> - for an investment decision on an industrial project. It should define and analyze the critical elements that relate to the production of a given project together with alternative approaches to such production. Such a study should provide a project of a defined production capacity at a selected location, using a particular technology or technologies in relation to defined materials and inputs, at a given investment and production costs, and sales revenues yielding a defined return on investment.

To achieve this objective, an iterative process is initiated with a cycle of feedbacks and interlinkages, covering possible alternative solutions for production programmes, location, sites, technology, plant, mechanical, electrical, and civil engineering and organisational setup that have to be harmonised with a view to minimise investment and production and costs. If the resulting data show a non-viable project, several parameters and the production programme, material inputs or technology should be adjusted in an attempt to present a well-defined, viable project. The feasibility study should describe this optimisation process, justify the assumptions made and the solutions selected and define the scope of the project as the integration of the selected partial alternatives. If the project is not viable despite all alternatives reviewed, this should be stated and justified in the study.

Final estimates on investment and production costs and the subsequent calculations of financial and economic profitability are only meaningful if the scope of the project is defined unequivocally in order not to omit any essential part and the costs pertaining to it. The scope should be defined in drawings and schedules which should then serve as a supporting structure during further project work.

The content of most feasible studies is more or less the same or similar, though there may be considerable differences in orientation and emphasis depending upon such factors as the nature of the industry, the magnitude and complexity of the production unit contemplated, and the investment and other costs involved. A satisfactory feasibility study must analyse all the basic components and implications of an industrial project and any shortfall in this regard will make the usefulness of the study limited. Annexures 2 to 12 show the content of feasibility studies on the different aspects of a project.

The feasibility study is often misunderstood and often deliberately misused by suppliers of equipment or technology. Frequently, an outline of a project primarily oriented to the supply of equipment or the choice of particular techniques is considered as feasibility study. Sometimes, production or sales estimates are based on experience gained in an industrialised environment and bear little relation to the conditions within which a project has to operate. As these studies are unrelated or unadapted to local production factors, they

can be misleading and result in misapplication of resources, as has often occurred in many cases. A feasibility study must be related to available production factors, local market and production conditions and this involves an analysis which has to be translated into costs and income.

A feasibility study may be either market-oriented or based on material inputs, i.e., it derives its initiative from an assumed or existing demand or from available material inputs such as raw materials or energy. In view of the determinant position of the demand and market analysis within the feasibility study, it is ranked before material inputs. It should be kept in mind that all chapters of the feasibility study are interrelated and that their ranking within the study is not indicative of the actual sequence of their preparation.

A feasibility study is not an end in itself, but only a means to arrive at an investment decision that need not agree with the conclusions of the study. In fact, it would be rare to find investor response so flexible as to fully conform to the results of such a study.

Investment decision has to be taken during pre-investment stages and the implications of a particular investment must be analysed with great care prior to such decisions being taken.

In view of the enormous range of industrial activities, no uniform approach or pattern can be adopted for all types of industrial projects which can be of various categories and magnitudes and the emphasis on, and consideration of, different components vary from project to project. However, for most industrial projects a broad format can be prescribed - bearing in mind that the larger the project the more complex will be the information required - within which a feasibility study should be prepared.

A thorough study at the feasibility stage reduces the likelihood of difficulties during implementation by anticipating the problems that may arise and devising measures to deal with them. For most types of projects, detailed engineering should be completed, relatively reliable cost estimates made, institutional arrangements specified, and financial plans worked out before funds - whether from an external lender or from the domestic budget - are committed. One of the common causes of delayed or poor implementation has been inadequate or incomplete project preparation.

A pervasive shortcoming of project preparation work has been to underestimate the cost of implementing projects as well as the time required. This optimism on the part of project planners is found in all projects, large and small, simple and complex. The cost overruns can have adverse effects on both the financial and economic viability of projects. Providing for contingencies in the cost estimates helps to improve their accuracy.

One of the thorny issues of project design is how to achieve the right balance between simplicity and complexity. Projects that have a few, well-defined objectives and are based on proven technologies or approaches stand a better chance of being implemented successfully than projects that embody many objectives or unproven methods. Given the scarcity of trained staff, managerial skills, and administrative capacity, special efforts to simplify objectives and to select technologies and approaches that have a high probability of working in a particular environment have paid off very well.

At times, projects suffer from being too restricted in scope. There are several examples of projects that did not yield their full benefits, or even failed, because the need for complementary investments and activities have not been recognised and met. This is true of many kinds of agricultural projects in which research, extension, credit, inputs, marketing, processing, and storage are all necessary elements. The same is the case with urban development and highway maintenance projects. Projects can be too simple as well as too complex; indeed, the swing of the pendulum in recent years toward greater complexity reflects the unimpressive results of the projects that were too simple.

There is a middle course, i.e., even when a multi-component approach, with its inherent complexity, is necessary, it is possible to concentrate efforts and resources on those elements that are essential to achieving the primary objectives and to leave desirable but secondary objectives to subsequent projects or to parallel operations outside the project. Adjusting the scale of a project or the timing of its components can be another way of matching complex project design with limited implementation capacity. Furthermore, the administrative capacity of an agency can be expanded under a project through well-designed technical assistance.

### 4.3 PROJECT IMPLEMENTATION

All project identification and preparation work is directed toward facilitating project implementation and helping to ensure its success. If, the experiences and lessons learnt during project implementation are fed back into the planning and design of the subsequent projects, it will be beneficial. If all the preceding work has gone well, then project implementation will be very smooth. But events seldom go according to plan; circumstances change, and implementation, therefore, becomes a critical stage of project work.

Projects should be designed with a view to their implementation. There must be a close match between a project's objectives and the capacity of local institutions to implement, operate, and maintain it. Also, projects should be prepared in as much detail as is feasible under the circumstances. Since experience shows that projects are rarely implemented exactly as designed, sufficient flexibility must be preserved so that management can change course, sometimes drastically, during implementation if this becomes necessary.

Particular attention should be paid to the start-up period, before implementation has reached full stride. The application of scheduling techniques such as network analysis, project control and evaluation techniques can facilitate this and later phases of the implementation process.

Project implementation management and ensuring effective co-ordination among the various parties can be very vexing. There has been a tendency, encouraged to some extent by the external lending institutions, to assign responsibility for the management of projects in the public sector to special project implementation cells. Such "enclaves" cells have helped to insulate project implementation from some of the bureaucratic, staffing, and salary weaknesses of the traditional ministries, thereby contributing in some instances to better implementation. But they have been without lasting institutional benefit, since they have operated under conditions that could not be replicated by the line agencies. Project implementation cells should be confined to such special cases as projects that embody innovative or very large-scale activities. Even then, arrangements should be made to reincorporate the cells as soon as possible into the agencies that bear permanent responsibility for such activities, in accordance with a strategy for strengthening the capacity of those agencies.

Ensuring effective co-ordination when several agencies or organisations are responsible for different components of a project is inherently difficult. It can be very time-consuming and unproductive, unless it is well-planned. There is need for some co-ordinating mechanism; the basic requirements are a clear definition of the responsibilities of each of the participating agencies and adequate incentives for them to co-operate in achieving the project's objectives. If a co-ordinating committee is set up, its authority should be clearly demarcated, and its members should be as close as possible to the operating level.

A review of the experiences with the implementation of several projects reveals that there are several factors which emerge as essential ingredients of successful implementation. Probably the most important reason for the success of a project is strong commitment by the government to its objectives. A coalition among the interested agencies and principal actors needs to be formed early in the planning stage and continued through implementation. When financial resources allocated dry up, tariffs are not increased on time, or prices and other incentives become distorted, lack of effective support may be the cause. Similarly, mutual commitment and support is needed between the government and any external financing agencies.

Appropriate design and adequate project preparation are essential. It is highly desirable that the objectives and design of projects are adapted to local, political, administrative, economic, and cultural conditions, particularly if success hinges on changing behaviour. When technologies and approaches have not been fully worked out, a pilot project to test them can save both time and money.

There is also a close correlation between good managers and good projects. Experience with many projects show that good managers make a difference. The underlying reasons for success and for failure are largely mirror images. But some of the specific difficulties that projects typically encounter during implementation deserve special mention.

Managerial problems are the most pervasive. Weak public administration and weak management at the enterprise or project level are often at the root of delays and cost overruns. Such weaknesses are

manifested in inadequate planning, delays in land acquisition, protracted bidding and contracting procedures, insufficient project supervision, slow response to changes in the policy environment, and low staff morale and productivity.

Financial difficulties too are not uncommon. They can arise from an imbalance between the national investment plan and available resources, which leads to underfunding of publicly supported projects across-the-board; from global or domestic inflation; from government's reluctance to authorise tariff increases for public services or basic commodities; or from bureaucratic delays in providing funds or even in paying the bills. The consequences are same, whatever the reasons. Physical delays in project implementation, cost overruns, reductions in the project scope wherever this is possible, and deferred implementation of institutional and policy reforms are the usual consequences. Cost overruns are a barometer of the implementation process since practically all of the problems encountered results in additional costs as well as delays.

Technical problems are endemic. These include difficult or unforeseen soil conditions, poor quality materials, defective designs, and unsuitability of imported equipment for local conditions. In agricultural projects, inadequate technical packages or disappointing results from newly introduced technologies are common. In people-oriented projects such as education and health care projects, well-tested approaches to the particular circumstances in the region may be lacking. It often takes longer than expected to ease institutional bottlenecks and to develop the services necessary to provide new technologies and to persuade beneficiaries to adopt them. But in most cases, solutions are worked out eventually. Technical problems tend to be less intractable than financial or managerial ones.

## 5. PROJECT ANALYSIS

The various dimensions of project work are considered throughout the several stages of project life cycle, both separately and in relation to each other, and in varying degrees of detail. Thus, a multidimensional project analysis is a vital exercise that should be carried out to prepare the detailed project report (DPR).

### 5.1 TECHNICAL ANALYSIS

Of the various dimensions, technical analysis is one of the important dimensions of project analysis. Among the issues of technical design are size, location, timing, and choice of a technology package. We have already emphasised the need to select a technology appropriate to the local needs and circumstances and the requirements of the project. "Appropriateness" is, however, a relative concept. It generally means that the technology should be determined in relation to the objectives of the project, to the impact on intended beneficiaries, and to local conditions, including the availability and cost of capital, raw materials and labour, the size of markets, and the present and potential capacity for planning and implementation.

Numerous tradeoffs are implicit in these considerations; for example, the technology may have to be reduced in complexity to fit the capabilities of local institutions or the socio-cultural traditions of the beneficiaries. The range of choice is very wide, from sophisticated high technology for long-distance telecommunications to a labour-intensive approach for maintenance of rural roads, schools, and tertiary irrigation canals.

Technical analysis also provides an opportunity to consider how a country can take best advantage of its investment plan, policy framework, and development projects to build a capacity to use science and technology effectively throughout the economy. Both trained people and institutions capable of utilising their skills are required. In the early stages of a country's development, the emphasis should be on building local capacity to import technology from abroad knowledgeably and to adapt it to local conditions. At later stages, the emphasis should shift to the development of local technology and its integration with imported technology, and to the encouragement of local research and innovation.

### 5.2 ECONOMIC ANALYSIS

The fundamental issue in economic analysis is how to allocate scarce resources among many competing uses. It seeks to determine not only whether a project can be expected to provide a satisfactory

return to the economy, but also whether there is an alternative way of achieving the same objectives that would offer a higher return. The analysis entails a comparison of costs and benefits with and without the project, both discounted to present values, through the use of analytical techniques that by now are highly refined - though no more accurate than the underlying data. The central concept of economic analysis is that resources should be valued in terms of their opportunity cost to the economy in their best alternative use; this is applicable to all economic systems, whether market-oriented, centrally planned, or mixed economies.

Most lending institutions use cost-benefit analysis to assess the projects they help finance; this analysis is applied in one form or another to fund projects from public resources. Private industrial enterprises also use cost-benefit analysis for major investments. It can be a powerful tool, if done properly, for guiding investment choices.

Cost-benefit analysis encounters some practical problems, among them: how to define the situation "with" and "without" the project (which should not be confused with the situation "before" and "after" the project); how to deal with sunk costs incurred before the analysis (the answer may be to ignore or disregard them); how to establish the shadow prices (i.e., opportunity costs) for labour and capital when market prices are distorted for various reasons; and how to deal with nonquantifiable benefits. For most of these problems of definition or measurement, reasonable approaches can be found that are consistent with the reliability of the available data. The results of the analysis can be presented as a measure of net present value, as an internal rate of return, or as a cost-benefit ratio; each has its particular uses.

All types of projects are not amenable to cost-benefit analysis; it is not customarily used, for example, in evaluating health or education projects. Nor does it have the same meaning in different sectors. In power and water works, for example, where prices are fixed by the State government rather than fixed by the market place, the economic rate of return is a minimum estimate, more indicative of the appropriateness of the regulated tariffs than of the real return to the economy. Cost-benefit analysis, therefore, is not very useful in comparing the merits or relative ranking of projects in different sectors. Much depends on the common sense, judgement, and ingenuity of the analyst. Intuition and bias are also very likely to play a part. These caveats notwithstanding, economic evaluation can introduce rationality into the decisionmaking process, identify and measure risks, and avoid some of the more serious mistakes that can occur even in the best laid investment plans.

### 5.3 FINANCIAL ANALYSIS

Financial analysis issues arise in the course of project design in several ways. The most important universal concern, applicable to all types of projects, is that there be funds sufficient for the project completion as well as operate and maintain it subsequently. This sounds obvious, but several development projects have been started without adequate consideration of the future availability of funds. This is particularly true for education projects, in which recurrent costs for teachers' salaries may quickly exceed the capital costs of the facilities; or for projects in irrigation, roads, health, water supply, and other infrastructure, in which facilities once completed may deteriorate rapidly for want of adequate maintenance.

A second financial concern is to recover an appropriate portion of the costs from the beneficiaries or users. A cost recovery policy has three separate but related objectives:

- (a) Economic efficiency: The resources provided under a project are used most efficiently when they are priced in accordance with their marginal or opportunity cost. The extent to which efficiency prices can be applied, however, varies widely from sector to sector.
- (b) Income distribution: In the interests of equity, the prices or other charges levied to recover costs should take into account differences in income levels (as affected by the project) and inability to pay.
- (c) Revenue generation: Governments, being in short of resources, need to generate revenue from projects. In addition, revenue earning enterprises need to be made or kept financially viable. If rural and urban development, water supply, and other projects are to be replicated on the scale necessary to reach the large numbers of potential beneficiaries, a substantial contribution from

the initial beneficiaries will often have to be secured.

Difficult tradeoffs may be required among these, sometimes conflicting, objectives. Cost recovery for basic services can be an explosive political issue. This fact, together with administrative considerations, will determine what can be accomplished and how quickly. Two important rules to follow are that new or increased levies should be related to benefits as they materialise and imposed in small but regular increments, and that similar situations should be treated similarly to avoid the appearance of discrimination.

The financial viability of revenue-earning enterprises - electric and water utilities, public and private industries, railways, telecommunications, and so on - can be translated into three subsidiary objectives or tests of performance.

- (a) Will the enterprise have sufficient revenue to earn a reasonable return on its invested capital? As part of the test of "reasonableness", will it be able to generate enough funds internally from its operations to make a satisfactory contribution to its future capital requirements?
- (b) Will the capital structure of the enterprise enable it to meet all of its capital obligations, including the service of its debt, in a timely manner?
- (c) Will there be adequate liquidity, that is, sufficient working capital to cover all current operational requirements?

Emphasising financial viability is an important means of enforcing discipline on an enterprise and encouraging efficient management and use of resources. There is always some scope for improving financial performance by raising operating standards and reducing waste. Achieving financial viability will ultimately throw issues of tariff policy into bold relief. In many cases, increases in prices - often substantial - will be necessary to reach the financial objectives. To raise the price of a basic product or service that figures prominently in the cost of living requires political courage. But not to raise the price may, in the long run, have even more adverse economic, and therefore political, consequences. During an inflationary period, governments are especially reluctant to increase the cost of basic goods and services. This is understandable, but failure to raise prices may also have an inflationary impact if the government must borrow to cover the deficits.

One means of easing the bureaucratic and political pain of raising the price of public services is to adjust prices in small increments and at regular intervals. Another way is to make price increases automatic or quasi-automatic, as when fuel costs are passed on to users through equivalent increases in electricity prices without the need for government approval each time.

#### 5.4 SOCIAL ANALYSIS

Social analysis deals with the impact of projects on people. Its role is to consider the suitability for the proposed project design for the people it is intended to serve, to make proposals for improving the "fit" between the two, and to fashion strategies for project implementation that can be expected both to win and hold people's support and to achieve project goals by inducing changes in social attitudes and behaviour. Some projects - in such fields as rural development, education, and health - are clearly oriented toward people. Infrastructure projects, such as power, communications, transportation etc., are less so, but even these may have to deal effectively with people, as workers or consumers, in order to achieve their objectives. A project that runs counter to or ignores the traditions, values, and social organisation of the intended beneficiaries, or that is based on objectives which they do not share, has little prospect of success.

Social analysis, a relatively new dimension in project analysis, focuses on four principal areas:

- (a) The sociocultural and demographic characteristics of the project population
- (b) The way in which the project population is organised to carry out productive activities
- (c) The project's cultural acceptability, including its capacity for both adapting to people's behaviour and perceived needs and for bringing about changes in them.
- (d) The strategy necessary to elicit commitment from the project population and to ensure their sustained participation throughout the project cycle.

Predicting social behaviour is even more uncertain than forecasting financial or economic performance. Project planners have often made unduly optimistic assumptions about local people's interest in and

need for a project, the economic and social incentives for them to participate, and the rate at which change in their social condition can be brought about. Social analysts with professional training and broad experience can improve the projections, but more importantly, they can make a significant contribution to a project's success by helping to design effective organisations and approaches to achieve desirable changes in social behaviour.

Social analysis of projects has frequently failed to take adequate account of the particular interests and needs of women. Despite the fact that they constitute roughly half the population, women have reaped far less than their share of the benefits of development. Women tend to have less schooling than men, their mobility is constrained by economic and social considerations, and they often face legal barriers to their ownership of assets or access to credit. Yet women play a key role in the development process, both as producers and consumers. They provide most of the agricultural labour used in production, harvesting, storage, and marketing. Further, the central position of women in family life profoundly influences attitudes and decisions on education, nutrition, health, and family size. Thus, even if women never enter the formal labour market, ensuring that they receive adequate education may be one of the best investments that can be made.

Non-recognition of the role of women when projects are designed and implemented is not only inequitable but also retards the pace of economic growth. Decisions concerning the use of technologies and the provision of the wide range of services must be made with full regard to women's needs and constraints; otherwise project benefits will be reduced and the position of women made even worse. In many ways, women are the largest under-utilised resource for development.

### 5.5. INSTITUTIONAL ANALYSIS

Institutional analysis, in recent times, has become one of the important dimensions of project analysis. The outcome of development projects depends on the quality of the institutions responsible for them. Yet institutions, especially in developing countries, suffer from an acute shortage of experienced managers and staff, an excess of untrained staff, overstrained services and facilities, low wages and salaries, inadequate data and information systems, and an inimical policy environment. There are no standard solutions and few readily transferable models of institutions either from developed or developing countries. Institutional development is a lengthy process of experiment and adaptation, subject to many reverses when political or economic fortunes change. But, when strong institutions have been forged, they have played a key role in development.

The overall policy environment affects the performance not only of projects but also of the institutions responsible for them. If managers of these institutions are compelled to spend time and effort counteracting the impact of government economic policies, such as critical shortage of foreign exchange, they cannot build long-term capacity effectively. Institutional problems multiply rapidly when government policies seriously distort the economic environment or when government regulations impose extraneous requirements, such as the employment of staff in excess of requirements for political or social reasons.

Institutional problems have been compounded as more complex development objectives have been assigned to projects. Executing multicomponent projects or projects focused on alleviating poverty or upgrading social services has placed heavy demands on institutions. Knowledge of the economic, social, and behavioural characteristics of small farmers, urban squatters, or disadvantaged tribal people is still rudimentary. Understanding of the management and institutional techniques for dealing with such projects is also at an early stage.

Institutions in the public sector present a particular challenge, both because of their importance and because of the many problems they characteristically confront. A comprehensive reform of the public administration - however badly needed - is a very ambitious undertaking. A few have successfully carried out such a reform in the face of the strong resistance that these efforts generate. While careful diagnosis of the problems of the public service is a necessary first step in establishing an overall strategy for change, implementing the strategy will almost invariably call for a selective approach. The best results have been achieved by concentrating on a few of the more critical problems. The problems to be tackled first are those

that seriously constrain the performance of the public administration and that are within its capacity to solve; in addition, it should be possible to mobilise and maintain public support for the effort.

There are a number of Central Government and State Government undertakings and the performance of many of these undertakings has been far from satisfactory. Serious concern has been growing about the need to increase their efficiency, reduce their deficits that burden the public budget, and avoid political interference in their affairs. Given the preponderance of public enterprises in the country's economy, reforming them has repercussions going far beyond improved project performance. Since 1991, the government, in fact, is beginning to devote considerable effort to limiting the spread of public enterprises and to transferring ownership of some of these enterprises to the private sector. The legitimate demands on the public sector are very large, and the capacity for public management is among the scarcest of development resources. This capacity should, therefore, be reserved for use where it is most needed and most likely to be efficacious; government should exercise great caution in deciding which fields are appropriate for public ownership.

For those agricultural and institutional public undertakings carrying out processing, manufacturing, or marketing operations that private producers and traders can do efficiently, the simple answer may be to abolish them. For other state undertakings, reducing the number of staff, rationalising their structures, and recruiting and promoting staff on the basis of competence are some of the measures needed; in short, what is needed is downsizing or smartizing of the enterprise. Policy reforms are being tried to improve the "rules of the game" under which the enterprises operate. This reform has two objectives: to give public enterprises greater authority and autonomy to carry out their activities in accordance with broad goals and specific performance targets agreed on with results, while improving the flow of information to government about their performance.

A widespread weakness of development institutions, particularly but not exclusively in the public sector, is the shortage of qualified managers at the middle and upper echelons and of experienced specialists such as technical and finance professionals. In the long run, the educational system in all its forms - from primary education through Universities, vocational schools, and management institutes - must provide the solution. In the short run, assistance from consultants or non-resident Indians with high technical and managerial talents can be sought. However, care should be taken to see that it does not delay the development of local technical and managerial skills. Whatever the source of management, greater attention to organisational questions and improved management, accounting, and information systems and procedures can enhance effectiveness. Continuity of management is important, and frequent changes for political reasons are highly disruptive.

One fruitful approach to strengthening management in the public service is through improved incentives. Salary and other financial incentives for officials in public service cannot normally match those in the private sector, but disparities can be narrowed. In particular cases, elements of the financial package other than pay can also be improved without disturbing prevailing standards in the public service. Establishing "super-grades" outside the normal system may be a way to meet special needs, while making lateral entry and exit easier can encourage managers to view public service as a natural stage in a career.

Programs for training managers and staff deserves greater attention. The potential contribution of such programs is very large, but experience shows that too often they have little effect. Training programs cannot be added on to projects at the last moment, but must be carefully planned in advance and properly executed. Sufficient resources must be provided and skilled trainers recruited. As a general rule, the closer training is to the work place in which it will be used, the more effective it is likely to be.

## 5.6 ENVIRONMENTAL ANALYSIS

It is now widely recognised that environmental analysis is necessary for a country to ensure the sound management and use of its natural resources as an integral part of its strategy for economic growth. Desertification, deforestation, soil erosion, over-exploitation of such renewable resources as fisheries, and air and water pollution are lowering the carrying capacity of the environment. Usually the poor are disproportionately affected by environmental degradation. The objective of environmental management

is to achieve a balance of human demands on the natural resource base and the ability of that resource base to meet these demands on a sustainable basis in the interests of future generations as well as those alive today.

With careful environmental management, the pace of economic and social progress need not be slowed. In environmental work, the "ounce of prevention" is almost always more important and less costly than the "pound of cure". Sometimes remedial action may not be screened to detect those with a potentially harmful impact on the environment. Most environmental problems, if properly anticipated, can be dealt with at relatively small cost - usually less than five percent of total project cost. Analysis of trade offs between different design features and their environmental costs and benefits should be a routine part of project work; the analysis is complicated, however, by the fact that the standard time-discounting methodology gives insufficient weight to environmental costs and benefits because of their long-term nature.

### 5.7. LOGISTICS

Managing the logistics process is an important aspect of project implementation. Delays in acquiring the necessary goods and works are likely to be compounded into further delays and increased costs for the project as a whole. Logistics is, therefore, a process to be carefully planned, organised and managed, the more so since the number of ways things can go wrong sometimes appears endless.

Logistics management must serve three objectives. The first is to help ensure the efficient execution of the project by acquiring materials and equipment with the optimal combination of quality, price, and delivery time. The second is to promote such national goals as the development of indigenous industry, the balanced regional development of industry or the support of small-scale enterprises. The third is to comply with the procurement regulations of any external lending institutions helping to finance the project.

There are a wide variety of types and methods of logistics. The one which is most appropriate depends on the size and nature of the project, the particular materials or equipment to be procured, and the regulations of lending agencies. For large projects, international competitive bidding is generally the best way of ensuring efficient logistics, safeguarding against waste or corruption, and satisfying the interest of lending agencies that all qualified firms be permitted to bid. Local competitive bidding is more appropriate for small-scale procurement of materials and equipment in which foreign firms will not be interested; changes in procedure may be necessary to ensure effective competition among local firms.

Obtaining consulting services raises different issues. First, there is the question of need. Most of the services for which consultants might be recruited can, in principle, be provided by local staff of the project organisation if they are competent, experienced, and available. When such in-house capacity does not exist and cannot be put in place by additional training soon enough to meet the demands of the project, the next best choice is the use of local consulting firms. Establishing a local consulting industry is desirable both to provide some competition to stimulate project staff and to supply more specialised skills or expert services. When local services are not available, consulting firms from other regions may be explored. This has the dual advantages of better knowledge and understanding of comparable local conditions and relatively low costs. There will remain, however, some projects - especially the large complex projects requiring high level of technical knowledge - for which only expatriate consultants from developed countries are suitable. Joint ventures between local and foreign consulting firms, if entered into voluntarily, are often a good way of developing local capacity.

When a satisfactory relationship with a consulting firm already exists, it may be eminently sensible to continue it. When no such relationship exists, or when for other reasons it is desirable to invite proposals from a short list of consulting firms, the selection process should ensure that price considerations are subordinated to a concern with quality. The cost of consulting services is usually only a small fraction of total project costs, but the quality of the work performed can have an impact on the final project out of all proportion to the cost.

### 6. DETAILED PROJECT REPORT (DPR)

The preparation of the detailed project report (DPR) is the final and most important stage of the pre-investment phase of the project. It is on the basis of the DPR, the Project Investments Board and the Cabinet

54

31

Committee on Economic Affairs give their clearance for the project. The preparation of DPR is undertaken only after the investment decision is made on the basis of the technical, economic, and financial feasibility studies, so that the expensive efforts involved in the preparation of DPR are not wasted. Process designs, layout drawings and construction data are absolutely necessary for the preparation of DPR. Generally, completion of the DPR is expected to be completed within a year after the investment decision based on feasibility study. This will enable the early implementation of the project, without rendering the cost estimates to be affected by higher incidence of inflation.

The outline and the content of DPR is the same as the technoeconomic feasibility report. All the vital aspects of location and site costs, process/technology, market demand, plant capacity, product revenue, production costs, profitability, economic benefits, etc., must be covered in much greater detail in the DPR. The basic difference between the feasibility study report and DPR is the level of accuracy and degree of detail. To prepare the DPR from a techno-economic feasibility study report, we have to:

- (i) breakdown all project components, time-phase and schedule them with more detailed and accurate cost estimates, deviations from the feasibility study report with explanations, giving the improved basis for assumptions and calculations.
- (ii) develop baselines for controlling time and cost during the implementation of the project, and
- (iii) be prepared with all the technical and resource requirements to implement the project. The items to be covered in DPR are:
  - (a) Deviations from feasibility study
  - (b) Drawings
  - (c) Physical topographical information
  - (d) Rates - the basis for various cost estimates
  - (e) Water and Power Supply - guarantees from Power Boards/local authority
  - (f) Estimates relating to land, site development, main plant structures, auxiliary plant structures, administrative and other buildings, roads and paved areas, railway sidings, water supply, effluent disposal, storm water drainage, power supply, construction plant and equipment, compound wall/fencing, plant layout and equipment, machinery, spares, foundation, erection, electrification, material handling equipment etc.
  - (g) General - import duty rates, freight and handling, insurance, and contingencies.
  - (h) Assessment of working capital requirements with due consideration of inventory and credit policies consistent with marketing network proposed.

Development of ancillary industries is an additional criterion meriting the clearance of DPR for new projects and expansion of existing facilities. The requirements in this regard are:

- (a) All DPRs must indicate the parts, components, etc., with approximate annual quantities proposed to be procured from ancillary industries around the project, for use in construction, operation and maintenance
- (b) When applying for industrial licence or letter of intent, where applicable, the items proposed to be procured from ancillary industries around the project must be stated
- (c) Before finalising foreign collaboration agreements, consideration should be given to items obtainable from ancillary industries
- (d) Project proposals from public sector undertakings must provide for encouraging the setting up of ancillary units in small-scale sector
- (e) The agreements for foreign collaboration must provide for extension of technical know-how to ancillary units
- (f) Public sector enterprises should assist entrepreneurs in the ancillary sector in securing land for setting up units. With most enterprises adopting 'just-in-time' concept, even private sector projects face the problem of sourcing through ancillaries and extend technical, material, and quality assurance facilities to these suppliers. For example, even Maruti Udyog Ltd., took more than two years to develop suppliers to the satisfaction of its collaborators, Suzuki of Japan. The

DPR must indicate the gestation period of the project, to serve as a guideline and a yardstick to measure the performance of the project.

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## ANNEXURE 1

### PRE-FEASIBILITY STUDY - AN OUTLINE

1. Executive summary - a synoptic review of all the essential findings of each chapter.
2. Project background and history
  - (a) Project sponsor(s);
  - (b) Project history;
  - (c) Cost of studies and/or investigations already performed.
3. Market and plant capacity;
  - (a) Demand and market
    - i) The estimated existing size and capacities of the industry. (specifying market leaders), its past growth, the estimated future growth (specifying major programmes of development), the local dispersal of industry, its major problems and prospects, general quality of goods;
    - ii) Past imports and their future trends, volume and prices;
    - iii) The role of the industry in the national economy and the national policies, priorities and targets related or assigned to the industry;
    - iv) The approximate present size of demand, its past growth, major determinants and indicators;
  - (b) Sales forecast and marketing
    - i) Anticipated competition for the project from existing and potential local and foreign producers and supplies;
    - ii) Localisation of market(s);
    - iii) Sales programme;
    - iv) Estimated annual sales revenues from products and by-products (local/foreign); v) Estimated annual costs of sales promotion and marketing;
  - (c) Production programme (approximate)
    - i) Products;
    - ii) By-products
    - iii) Wastes (estimated annual cost of waste-disposal);
  - (d) Determination of plant capacity
    - i) Feasible normal plant capacity;
    - ii) Quantitative relationship between sales, plant capacity and material inputs.

56

33

4. Material inputs (approximate input requirements, their present and potential supplies and a rough estimate of annual costs of local and foreign material inputs):
  - (a) Raw materials;
  - (b) Processed industrial materials;
  - (c) Components;
  - (d) Auxiliary materials;
  - (e) Factory supplies;
  - (f) Utilities, especially power.
5. Location and site (preselection, including, if appropriate, an estimate of the costs)
6. Project engineering:
  - (a) Preliminary determination of scope of project;
  - (b) Technology(ies) and equipment
    - i) Technologies and processes that can be adopted, given in relation to...
    - ii) Rough estimate of costs of local and foreign technology;
    - iii) Rough layout of proposed equipment (major components);
      - a. Production equipment;
      - b. Auxiliary equipment;
      - c. Service equipment;
      - d. Spare parts, wear and tear parts, tools;
    - iv) Rough estimate of investment cost of equipment (local/foreign), classified...
  - (c) Civil engineering works
    - i) Rough layout of civil engineering works, arrangement of buildings, ... of construction materials to be used:
      - a. Site preparation and development;
      - b. Buildings and special civil works;
      - c. Outdoor works;
    - ii) Rough estimate of investment cost of civil engineering works ... classified as above.
7. Plant organization and overhead costs:
  - (a) Rough organization layout
    - i) Production;
    - ii) Sales;
    - iii) Administration;
    - iv) Management;
  - (b) Estimated overhead costs i) Factory; ii) Administrative; iii) Financial.
8. Manpower:
  - (a) Estimated manpower requirements, broken down into labour and ... categories of skills (local/foreign);
  - (b) Estimated annual manpower costs, classified as above, including overhead salaries.
9. Implementation scheduling:
  - (a) Proposed rough implementation time schedule;
  - (b) Estimated implementation costs given the implementation programme.
10. Financial and economic evaluation:
  - (a) Total investment costs
    - i) Rough estimate of working capital requirements;
    - ii) Estimated fixed assets;
    - iii) Total investment costs, obtained by summing the estimated investment costs.
  - (b) Project financing

- i) Proposed capital structure and proposed financing (local/foreign);
- ii) Interest;
- (c) Production cost (summary of estimated production costs, classified by fixed and variable costs);
- (d) Financial evaluation based on above estimated values
  - i) Pay-off period;
  - ii) Simple rate of return;
  - iii) Break-even point;
  - iv) Internal rate of return;
  - v) Net Present Value
  - vi) Cost-benefit ratio
- (e) National economic evaluation
  - i) Preliminary tests:
    - a. Project exchange rate;
    - b. Effective protection;
  - ii) Approximate cost-benefit analysis, using estimated weights and shadow prices (foreign exchange, labour, capital);
  - iii) Economic industrial diversification;
  - iv) Estimate of employment-creation effect;
  - v) Estimate of foreign exchange savings.

## ANNEXURE 2

### TECHNOECONOMIC FEASIBILITY STUDY : CONTENT

- I Executive summary
- II Project background and history
- III Market and plant capacity Demand and market study Sales and marketing Production programme  
Plant capacity
- IV Material inputs Materials and inputs Supply programme
- V Location and site Location Plant site and local conditions Environmental impact
- VI Project engineering Layout and physical coverage of project Technology and equipment Civil engineering
- VII Plant organisation and overhead costs Plant organisation Overhead costs
- VIII Manpower Labour Staff
- IX Project implementation
- X Financial and economic evaluation Total investment outlay Project financing Production cost  
Commercial profitability National economic evaluation

## ANNEXURE 3

### EXECUTIVE SUMMARY

Project background and history

State:

Name and address of project promoter Project orientation: market or raw material oriented

Market Orientation: domestic or export Economic and industrial policies supporting the project

Project background

Market and plant capacity

58

35

List annual data on:

- Demand
- Projected sales
- Production programme
- Plant capacity

Materials and inputs

Describe general availability of:

- Raw materials
- Auxiliary materials
- Factory supplies
- Utilities

List annual supply requirements of material inputs

Location and site

Describe location and state plant site

Project engineering

- Describe layout and scope of the project
- State technology finally selected
- Summarize equipment selected
- Describe required civil engineering works

Plant organization and overhead costs

Manpower

- State selected type and size of labour force
- State selected type and size of staff

Implementation scheduling

- Duration of plant erection and installation
- Duration of projection start-up and running-in period
- Financial and economic evaluation

Total investment costs

List major investment data in local and foreign exchange as needed, for:

- Land and site preparation
  - + Civil engineering works
  - + technology and equipment
  - + pre-production capital costs + working capital
- 
- = total investment costs

Project financing (assumed)

- Sources of financing
- Impact of cost of financing and debt servicing on
- Project proposals
- Public policy and regulations on financing
- Financing institutions
- Required financial statements
- Financial ratios

Total production or manufacturing costs (at feasible normal capacity)

List annual data for

- Factory costs
  - + administrative overheads
  - + sales and distribution costs
- 
- = operating costs

+ financial costs  
 + depreciation  
 = total production or manufacturing costs

#### Financial evaluation

Net present value  
 Internal rate of return  
 Pay-back period  
 Simple rate of return  
 Break-even analysis Sensitivity analysis

#### National economic evaluation

Appraise the project proposal from the national economic point of view

#### Conclusions

Major advantages of project  
 Major drawbacks of project  
 Chances of implementing the project

## ANNEXURE 4

### PROJECT BACKGROUND AND HISTORY

#### Project background

Describe the project idea List the major project parameters that served as the guiding principles during the preparation of the study: product and product mix, plant capacity and location, market or raw material orientation of project, implementation schedule and others Outline the economic, industrial, financial, social and other related policies Show different geographical levels, such as international, regional, national, area and local Highlight the economic, sectoral and subsectoral project coverage

#### Project promoter and/or initiator

Name(s) and address(es)  
 Financial possibilities  
 Role within the project  
 Other relevant information

#### Project history

Historical development of the project (dates of essential events in project history) Studies and investigations already performed (title, author, completion date, ordering party) Conclusions arrived at, and decisions taken, from these former studies and investigations for further use within this study

#### Feasibility study

Author, title  
 Ordering party

Cost of preparatory studies and related investigations (provided that they form part of the project's pre-production expenses, i.e. they are to be borne by the project and not by third parties)

#### Pre-investment studies

Opportunity studies  
 Pre-feasibility studies  
 Feasibility study  
 Partial studies  
 Experts, consultant and engineering fees

Preparatory investigations, such as:

60

37

- Land surveys
- Quantity surveys (quantification of building materials)
- Quality (laboratory) tests
- Other investigations and tests

## ANNEXURE 5

### MARKET AND PLANT CAPACITY

#### Demand and market study

Data and alternative projection methods List and describe data needed for the demand and market study List and describe possible alternative methods of data evaluation and determination of present and future demand Select a method of data evaluation and state reasons for selection Detail the methods of data evaluation and demand determination to be used for the project under consideration

#### Determination of demand and market size for products (by-products)

##### Evaluate data and present final results showing:

The size and composition of present effective demand (total and by segment) The demand projections for the market (total and by segment) for the lifetime of the project The estimated market penetration by products

#### Sales forecast and marketing of products and by-products

Data and alternatives Describe data required in addition to the results of the demand market study Describe possible alternative sales and marketing programmes

#### Selection of sales programmes and marketing strategy State reasons for selection of sales programme

- \* Detail the sales programme
- \* Presentation of the programme (descriptively, using tables, graphs and maps as appropriate to show development throughout the life of the project)

#### State reasons for selecting of marketing strategy

- \* Detail the marketing strategy
- \* Presentation of marketing strategy Product pricing Promotional efforts during the pre-production and production stages Organizational set-up of distribution and sales Commissions or discounts on sales After-sales facilities and services

#### Estimate of sales revenues

Estimate annual sales revenues based on the sales programme and the marketing strategy

Estimate of sales and distribution costs

Estimate of sales costs

Estimate of distribution costs

#### Production programme

##### Data and alternatives

Describe the data required to set up a production programme Describe possible alternative production programmes When preparing the production programme, keep in mind among other things:

- \* Anticipated sales
- \* Minimum storage requirements
- \* Expected wastage
- \* Parameters of plant capacity
- \* After-sales requirements
- \* Reserves due to operational reasons

#### Selection of production programme

- State reasons for selection Describe in detail the production programme For each product (and by-product):
- Quality specifications
  - Quantities produced annually
  - Time schedule of production (start-up, trial runs, full capacity production)
- For emissions such as:
- Wastes and effluents (to be treated or not) dust, fumes, noise etc. quality of emissions
  - Quantities of emissions
  - Time schedule
  - Means of treatment
- Estimate costs of emissions disposal
- Treatment (as far as not covered under equipment and civil works)
  - Disposal in dumps and/or sewage system
  - Compensation payments to neighbours for damage caused by emissions
- Plant capacity
- Data and alternatives
- Describe data for the determination of plant capacity (feasible normal as opposed to nominal maximum capacity)
  - List possible alternatives on plant capacity
- Determination of feasible normal plant capacity
- Select and describe in detail the feasible normal plant capacity
  - State reasons for selection
  - Describe nominal maximum capacity
  - The selection of the feasible normal plant capacity should be based on :
    - \* Parameters of the production programme
    - \* Parameters of minimum economic equipment size
  - Plant capacity should be determined as feasible normal capacity for
    - \* The entire plant
    - \* The main departments (semi-finished products)

## ANNEXURE 6

### MATERIALS AND INPUTS

- Characteristics of materials and inputs
- Materials and inputs should be classified into:
- Raw materials (unprocessed and semi-processed)
  - Processed industrial materials (intermediates)
  - Manufactures (sub-assemblies)
  - Auxiliary materials
  - Factory supplies
  - Utilities
- Data and alternative
- Describe data for the selection of materials and inputs List all required materials and inputs and show alternatives
- Selection and description of materials and inputs
- Select and describe in detail the chosen materials and inputs State reasons for selection Describe materials and inputs, stating
    - \* Quantitative properties
    - \* Sources, supplies
    - \* Availability (schedule)
    - \* Unit costs

62

39

## Supply programme

## Fundamental data and alternatives

Describe fundamental data for the preparation of the supply programme Prepare supply programme, show alternatives

When setting up the supply programme, consider the:

- \* Production programme
- \* Availability of supplies
- \* Characteristics of supplies
- \* Technology and equipment
- \* Losses of raw material inputs due to transport and storage
- \* Losses of semi-finished and finished products due to processing, distribution and storage
- \* Replacements due to warranty services
- \* Local conditions

## Selection of the supply programme

Select and describe in detail the optimum supply programme

State reasons for selection

Describe supply programme, stating for each input:

- \* Quantitative supply programme
- \* Sources of supply
- \* Timely delivery (schedule)
- \* Storage measures and capacities (if necessary)

## Cost estimate

Estimate annual costs of materials and inputs:

- \* Raw materials
- \* Processed industrial materials
- \* Manufactures
- \* Auxiliary materials
- \* Factory supplies
- \* Utilities

## ANNEXURE 7

## LOCATION AND SITE

## Location

## Data and alternatives

Describe the fundamental data and requirements on the locations for plant operation List possible locations, describe and show them on maps of appropriate scale

## Choice of location

Select and describe in detail the chosen optimum location

State reasons for selection

Describe location, state:

- \* Country
- \* Geographical location
- \* District
- \* Town

For the choice of location, the following aspects, among others, should be taken into consideration:

- \* Public policies
- \* Material versus market orientation

- \* Local conditions: infrastructure and socio-economic environment

Site

Data and alternatives

Describe fundamental data and requirements on site for plant erection and operation List possible site alternatives, describe and show them on maps of appropriate scale

Site selection

Select and describe in detail the chosen optimum site State reasons for selection

Describe site, state:

- \* Location (town, street, number etc.)
- \* Geographical and geodetical conditions
- \* Use maps of appropriate scale, showing
  - Orientation
  - Boundaries
  - Neighbours
  - Contour lines
  - Roads and other traffic connections
  - Utility connections, next points of tie-in
  - Existing obstacles and structures
  - Underground conditions
- \* Existing rights of way, easements etc.

For the selection of the plant site, the following aspects, among others, should be taken into consideration:

- \* Cost of land
- \* Local conditions: infrastructure and socio-economic environment
- \* Public policies versus private interests
- \* Site preparation and development
- \* Site Properties and conditions

Cost estimate Investment cost, such as:

- \* Land
- \* Taxes
- \* Legal expenses
- \* Payments to neighbours
- \* Rights of way (one time payments)

Production cost, such as annual payments for:

- \* Rights of way
- \* Easements
- \* Rents

Local conditions

List and describe local conditions

Climate

Site and terrain

Transport facilities

Water supply

Power supply

Waste disposal

Manpower

Fiscal and legal regulations

Construction, erection and maintenance facilities

Living conditions

A general check-list of local conditions is annexed to the notes on this chapter

64  
41

## Environmental impacts

Describe environmental impacts to be expected because of erection and operation of plant on  
 Population (increase of employment etc.) Infrastructure (development of traffic network, public  
 utilities etc.) Ecology (water, air, soil, plants, animals etc.) Landscape

## ANNEXURE 8

## PROJECT ENGINEERING

## Project layouts

## Data and alternatives

State the data required for the preparation of project layouts, such as:

- \* Production programme
- \* Supply Programme
- \* Technology
- \* Equipment
- \* Civil works
- \* Local conditions

Prepare and describe alternative project layouts

## Selection of layouts

Select and describe in detail optimum layouts, state the reasons for the selection, show the selected layouts by appropriate drawings

## Scope of project

## Data and alternatives

State the data required to define the scope of the project

Prepare and describe alternatives

## Selection of the scope of the project

Select and describe in detail the optimum scope of the project

State reasons for the selection

Use physical layout drawings to show the scope of project and project components

Number and list the project components required to serve as bases for further engineering and cost estimates

## Technology(ies)

## Data and alternatives

State the data required for the technologies to be used

Describe alternative technologies

## Selection of technology

Select and describe in detail the optimum technologies

When selecting the technologies the following aspects should be considered:

- \* The nature of the technologies required (e.g. labour versus capital intensity, non-obsolence)
- \* Sources
- \* Means of acquisition: licensing, purchase, joint venture
- \* Cost

State the reasons for the selection Describe the selected technology, stating the type, source, specification

## Cost estimate

Investment costs

Lump sum payments

65

42

- \* Organizational layout
- \* Strategies and objectives of management for administering and operating the factory, marketing the products etc.
- \* Skill requirements and level of training of staff
- \* Availability of staff, local/foreign

#### Selection of staff

Select and describe in detail the manning table for staff

State reasons for selection

Describe in detail the selected alternative

- \* Show structure (organization)
- \* Prepare detailed manning table

#### Cost estimate

Estimate annual cost of local and foreign staff

## ANNEXURE - II

### IMPLEMENTATION SCHEDULING

#### Data and activities

State fundamental data for project implementation Elaborate implementation programme and time schedule and show alternatives, considering:

Establishment of project implementation management Arrangements for technology supply Detailed engineering of equipment, tendering, evaluation of bids, awards of contracts Detailed planning of civil works, tendering, evaluation of bids, awards of contracts Arrangements for financing

Construction period:

\* Purchase of land

\* Supervision, co-ordination, testing and take over of equipment and civil works

Build-up of administration, recruitment and training of staff and labour Arrangements for supplies Arrangements for marketing Establishment of contacts with public authorities for timely approval of licences, contracts etc. Preliminary and capital issue expenses

#### Selection of project implementation programme and time schedule

Select and describe in detail the optimum implementation programme and time schedule list activities and show their sequence in bar diagrams and/or networks State reasons for selection

#### Cost estimate of project implementation

Investment (land, technology, civil works, plant and equipment) and production costs (material and labour inputs and overhead costs) are explained and estimated in the preceding chapters. All cost components are collected in the following chapter with the objective of determining their timing; this will be based on the implementation schedule decided upon in the present chapter. For activities that occur during the investment phase up to the moment when the project becomes operational, cost estimates have to be made for the activities mentioned under "Data and activities" above.

26

43

## ANNEXURE - 12

## FINANCIAL AND ECONOMIC EVALUATION

## Total investment costs

Calculate the total investment costs by summarizing all investment components. Project the annual investment expenditures.

## Project financing

Describe and justify assumed or actual sources of finance. Prepare cash-flow table for financial planning. Estimate annual financial costs and insert total.

## Total production costs

Calculate total production costs by summarizing all cost items. Project production costs. Estimate unit costs.

## Financial evaluation

## Compute commercial profitability criteria

Net present value

Internal rate of return

Pay-back period

Simple rate of return

Break-even analysis

Sensitivity analysis

## National economic evaluation

Preliminary tests

Project exchange rate

Effective rate of protection

## Cost-benefit analysis. When applying the UNIDO method of economic project evaluation, estimate:

Direct benefits to aggregate consumption

Direct costs to aggregate consumption

Indirect benefits and costs to aggregate consumption

Redistribution of income

## To apply the UNIDO method, calculate:

Shadow price of labour Shadow price of foreign exchange Shadow price of investment

Estimate social rate of discount

w price of foreign exchange Shadow price of investment

\*\*\*

## GLOSSARY

## Study Note 2

**Detailed Project Report**: It is similar to the feasibility study, but with more accurate data and information; the progress and review of the project is anchored on detailed project report.

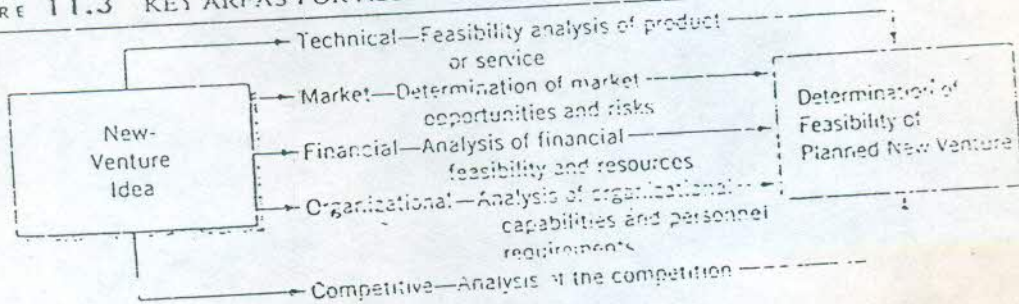
**Economic analysis**: It involves the allocation of resources among competing projects and to determine whether or not the returns from the investment are adequate, and whether any other alternatives can give a higher return.

**Environmental analysis**: This is undertaken to ensure the sound management and use of its natural resources and to minimise the ill effects, if any, resulting from the project on environment.

TABLE 11.5 SPECIFIC ACTIVITIES OF FEASIBILITY ANALYSES

Technical Feasibility Analysis	Market Feasibility Analysis	Financial Feasibility Analysis	Analysis of Organizational Capabilities	Competitive Analysis
Crucial technical specifications	Market potential	Required financial resources for:	Personnel requirements	Existing competitors
Design	Identification of potential customers and their dominant characteristics (e.g., age, income level, buying habits)	Fixed assets	Required skill levels and other personal characteristics of potential employees	Size, financial resources, market entrenchment
Durability		Current assets		Potential reaction of competitors to newcomer by means of price cutting, aggressive advertising, introduction of new products, and other actions
Reliability	Potential market share (as affected by competitive situation)	Necessary working capital	Managerial requirements	
Product safety		Available financial resources	Determination of individual responsibilities	
Standardization	Potential sales volume	Required borrowing	Determination of required organizational relationships	
Engineering requirements	Sales price projections	Potential sources for funds	Potential organizational development	Potential new competitors
Machines	Market testing	Cost of borrowing	Competitive analysis	
Tools	Selection of test	Repayment conditions		
Instruments	Actual market test	Operation cost analysis		
Work flow	Analysis of market	Fixed costs		
Product development	Marketing planning issues	Variable costs		
Blueprints	Preferred channels of distribution, impact of promotional efforts, required distribution points, warehouses, packaging considerations, price differentiation	Projected cash flow		
Models		Projected profitability		
Prototypes				
Product testing				
Lab testing				
Field testing				
Plant location				
Desirable characteristics of plant site (proximity to suppliers, customers), environmental regulations				

FIGURE 11.3 KEY AREAS FOR ASSESSING THE FEASIBILITY OF A NEW VENTURE



62  
45

# PROJECT FORMULATION

- 12.1 Meaning of Project Report • 12.2 Significance of Project Report • 12.3 Contents of a Project Report • 12.4 Formulation of a Project Report • 12.5 Planning Commission's Guidelines for Formulating a Project Report • 12.6 Specimen of a Project Report • 12.7 Network Analysis • 12.8 Common Errors in Project Formulation • 12.9 Let Us Sum Up • Assessment Questions

## LEARNING OBJECTIVES

On completion of this chapter, you should be able to:

- Define a project or business plan.
- Appreciate the significance of project.
- List the contents of a project report.
- Discuss the formulation of a project.
- Describe the network analysis involved in project formulation.
- Enumerate the common errors committed in formulating a project report of a small enterprise.

We know from available literature on development of entrepreneurship what do entrepreneurs do but relatively little about how do they do it. We are making a beginning from this chapter onwards to make you know how do entrepreneurs make their enterprises as running concern. We also know when intelligent people start on a long trip, they always make plans. They decide, for example, where they are going and how they plan to get there. Generally longer the trip, more they plan. Small entrepreneurs also need to draw the business plans because right from the conception of a business idea upto production involves numerous decisions to be taken. Formulation of project report/business plan is one of the first corner stones to be laid down in setting up an enterprise. This chapter is devoted to make you know what is and how to make a right project report or the business plan as it is sometimes called.

## 12.1 MEANING OF PROJECT REPORT

*Webster New 20th Century Dictionary* defines a project as a scheme, design, a proposal of something intended or devised. In simple words, project report or business plan is a written statement of what an entrepreneur proposes to take up. It is a kind of guide frost or course of action what the entrepreneur hopes to achieve in his business and how is he going to achieve it. In other words, project report serves like a kind of big road map to reach the destination determined by the entrepreneur. Thus, a project report can best be defined as a well evolved course of action devised to achieve the specified objective within a specified period of time. So to say, it is an operating document.

## 12.2 SIGNIFICANCE OF PROJECT REPORT

An objective without a plan is a dream. The preparation of a project report is of great significance for an entrepreneur. The project report serves the two essential functions:

First and most important, the project report is like a road map. It describes the direction

the enterprise is going in, what its goals are, where it wants to be, and how it is going to get there. It also enables an entrepreneur to know that he is proceeding in the right direction. Some hold the view that without well spelled out goals and operational methods/tactics, most businesses flounder on the rocks of hard times.<sup>1</sup>

The *second* function of the project report is to attract lenders and investors. Although, it is not mandatory for the small enterprises to prepare project reports, yet it is useful and beneficial for them to prepare the project reports for various reasons. The preparation of project report is beneficial for those small enterprises which apply for financial assistance from the financial institutions and the commercial banks. It is on the basis of project report that the financial institutions make appraisal if the enterprise requires financial assistance or not. If yes, how much. Similarly, other organisations which provide various assistance such as work shed, raw material, seed/margin money, etc. are equally interested in knowing the economic soundness of the proposal. In most cases, the quality of the firm's project report weighs heavily in the decision to lend or invest funds.<sup>2</sup>

### 12.3 CONTENTS OF A PROJECT REPORT

Having gone through the significance of project report, it is now clear that there is no substitute for a well-prepared business plan or project report and also there are no short-cuts to preparing it. The more concrete and complete the business plan, the more likely it is to earn the respect of outsiders and their support in making and running an enterprise. Therefore, the project report needs to be prepared with great care and consideration. A good project report should contain the following contents:

1. **General Information:** Information on product profile and product details.
2. **Promoter:** His/her educational qualification, work experience, project related experience.
3. **Location:** Exact location of the project, lease or freehold, locational advantages.
4. **Land and Building:** Land area, construction area, type of construction, cost of construction, detailed plan and estimate along with plant layout.
5. **Plant and Machinery:** Details of machinery required, capacity, suppliers, cost, various alternatives available, cost of miscellaneous assets.
6. **Production Process:** Description of production process, process chart, technical know how, technology alternatives available, production programme.
7. **Utilities:** Water, power, steam, compressed air requirements, cost estimates, sources of utilities.
8. **Transport and Communication:** Mode, possibility of getting, costs.
9. **Raw Material:** List of raw material required by quality and quantity, sources of procurement, cost of raw material, tie-up arrangements, if any, for procurement of raw material, alternative raw material, if any.
10. **Manpower:** Manpower requirement by skilled and semi-skilled, sources of manpower supply, cost of procurement, requirement for training and its cost.
11. **Products:** Product mix, estimated sales, distribution channels, competitions and their capacities, product standard, input-output ratio, product substitute.
12. **Market:** End-users of product, distribution of market as local, national, international; trade practices, sales promotion devices, proposed market research.

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1. Dan Steinhoff and John F. Burgess: *Small Business Management Fundamentals*, McGraw-Hill Book Co., Singapore, 1989, p. 37.

2. Thomas W. Zimmerer and Norman M. Scarborough: *Essentials of Small Business Management*, Macmillan College Publishing Company, New York, 1994, p. 246.

13. Requirement of Working Capital: Working capital required, sources of working capital, need for collateral security, nature and extent of credit facilities offered and available.

14. Requirement of Funds: Break-up of project cost in terms of costs of land, building, machinery, miscellaneous assets, preliminary expenses, contingencies and margin money for working capital, arrangements for meeting the cost of setting up of the project.

15. Cost of Production and Profitability of first ten years.

16. Break-Even Analysis (Refer to 12.4).

17. Schedule of Implementation (Refer to 12.4).

## 12.4 FORMULATION OF A PROJECT REPORT

Normally, small-scale enterprises do not include sophisticated technique which is used for preparing project reports of large-scale enterprises. Within the small-scale enterprises too, all the information may not be homogeneous for all units. In fact, what and how much information will be given in the project report depends upon the size of the unit as well as nature of the production. A general set of information given in any project report is listed by Vinod Gupta<sup>3</sup> in his study on "*Formulation of a Project Report*". We are reproducing it here.

Project formulation divides the process of project development into eight distinct and sequential stages. These stages are:

1. General Information.
2. Project Description.
3. Market Potential.
4. Capital Costs and Sources of Finance.
5. Assessment of Working Capital Requirements.
6. Other Financial Aspects.
7. Economic and Social Variables.
8. Project Implementation.

The nature of information to be collected under each one of these stages has been given below.

### General Information

The information of general nature given in the project report include the following:

**Bio-data of Promoter:** Name and address of entrepreneur; the qualifications, experience and other capabilities of the entrepreneur; if these are partners, state these characteristics of all the partners individually.

**Industry Profile:** A reference of analysis of industry to which the project belongs, e.g., past performance; present status, its organisation, its problems etc.

**Constitution and Organisation:** The constitution and organisational structure of the enterprise; in case of partnership firm, its registration with the Registrar of Firms; application for getting Registration Certificate from the Directorate of Industries/District Industry Centre.

**Product Details:** Product utility, product range; product design; advantages to be offered by the product over its substitutes, if any

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3. Vinod Gupta: *Formulation of a Project Report*, National Institute for Entrepreneurship and Small Business Development (NIESBUD), New Delhi.

## Project Description

A brief description of the project covering the following aspects is given in the project report.

**Site:** Location of enterprise; owned or leasehold land; industrial area; No Objection Certificate from the Municipal Authorities if the enterprise location falls in the residential area.

**Physical Infrastructure:** Availability of the following items of infrastructure should be mentioned in the project report:

- (i) **Raw Material:** Requirement of raw material, whether inland or imported, sources of raw material supply.
- (ii) **Skilled Labour:** Availability of skilled labour in the area, arrangements for training labourers in various skills.

**Utilities:** These include:

- (i) **Power:** Requirement for power, load sanctioned, availability of power.
- (ii) **Fuel:** Requirement for fuel items such as coal, coke, oil or gas, state of their availability.
- (iii) **Water:** The sources and quality of water should be clearly stated in the project report.

**Pollution Control**—The aspects like scope of dumps, sewage system and sewage treatment plant should be clearly stated in case of industries producing emissions.

**Communication System**—Availability of communication facilities, e.g., telephone, telex etc. should be stated in the project report.

**Transport Facilities**—Requirements for transport, mode of transport, potential means of transport, distances to be covered, bottlenecks etc., should be stated in the business plan.

**Other Common Facilities**—Availability of common facilities like machine shops, welding shops and electrical repair shops etc. should be stated in the report.

**Production Process**—A mention should be made for process involved in production and period of conversion from raw material into finished goods.

**Machinery and Equipment**—A complete list of items of machinery and equipments required indicating their size, type, cost and sources of their supply should be enclosed with the project report.

**Capacity of the Plant**—The installed licensed capacity of the plant along with the shifts should also be mentioned in the project report.

**Technology Selected**—The selection of technology, arrangements made for acquiring it should be mentioned in the business plan.

**Research and Development**—A mention should be made in the project report regarding proposed research and development activities to be undertaken in future.

## Market Potential

While preparing a project report, the following aspects relating to market potential of the product should be stated in the report-

- (i) **Demand and Supply Position**—State the total expected demand for the product and present supply position. This should also be mentioned how much of the gap will be filled up by the proposed unit.
- (ii) **Expected Price**—An expected price of the product to be realised should be mentioned in the project report.

**Marketing Strategy**—Arrangements made for selling the product should be clearly stated in the project report.

**After-Sales Service**—Depending upon the nature of the product, provisions made for after-sales service should normally be stated in the project report.

Transportation—Requirement for transportation means indicating whether public transport or entrepreneur's own transport should be mentioned in the project report.

### Capital Costs and Sources of Finance

An estimate of the various components of capital items like land and buildings, plant and machinery, installation costs, preliminary expenses, margin for working capital should be given in the project report. The present probable sources of finance should also be stated in the project report. The sources should indicate the owner's funds together with funds raised from financial institutions and banks.

### Assessment of Working Capital Requirements

The requirement for working capital and its sources of supply should be carefully and clearly mentioned in the project report. It is always better to prepare working capital requirements in the prescribed formats designed by limits of requirement. It will minimise objections from the banker's side.

### Other Financial Aspects

In order to adjudge the profitability of the project to be set up, a projected Profit and Loss Account indicating likely sales revenue, cost of production, allied cost and profit should be prepared. A projected Balance Sheet and Cash Flow Statement should also be prepared to indicate the financial position and requirements at various stages of the project.

In addition to above, the Break-Even Analysis should also be presented in the project report. Break-even point is the level of production/sales where the industrial enterprise shall earn neither profit nor incur loss. In fact, it will just break even. Break-even level indicates the gestation period and the likely moratorium required for repayment of loans. Break-even point (BEP) is calculated as follows:

$$\text{BEP} = \frac{F}{S - V} \times 100$$

where, F = Fixed Cost  
S = Sales Projected  
V = Variable Costs

Thus, the break-even point so calculated will indicate at what percentage of sales, the enterprise will break even.

### Economic and Social Variables

In view of the social responsibility of business, the abatement costs, i.e., the costs for controlling the environmental damage should be stated in the project. Arrangement made for treating the effluents and emissions should also be mentioned in the report.

Besides, the socio-economic benefits expected to accrue from the project should also be stated in the report itself. Following are the examples of socio-economic benefits-

- (i) Employment Generation.
- (ii) Import Substitution.
- (iii) Ancillarisation.
- (iv) Exports.
- (v) Local Resource Utilization.
- (vi) Development of the Area.

## Project Implementation

Last but no means the least, every entrepreneur should draw an implementation scheme or a time-table for his project to ensure the timely completion of all activities involved in setting up an enterprise. Timely implementation is important because if there is a delay, it causes, among other things, a project cost overrun. In India, delays in project implementation has become a common feature. Delay in project implementation jeopardises the financial viability of the project, on the one hand, and props up the entrepreneur to drop the idea to set up an enterprise, on the other. Hence, there is a need to draw up an implementation schedule for the project and then to adhere to it.

Following is a simplified implementation schedule for a small project.

**An Illustrative Implementation Schedule**

Tasks \ Months	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Formulation of Project Report														
2. Application for Term-Loan														
3. Term-Loan Sanction														
4. Possession of Land														
5. Construction of Building														
6. Getting Power and Water														
7. Placing Order for Machinery														
8. Receipt and Installation of Machinery														
9. Manpower Recruitment														
10. Trial Production														
11. Commencement of Commercial Production														

The above schedule can be broken up into scores of specific tasks involved in setting up the enterprise. Project Evaluation and Review Technique (PERT) and Critical Path Method (CPM) can also be used to get better insights into all activities related to implementation of the project. PERT and CPM analyses are discussed later in this chapter under *Network Analysis*.

## 12.5 PLANNING COMMISSION'S GUIDELINES FOR FORMULATING A PROJECT REPORT

In order to process investment proposals and arrive at investment decisions, the Planning Commission of India has also issued some guidelines for preparing/formulating realistic industrial projects. So far as feasibility report is concerned, it lies in between the project formulating stage and the appraisal and sanction stage. The project formulation stage involves the identification of investment options by the enterprise and in consultation with the Administrative Ministry, the Planning Commission, and other concerned authorities.

Realising the usefulness of these guidelines, we now are presenting these guidelines in a summarised manner.

1. **General Information:** The feasibility report should include an analysis of the industry to which the project belongs. It should deal with the past performance of the industry. The description of the type of industry should also be given, i.e., the priority of the industry, increase in production, role of the public sector, allocation of investment of funds, choice of technique, etc. This should also contain information about the enterprise submitting the feasibility report.

2. **Preliminary Analysis of Alternatives:** This should contain present data on the gap between demand and supply for the outputs which are to be produced, data on the capacity that would be available from the projects that are in production or under implementation at the time the report is prepared, a complete list of all existing plants in the industry, giving their capacity and level of production actually attained, a list of all projects for which letters of intents/licenses have been issued and a list of proposed projects. All options that are technically feasible should be considered at this preliminary stage. The location of the project as well as its implications should also be looked into. An account of the foreign exchange requirement should also be taken. The profitability of different options should also be given. The rate of return on investment should be calculated and presented in the report. Alternative cost calculations *vis-a-vis* return should be presented.

3. **Project Description:** The feasibility should provide a brief description of the technology/process chosen for the project. Information relevant to determining optimality of the locations chosen should also be included. To assist in the assessment of the environmental effects of a project, every feasibility report must present the information on specific points, i.e., population, water, air, land, flora and fauna, effects arising out of project's pollution, other environmental discretions etc. The report should contain a list of the operational requirements of the plant, requirements of water and power, requirements of personnel, organisational structure envisaged, transport costs, activity-wise phasing of construction and factors affecting it.

4. **Marketing Plan:** It should contain the following items:

Data on the marketing plan.

Demand and prospective supply in each of the areas to be served.

The method and data used for main estimates of domestic supply and selection of the market areas should be presented. Estimates of the degree of price sensitivity should be presented.

It should contain an analysis of past trends in prices.

5. **Capital Requirements and Costs:** The estimates should be reasonably complete and properly estimated. Information on all items of costs should be carefully collected and presented.

6. **Operating Requirements and Costs:** Operating costs are essentially those costs which are incurred after the commencement of commercial production. Information about all items of operating cost should be collected; operating costs relate to the cost of raw materials and intermediates, fuel, utilities, labour, repair and maintenance, selling expenses and other expenses.

7. **Financial Analysis:** The purpose of this analysis is to present some measures to assess the financial viability of the project. A proforma Balance Sheet for the project data should be presented. Depreciation should be allowed for on the basis of specified by the Bureau of Public Enterprises. Foreign exchange requirements should be cleared by the Department of Economic Affairs. The feasibility report should take into account income-tax rebates for priority industries, incentives for backward areas, accelerated depreciation, etc. The sensitivity analysis should also be presented. The report must analyse the sensitivity of the rate of return of change in the level and pattern of product prices.

8. **Economic Analysis:** Social profitability analysis needs some adjustment in the data relating to the costs and returns to the enterprise. One important type of investment involves a correction in input and costs, to reflect the true value of foreign exchange, labour and capital. The enterprise should try to assess the impact of its operations on foreign trade. Indirect costs and benefits should also be included in the report. If they cannot be

quantified, they should be analysed and their importance emphasised.

4. **Miscellaneous Aspects:** The preceding three areas are deemed appropriate to almost every new small enterprise. Notwithstanding, depending upon the size of the operation and peculiarities of a particular project, other items may be considered important to be applied out in the project report. To mention, probable use of minicomputers or other electronic data processing services, cash flow statements, method of accounting etc., may be of great use in some small enterprises.

## 12.6 SPECIMEN OF A PROJECT REPORT

Look at the following Illustrative Project Report of a manufacturing unit, it will help you understand how to prepare a Project Report or Business Plan.

### Project Profile for Manufacturing Unit.....

#### A. PRODUCT DESCRIPTION

#### B. PRODUCTION AND GENERAL EVALUATION OF PROSPECTS:

#### C. MARKET ASPECTS

1. Users:
2. Sales Channels & Methods:
3. Geographical Extent of Market:
4. Competitive Situation:
  - (a) Domestic Market
  - (b) Export Market
5. Market needed for plant described:

#### D. PRODUCTION REQUIREMENTS

Rs.

##### Salient Features

1. Annual Capacity (One/Two/Three-Shift Operation)
2. Capital Requirements
  - Land & Buildings on rent (Mention value, if owned)
  - Equipment, furniture and fittings
  - Working capital
3. Total capital which the entrepreneur would need for the whole project provided he uses agencies planned by the Government for financial accommodation as discussed in the book
  - (i) Own
  - (ii) Borrowings
4. Expected net profit per annum

#### E. CAPITAL REQUIREMENTS

1. Fixed assets & working capital
  - (a) Land(...sq. metres) and Building(...sq. metres) on rent at Rs. ...per annum
  - (b) Equipments:
    - (i) Production Equipment (List down in an appendix, giving values, etc., of each machine separately)
    - (ii) Other Tools & Equipment
    - (iii) Furniture and Fittings

Rs.

(Contd.)

(c) Working Capital

[This would be calculated keeping in view the periods in which capital on an average in various forms, i.e. manufactured goods, semi-manufactured goods, raw material etc., would remain locked up. Often you may calculate it at 3 months' requirement level, unless the situation (line of industry) warrants otherwise]

			<u>Total</u>
<b>II. Raw Material &amp; Allied Supplies (Annual)</b>			
Description	Qty.	Rate Rs.	Annual Requirements
1.			
2.			
3.			
4.			
5.	Power, Fuel & Water		
6.	Maintenance & Allied Supplies		
7.	Other Supplies		
			<u>Total</u>
<b>III. Manpower (Annual)</b>			
Description	No. per month	Rate (Rs.) per month	Annual Cost Rs.
Manager			
Foreman			
Supervisors			
Skilled Workers			
Semi-Skilled Workers			
Unskilled Workers			
Office Staff			
Others			
			<u>Total</u>
<b>IV. Other Costs (Annual)</b>			
(a)	Depreciation on equipment, furniture & fittings ....annum		
(b)	Interest on capital (fixed and working .....per annum on average)		
(c)	Administrative Costs		
(d)	Sales cost (Including Sales Commission, Advertisement, etc)		
(e)	Provision for discount, bad debts and miscellaneous contingencies		
(f)	Training costs		
<b>F. TOTAL ANNUAL COSTS, SALES REVENUE AND NET PROFITS</b>			
(a)	Annual Costs		
(i)	Rent for Land & Buildings		
(ii)	Raw Materials & Allied Supplies		
(iii)	Manpower		
(iv)	Other Costs		
(b)	Annual Sales Revenue		
(c)	Expected Annual Net Profit (b-a) say		
(d)	% Profit on Own Capital .		
(e)	% Profit on Total Annual Sales Turnover		
(f)	% on Total Investment		

\* Adapted from S.S. Khanka: *Entrepreneurship in Small-Scale Industries*, Himalaya Publishing House, New Delhi, 1990, pp. 152-55.

## 12.7 NETWORK ANALYSIS

What is a network? A network is a set of symbols connected with each other with a sequential relationship with each step making the completion of a project/event. As discussed earlier, a business plan or project involves various activities to be undertaken to convert it into an enterprise. Delays in the completion of activities cause, among other things, cost overruns. Hence, there is a need for deciding the sequential order of all activities of the project so as to accomplish the project economically in the minimum available time with the limited resources. This is also called "project scheduling". A number of network techniques have been developed for project scheduling. Some of them are:

1. Programme Evaluation and Review Technique (PERT)
2. Critical Path Method (CPM)
3. Graphical Evaluation and Review Technique (GERT)
4. Workshop Analysis Scheduling Programme (WASP)
5. Line of Balance (LOB)

However, PERT and CPM are the two techniques the most commonly used in project management. These are, therefore, discussed in detail.

### Programme Evaluation and Review Technique (PERT)

PERT was first developed as a Management Aid for completing Polaris Ballistic Missile Project in USA in October 1958. It worked well in expediting the completion of the project from 7 years to 5 years. Since then, PERT has become very popular technique used for project planning and control. In nutshell, it schedules the sequence of activities to be completed in order to accomplish the project within a short period of time. It helps reduce both the time and cost of the project.

**Steps Involved in PERT:** The following steps are involved in PERT technique:

1. The activities involved in the project are drawn up in a sequential relationship to show what activity follows what.
2. The time required for completing each activity of the project is estimated and noted on network.
3. The critical activities of the project are determined.
4. The variability of the project duration and probability of the project completion in a given time period are calculated.

The above steps can be illustrated with the help of the following example.

The Managing Director of XYZ Ltd. is interested in getting his Operating Budget prepared. The project is decomposed into the following activities:

Job Identification	Job Description	Activity	Time Required
A	Forecasting of Sales	1-2	10 Days
B	Sales Pricing	2-4	8 Days
C	Production Scheduling	2-3	9 Days
D	Cost Determination	3-4	7 Days
E	Preparation of Budget	4-5	12 Days
	Total		36 Days

This is presented on Figure 12.1-

**Advantages of PERT:** PERT technique bears the following advantages:

1. It determines the expected time required for completing each activity.
2. It helps complete the project within a given period of time.

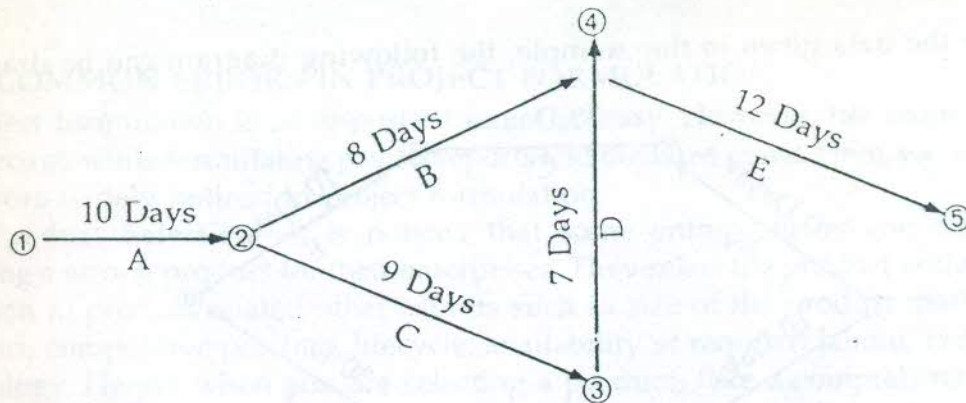


Fig. 12.1 : PERT Networking

3. It helps management handle uncertainties involved in the project and thus, reduce the risk element in the project.
4. It enables management to make optimum allocation of limited resources.
5. It presses for the right action, at the right point and at the right time in the organisation.

**Limitations of PERT:** PERT suffers from the following limitations:

1. PERT network is mainly based on time estimates required for each activity. On account of wrong time estimates, the network is bound to become highly unrealistic.
2. This technique also does not consider the resources required at different stages of the project.
3. For effective control of a project by using PERT technique requires frequent updating and revising the PERT calculations. But, this proves quite a costly affair for the organisation.

### Critical Path Method (CPM)

The Critical Path Method (CPM) was first developed in USA by the E.I. Duport Nemours & Co. in 1956 for doing periodic overhauling and maintenance of a chemical plant. It resulted in reducing the shut-down period from 130 hours to 90 hours and saving the company \$ 1 million. The CPM differentiates between planning and scheduling of the project. While planning refers to determination of activities to be accomplished, scheduling refers to the introduction of time schedule for each activity of the project. The duration of different activities in CPM are deterministic. There is a precise known time that each activity in the project will take.

Let us illustrate the CPM technique with an example of a research project. The following activities are identified in the project:

Job Identification	Job Description	Activity	Time required
A	Preparation of dealer questionnaire	1-2	10 Days
B	Preparation of consumer questionnaire	1-4	10 Days
C	Dealer Survey	2-3	20 Days
D	Consumer Survey	4-5	60 Days
E	Processing and interpretation of Dealer data	3-6	10 Days
F	Processing and interpretation of consumer survey data	5-6	30 Days

Now, with the data given in the example, the following diagram can be drawn up:

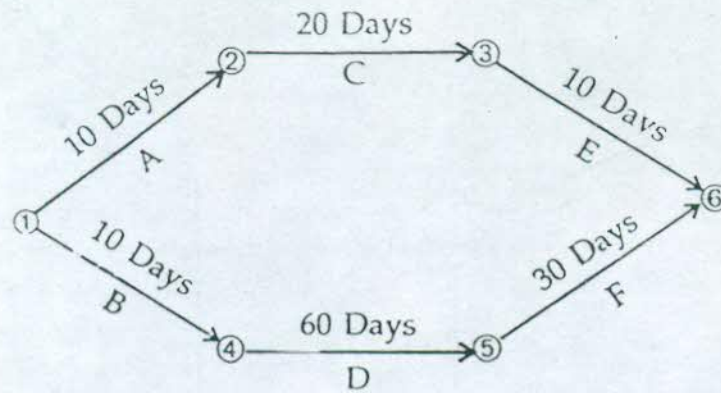


Fig. 12.2: Critical Path

**Advantages of CPM:** The important advantages of CPM technique are:

1. It helps in ascertaining the time schedule of activities having sequential relationship.
2. It makes control easier for the management.
3. It identifies the most critical elements in the project. Thus, the management is kept alert and prepared to pay due attention to the critical activities of the project.
4. It makes better and detailed planning possible.

**Limitations of CPM:** The main limitations of the CPM are:

1. CPM operates on the assumption that there is a precise known time that each activity in the project will take. But, it may not be true in real practice.
2. CPM time estimates are not based on statistical analysis.
3. It cannot be used as a controlling device for the simple reason that any change introduced will change the entire structure of network. In other words, CPM cannot be used as a dynamic controlling device.

#### Differences between PERT and CPM

Though both PERT and CPM developed in mid-fifties and are used as Management Aids in project management, there are certain differences between them. These are listed in the following Table 12.1.

TABLE 12.1 : Differences between PERT and CPM

PERT	CPM
1. Its origin is military.	Its origin is industry.
2. It is an event-oriented approach.	It is an activity oriented approach.
3. It allows uncertainty.	It does not allow uncertainty.
4. It is a probabilistic model.	It is a deterministic model.
5. It is time-based.	It is cost-based.
6. It does not demarcate between critical and non-critical activities.	It marks critical activities.
7. It averages time.	It does not average time.
8. It is suitable when high precision is required in time estimates, e.g. defence projects.	It is suitable when reasonable precision is required, e.g. civil construction projects, industrial expansion schemes, etc

## 12.8 COMMON ERRORS IN PROJECT FORMULATION

Project formulation is as important is not so easy. However, the entrepreneurs often make errors while formulating project reports and business plans. Here, we are highlighting the errors widely noticed in project formulation:

1. **Product Selection**—It is noticed that some entrepreneurs commit mistakes by selecting a wrong product for their enterprises. They select the product without giving due attention to product related other aspects such as size of the product markets, its future demand, competitive position, lifecycle, availability of required labour, raw material and technology. Hence, when you are selecting a product, take a comprehensive view.

2. **Capacity Utilization Estimates**—The entrepreneurs usually make over-optimistic estimates of capacity utilization. Their estimates are based on a completely false premises. The estimates are made in complete disregard of present-enterprise performance, prevailing market conditions, competitive atmosphere, the technical snags, etc. A business plan formulated as such falls prey to financial jugglery. Hence, avoid such temptations while estimating capacity utilization for your enterprise.

3. **Market Study**—Product production is ultimately meant for eventual sale. Hence, market study of the product assumes importance. Market study continues to be a grey area. But, there are some entrepreneurs who pass by this component of their business plan completely. Based on their nebulous ideas and scanty and scattered information on demand and supply of their proposed product, they conclude that market is just there waiting to be tapped. This is a wrong attitudinal block. Avoid it.

4. **Technology Selection**—The requirement for technology differs from product to product depending upon the nature of products. Swayed by the reported profit margins, the entrepreneurs sometimes plan for a technology not possible to set up within limited financial resources. Thus, in the absence of technological feasibility, enterprise is foredoomed to failure. Hence, make sure your technological feasibility.

5. **Location Selection:** The entrepreneur often makes two types of errors while selecting location for their enterprises. *First*, they are completely swayed by the Government offer of financial incentives and concessions to establish industries in a particular location. This becomes their sole and overriding concern completely disregarding other factors like market proximity, availability of raw materials, manpower and infrastructural facilities. *Second*, the entrepreneurs select a location for their enterprises merely because it is their home town or they own ancestral land there which is, however, not an appropriate location. Make sure you do not fall prey to such temptations.

6. **Selection of Ownership Form:** Many enterprises fail merely because the ownership form of enterprises is not suitable. Hence, select a suitable form of ownership taking a comprehensive view of the factors affecting the selection of a form of ownership.

### 12.9 LET US SUM UP

The project report/business plan is a blue-print of all those activities that an entrepreneur proposes to engage in. It is not only a guide for business activities, but also an essential exercise for developing cost and benefit estimates, resources planning and feasibility testing of the proposed business activity. The project report is required for purposes of obtaining funds from the financial institutions and commercial banks. The project report for an entrepreneur is what a guide map is for a traveller. In order to complete the project within a stipulated period and cost, all activities involved in the project are scheduled in a sequential relationship called 'networking' or 'scheduling' of activities. The common errors made by the entrepreneurs while formulating project reports/business plans are also highlighted.

# PROJECT APPRAISAL

- 13.1 Concept of Project Appraisal • 13.2 Methods of Project Appraisal • 13.3 Let Us Sum Up • Assessment Questions

## LEARNING OBJECTIVES

On completion of this chapter, you should be able to:

- Define the term 'project appraisal'.
- Discuss the methods of project appraisal of proposed small scale enterprises.

It is a well established fact that every industrial project involves risk. There are certain ways and means to reduce risk involved in it. Project appraisal is one of them. This chapter deals with the concept and methods of project appraisal.

## 13.1 CONCEPT OF PROJECT APPRAISAL

Simply speaking, project appraisal means the assessment of a project. Project appraisal is made for both proposed and executed projects. In case of former, project appraisal is called '*ex-ante analysis*' and in case of latter '*post-ante analysis*'. Here, project appraisal relates to a proposed project.

Project appraisal is a costs and benefits analysis of different aspects of proposed project with an objective to adjudge its viability. A project involves employment of scarce resources. An entrepreneur needs to appraise various alternative projects before allocating the scarce resources for the best project. Thus, project appraisal helps select the best project among available alternative projects. For appraising a project, its economic, financial, technical, market, managerial and social aspects are analysed. Financial institutions do project appraisal to assess its credit-worthiness before extending finance to a project. For a financial institution, project appraisal is a process whereby a leading financial institution makes an independent and objective assessment of the various aspects of an investment proposition for arriving at a financial decision and is aimed at determining the viability of a project and sometimes, also in modifying its scope and content so as to improve its viability. However, sometimes project appraisal and project evaluation are used interchangeably.

## 13.2 METHODS OF PROJECT APPRAISAL

Appraisal of a proposed project includes the following analyses:

1. Economic Analysis
2. Financial Analysis
3. Market Analysis
4. Technical Feasibility
5. Managerial Competence

These are discussed in turn.

### Economic Analysis

Under economic analysis, the aspects highlighted include requirements for raw

material, level of capacity utilization, anticipated sales, anticipated expenses and the probable profits. It is said that a business should have always a volume of profit clearly in view which will govern other economic variables like sales, purchases, expenses and alike. It will have to be calculated how much sales would be necessary to earn the targeted profit. Undoubtedly, demand for the product will be estimated for anticipating sales volume. Therefore, demand for the product needs to be carefully spelled out as it is, to a great extent, deciding factor of feasibility of the project concern. How to estimate demand for the project is discussed later in the chapter.

In addition to above, the location of the enterprise decided after considering a gamut of points also needs to be mentioned in the project. The Government policies in this regard should be taken into consideration. The Government offers specific incentives and concessions for setting up industries in notified backward areas. Therefore, it has to be ascertained whether the proposed enterprise comes under this category or not and whether the Government has already decided any specific location for this kind of enterprise.

### Financial Analysis

Finance is one of the most important pre-requisites to establish an enterprise. It is finance only that facilitates an entrepreneur to bring together the labour of one, machine of another and raw material of yet another to combine them to produce goods. In order to adjudge the financial viability of the project, the following aspects need to be carefully analysed:

1. Assessment of the financial requirements both—fixed capital and working capital—need to be properly made. You might be knowing that fixed capital normally called 'fixed assets' are those tangible and material facilities which purchased once are used again and again. Land and buildings, plants and machinery are the familiar examples of fixed assets/capital. The requirement for fixed assets/capital will vary from enterprise to enterprise depending upon the type of operation, scale of operation and time when the investment is made. But, while assessing the fixed capital requirements, all items relating to the asset like the cost of the asset, architect and engineer's fees, electrification and installation charges (which normally come to 10 per cent of the value of machinery), depreciation, pre-operation expenses of trial runs, etc., should be duly taken into consideration. Similarly, if any expense is to be incurred in remodelling, repair and additions of buildings should also be highlighted in the project report.

2. In accounting, working capital means excess of current assets over current liabilities. Current assets refer to those assets which can be converted into cash within a period of one week. Current liabilities refer to those obligations which can be payable within a period of one week. In short, working capital is that amount of funds which is needed in day today's business operations. In other words, it is like a circulating money changing from cash to inventories and from inventories to receivables and again converted into cash. This circle goes on and on. Thus, working capital serves as a lubricant for any enterprise, be it large or small. Therefore, the requirements of working capital should be clearly provided for. Inadequacy of working capital may not only adversely affect the operation of the enterprise but also bring the enterprise to a grinding halt.

What constitute working capital and what factors decide working capital requirements are discussed in detail in Chapter 21.

The activity level of an enterprise expressed as capacity utilization needs to be well spelled out. However, the enterprise sometimes fails to achieve the targeted level of capacity due to various business vicissitudes like unforeseen shortage of raw material, un-

expected disruption in power supply, inability to penetrate the market mechanism, etc. Then, a question arises to what extent an enterprise should continue its production to meet all its obligations/liabilities. 'Break-even analysis' gives an answer to it. In brief, break-even analysis indicates the level of production at which there is neither profit nor loss in the enterprise. This level of production is, accordingly, called 'break-even level'. Break-even analysis is already discussed in Chapter 11.

### Market Analysis

Before the production actually starts, the entrepreneur needs to anticipate the possible market for the product. He/she has to anticipate who will be the possible customers for his product and where and when his product will be sold. This is because production has no value for the producer unless it is sold. It is said that if the proof of pudding lies in eating, the proof of all production lies in marketing/consumption.<sup>1</sup> In fact, the potential of the market constitutes the determinant of probable rewards from entrepreneurial career.

Thus, knowing the anticipated market for the product to be produced becomes an important element in every business plan. The various methods used to anticipate the potential market, what is named in 'Management Economics' as 'demand forecasting', range from the naive to sophisticated ones. The commonly used methods to estimate the demand for a product are as follows:

1. **Opinion Polling Method:** In this method, the opinions of the ultimate users, i.e. customers of the product is estimated. This may be attempted with the help of either a complete survey of all customers (called, complete enumeration) or by selecting a few consuming units out of the relevant population (called, sample survey). Let us discuss these in some details.

(a) *Complete Enumeration Survey:* In this survey, all the probable customers of the product are approached and their probable demands for the product are estimated and then summed. Estimating sales under this method is very simple. It is obtained by simply adding the probable demands of all customers. An example should make it clear.

Suppose, there are total  $N$  customers of  $X$  product and everybody will demand for  $D$  numbers of it. Then, the total anticipated demand will be:

$$\sum_{i=1}^N D_i$$

Though the principle merit of this method is that it obtains the first-hand and unbiased information, yet it is beset with some disadvantages also. For example, to approach a large number of customers scattered all over market becomes tedious, costly and cumbersome. Added to this, the consumers themselves may not divulge their purchase plans due to the reasons like their personal as well commercial/business privacies.

(b) *Sample Survey:* Under this method, only some number of consumers out of their total population is approached and data on their probable demands for the product during the forecast period are collected and summed. The total demand of sample customers is finally blown up to generate the total demand for the product. Let we explain it with an example.

Imagine, there are 1000 customers of a product spread over the market. Out of these, 50 are selected for survey using stratified method. Now, if the estimated demand of these

1. S.S. Khanka: Marketing of Small Industry Products, *Prabandh*, July-September 1996, Vol. 17, No.63, pp. 20-24.

sample customers is  $D_i$ , i.e., it refers to 1 2 3 4.....50, the total demand for the entire group of customers will be

$$\sum_{i=1}^{50} n_i D_i = n_1 D_1 + n_2 D_2 + n_3 D_3 \dots n_{50} D_{50}$$

where  $n_i$  is the number of customers in group  $i$ , and  $n_1 + n_2 + n_3 \dots n_{50} = 1000$ .

But, if all the 1000 customers of the group are alike, then the selection may be done on a random basis and total demand for the group will be:

$$(D_1 + D_2 + D_3 + D_4 \dots D_5) \frac{1000}{50}$$

No doubt, survey method is less costly and tedious than the complete enumeration method.

(c) *Sales Experience Method*: Under this method, a sample market is surveyed before the new product is offered for sale. The results of the market surveyed are then projected to the universe in order to anticipate the total demand for the product.

In principle, the survey market should be the true representative of the national market which is not always true. Suppose, if Bombay is selected as a sample market, it may not be a true representative of a small place, say Silchar simply because the characteristic features of Bombay are altogether different from those of a small town like Silchar. Again, if we select Agra as a sample market, sales in Agra would be influenced by the size of the floating tourists population throughout the year.

(d) *Vicarious Method*: Under the vicarious method, the consumers of the product are not approached directly but indirectly through some dealers who have a feel of their customers. The dealers' opinions about the customers' opinion are elicited. Being based on dealers' opinions, the method is bound to suffer from the bias on the part of the dealers. Then, the results derived are likely to be unrealistic. However, these hang-ups are not avoidable.

2. *Life Cycle Segmentation Analysis*: It is well established that like a man, every product has its own life span. In practice, a product sells slowly in the beginning. Backed by sales promotion strategies over period, its sales pick up. In the due course of time, the peak sale is reached. After that point, the sales begins to decline. After some time, the product loses its demand and dies. This is natural death of a product. Thus, every product passes through its 'life cycle'. This is precisely the reason why firms go for new products one after another to keep the firm alive.

Based on above, the product life cycle has been divided into the following five stages:

1. Introduction
2. Growth
3. Maturity
4. Saturation
5. Decline

The sales of the product varies from stage to stage and follows S-shaped curve as shown in Figure 13.1.

72

62

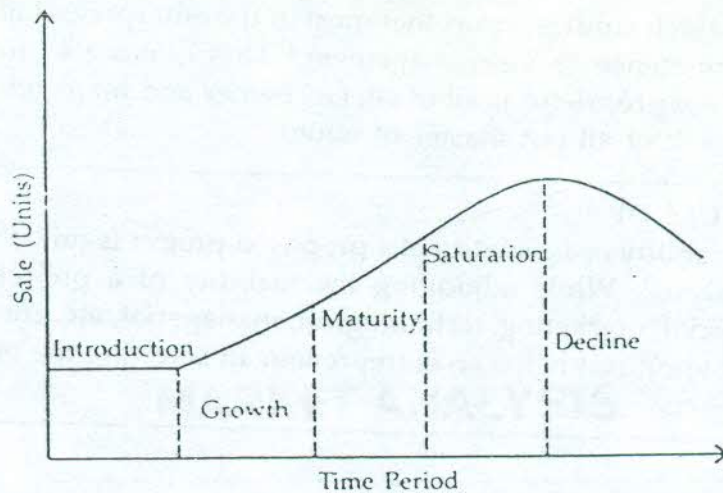


Fig. 13.1: Product Life-Cycle

Considering the above five stages of a product life cycle, the sales at different stages can be anticipated.

### Technical Feasibility

While making project appraisal, the technical feasibility of the project also needs to be taken into consideration. In the simplest sense, technical feasibility implies to mean the adequacy of the proposed plant and equipment to produce the product within the prescribed norms. As regards know-how, it denotes the availability or otherwise of a fund of knowledge to man the proposed plants and machinery. It should be ensured whether that know-how is available with the entrepreneur or is to be procured from elsewhere. In the latter case, arrangement made to procure it should be clearly checked up. If project requires any collaboration, then, the terms and conditions of the collaboration should also be spelt out comprehensively and carefully. In case of foreign technical collaboration, one needs to be aware of the legal provisions in force from time to time specifying the list of products for which only such collaboration is allowed under specific terms and conditions. The entrepreneur, therefore, contemplating for foreign collaboration should check these legal provisions with reference to their projects.

While assessing the technical feasibility of the project, the following inputs covered in the project should also be taken into consideration:

- (i) Availability of land and site.
- (ii) Availability of other inputs like water, power, transport, communication facilities.
- (iii) Availability of servicing facilities like machine shops, electric repair shop, etc.
- (iv) Coping-with anti-pollution law.
- (v) Availability of work force as per required skill and arrangements proposed for training-in-plant and outside.
- (vi) Availability of required raw material as per quantity and quality.

### Management Competence

Management ability or competence plays an important role in making an enterprise a success or otherwise. Strictly speaking, in the absence of managerial competence, the projects which are otherwise feasible may fail. On the contrary, even a poor project may become a successful one with good managerial ability. Hence, while doing project appraisal, the managerial competence or talent of the promoter should be taken into

consideration. Research studies report that most of the enterprises fall sick because of lack of managerial competence or mismanagement.<sup>2</sup> This is more so in case of small-scale enterprises where the proprietor is all in all, i.e., owner and manager. Due to his one-man show, he may be jack of all but master of none.

### 13.3 LET US SUM UP

Assessing the viability or feasibility of a proposed project is called 'project appraisal' or 'ex-ante analysis'. While adjudging the viability of a project, aspects such as economic, financial, marketing, technological, managerial, etc. are taken into consideration. Project appraisal helps an entrepreneur in selecting the best one among the alternative projects.

<b>SECTION II</b>	<b>MARKET ANALYSIS</b>	<b>65 - 139</b>
	▪ Basics of Marketing	<b>65 - 80</b>
	▪ Market and Demand Analysis	<b>81 - 112</b>
	▪ How to Choose the Right Forecasting Techniques	<b>113 - 127</b>
	▪ Four Steps to Fore-cast Total Market Demand	<b>128 - 133</b>
	▪ Pricing Policy	<b>134 - 130</b>

## COMMERCIAL APPRAISAL MARKETING

1. Demand-Techniques of forecasting
  - a) Important substitution
  - b) Past treatment method
  - c) End use method
  - d) Correlation and regression
  - e) Export market
2. Supply depth of competition
3. Pricing policy
4. Life cycle of the product
5. Brand name for the product
6. Packing and transport
7. Distribution channels
8. Sales promotion
  - a) Salesman
  - b) Advertising
  - c) Servicing
9. Sources of market information.
10. Publications useful to study various aspects of marketing

## MARKET STUDY - NEED, ADVANTAGES & LIMITATIONS :

You need to check for yourself the market prospects of the product selected by you before you launch a venture. You should rely merely upon intuition or hearsay to assess the market prospects. A comprehensive market study is a must. The specific advantages of such a study are :

- a) It enables you to evaluate viability of an enterprise by arriving at a year to year estimate of sales.
- b) It makes it possible for you to estimate scale and utilisation of installed capacity with reference to the proposed enterprise.
- c) You can judge whether the proposed capacity is on the higher side or lower-side.
- d) It provides a preliminary input for marketing strategy and programme formulation for the enterprise. (A market programme is a set of decisions required in respect of various market related issues. It influences market performance of an enterprise)

Market study is usually focussed on gross market demand-present and future. It typically highlights the gap, between expected market demand and supply in respect of a given product. Such a gap could be positive (demand exceeds supply) and therefore favourable. The gap could also be negative. A favourable gap in itself does not guarantee market success for an enterprise. Market success is an outcome of favourable demand supply gap as well as effective market programme.

## MARKET SURVEY - PRIMARY RESEARCH : A THREE STAGE TASK :

Market study is essentially a three-stage task. These tasks are :

- \* Determination of information needs
- \* Information gathering
- \* Analysis of collected information and reaching conclusions.

**MARKET DEMAND : A SIX ELEMENT CONCEPT :**

Market demand is a six-element concept. Market demand for a product is the total volume that will be bought by a defined customer group in defined geographical area in a defined time period in a defined environment. Let us explain these elements.

**i) PRODUCT :**

Market demand pre-supposes a careful definition of the product or product class. To take up the earlier example of ACT, the promoter of collapsible tube must decide whether the relevant market study is aluminium collapsible tube or all tube market. The decision depends upon how you perceive the opportunity for entering a chosen (substitute or alternative or competing) market or losing to such adjacent products.

**ii) VOLUME :**

The market demand can be measured in terms of either volume of business or value in terms of money or both. Volume is useful measure when the product is homogeneous. You do not have to collect historical sales for price level changes, if you use volume. However, if the product lacks homogeneity, you are forced to use monetary unit. In the context of market studies, it is useful to generate a physical volume estimate of sales as also to arrive at trends in such volume, over the years to come.

**iii) CUSTOMER GROUP :**

The demand may be measured for the whole market or for various customer groups or segments separately. For example, you may analyse furniture demand for house-hold and institutional (offices, shops, hotels, hospitals, etc.) segments separately. You may decide not to count upon demand from specific segments on account of product limitations or organisational constraints. Technology, manpower, skill, location, managerial capability, state of organisational development and financial resources vis-a-vis customer profile in individual segments

decide what segment you must cater to or stay away from. A producer of electronic instruments may choose not to sell to defence establishment in view of its stringent quality standards, till he can reach such standard of quality in his unit.

iv) GEOGRAPHICAL AREA :

Market demand should be measured with reference to a well-defined geographical area. New entrepreneurs often do not have organisational resources to sell on a nation-wide scale. There are products which have to be marketed only within a certain radius from the location of the unit, e.g. corrugated box, industrial gas, collapsible tubes or prefabricated structures.

v) TIME PERIOD :

The market demand must be forecasted for a specified time period. It is customary, for the purpose of a market study, to estimate demand for 5 or 8 or 10 years for commencement of production.

vi) MARKET ENVIRONMENT :

Market demand estimates for an enterprise is subject to a given socio-economic environment. Radical policy changes or cultural upheavals will upset the demand estimates.

Major headings

Information needed

1. Demand

Product, uses, the consumers, actual consumption likely consumption in future and export prospect.

2. Supply

Production capacity, actual production, capacity utilisation, imports and likely future capacity

3. Distribution

Channels of distribution involved, the cost of distribution and the mode of transport

4. Pricing

Domestic and international price trends, control on prices, duties and taxes.

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MANUFACTURERS

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Industrial goods

Consumer durables

Cigarettes, tooth paste etc.

Textiles

Distributors

Wholesellers

Wholesellers

Retailers

Retailers

Retailers

Users/Consumers

Consumers

Consumers

Consumers

## EXPORT MARKET STUDY :

The concept and techniques underlying export-market study are essentially not different from those outlined earlier for evaluating domestic market. Segmentation, EDS, market survey and demand-forecasting methods relevant for domestic market study are equally useful for export market assessment.

## EXPORT MARKET ENVIRONMENT :

The international market, however, is marked by a complex and uncertain environment. An enterprise must understand the environment concerning potential-importing countries. The major ingredients of export-specific environment are explained below :

### i) LEGAL FRAMEWORK

Based on the economic philosophy level of economic development, different countries have different laws. These laws pertain to restriction on imports blanket ban on import, imports against export-performance, country-wise quotas for import, tariffs on imports and so on. Then, there are laws pertaining to currency, tax-structure, shipping and product specifications, etc. These laws should be kept in view when examining a market opportunity.

### ii) INTER-NATION RELATIONSHIP

There exist agreements between nations which favour imports from specified nations. There are, on the other hand, countries which do not trade with each other. There are embargoes and sanctions.

### iii) CULTURE

There are cultural influences which permeate business transactions. Some cultures support matter of fact, quick to the point style while others promote a subtle, don't-no style. Haggling is customary in some countries and rare in others.

### iv) ADMINISTRATIVE/COMMERCIAL INFRASTRUCTURE :

Shipping, custom-handling, clearing and forwarding service, communications, legal institutions all these are real needs in

international business. It may be difficult to export to a country which shipping lines resent because ships have to wait long to get a berth on account of port congestion or where custom handling authorities are particularly uncooperative.

v) **POLITICO-MILITARY SITUATION :**

An enterprise normally avoids selling to a country which is plagued by political instability or military action. (There can be exceptions where fierce international competition prevails or domestic market is saturated). In fact, there can be regions which receive a scanty flow of international goods because it is characterized by strife. Alternatively, enterprise sell to such countries at a higher or through re-exporting countries.

vi) **Some obstacles to Export Market Study.**

The export market study entails difficulties which are elucidated below:-

The market survey, involving field-work, is too expensive and time consuming "networking" (identifying information sources and tapping these through personal contacts is difficult) Written communication does not bring forth adequate response (there is the language barrier as well) If a field-survey is undertaken, it is not easy to get co-operation from firms and authorities in foreign countries.

An enterprise is forced to rely on published reports. There are countries where even such exercise as population-census are not undertaken.

There is dearth of good market research agencies.

*Marketing is so basic that it cannot be considered a separate function. . . . It is the whole business seen from the point of view of its final result, that is, from the customer's point of view.*

PETER DRUCKER

As human history moves toward the year 2000, with its awe-inspiring problems and opportunities, the subject of marketing is attracting increasing attention from companies, institutions, and nations. Marketing has evolved from its early origins in distribution and selling into a comprehensive philosophy for relating any organization dynamically to its markets. Marketing is a cornerstone of policy and practice in such giant concerns as General Electric, Procter & Gamble, Sears, and IBM. Large and small business firms everywhere are beginning to appreciate the difference between selling and marketing and are organizing to do the latter. Nonprofit organizations such as museums, universities, churches, and government agencies are seeing marketing as a new way of looking at their relations with their publics. Developing nations are examining marketing principles to see how their domestic distribution system can be improved and how they can compete more effectively in world markets. Socialist nations are beginning to study how they could use marketing research, advertising, and pricing to increase their effectiveness in planning and distributing their goods.

The intensifying interest in marketing is paradoxical because while marketing is one of man's newest action disciplines, it is also one of the world's oldest professions. From the time of *simple barter* through the stage of a *money economy* to today's modern *complex marketing system*, exchanges have been taking

place. But marketing—the study of exchange processes and relationships—made its formal appearance only in the early part of the twentieth century out of questions and issues neglected by its mother science, economics.

In this short time, marketing has achieved the image of society's savior in the minds of many, and society's corrupter in the minds of others. Marketing's good deeds have been described in various ways:

Aggressive marketing policies and practices have been largely responsible for the high material standard of living in America. Today through mass low-cost marketing we enjoy products which were once considered luxuries and which are still so classified in many foreign countries.<sup>1</sup>

Advertising nourishes the consuming power of men. It creates wants for a better standard of living. It sets up before a man the goal of a better home, better clothing, better food for himself and his family. It spurs individual exertion and greater production. It brings together in fertile union those things which otherwise would not have met.<sup>2</sup>

Others take a dimmer view of marketing's contribution to society:

For the past 6,000 years the field of marketing has been thought of as made up of fast-buck artists, con-men, wheeler-dealers, and shoddy-goods distributors. Too many of us have been "taken" by the tout or con-man; and all of us at times have been prodded into buying all sorts of "things" we really did not need, and which we found later on we did not even want.<sup>3</sup>

What does a man need—really need? A few pounds of food each day, heat and shelter, six feet to lie down in—and some form of working activity that will yield a sense of accomplishment. That's all—in a material sense. And we know it. But we are brainwashed by our economic system until we end up in a tomb beneath a pyramid of time payments, mortgages, preposterous gadgetry, playthings that divert our attention from the sheer idiocy of the charade.<sup>4</sup>

It is clear that various social commentators have vastly different views on the meaning and social worth of marketing. This leads us to the major purpose of the first chapter. The purpose is to define the nature of marketing, the tasks of marketing management, and alternative *public means* of marketing management.

## MARKETING

Various definitions of marketing have appeared through time:

It has been described by one person or another as a business activity; as a group of related business activities; as a trade phenomenon; as a frame of mind; as a coordinative, integrative function in policy making; as a sense of business pur-

<sup>1</sup>William J. Stanton, *Fundamentals of Marketing* (New York: McGraw-Hill Book Company, 1964), pp. 4-5.

<sup>2</sup>Sir Winston Churchill.

<sup>3</sup>Richard N. Farver, "Would You Want Your Daughter to Marry a Marketing Man?" *Journal of Marketing*, January 1967, p. 1.

<sup>4</sup>Sterling Hayden, *Wanderer* (New York: Alfred A. Knopf, Inc., 1957).

pose; as an economic process; as a structure of institutions; as the process of exchanging or transferring ownership of products; as a process of concentration, equalization, and dispersion; as the creation of time, place, and possession utilities; as a process of demand and supply adjustment; and as many other things.<sup>5</sup>

All of these definitions provide useful but partial perspectives on the nature of marketing. We would like to propose a definition of marketing that is rooted in the logic of human nature and behavior. Our definition is:

*Marketing is human activity directed at satisfying needs and wants through exchange processes.*

## Human needs and wants

The starting point for the discipline of marketing lies in *human needs and wants*. Mankind needs food, air, water, clothing, and shelter to survive. Beyond this, people have a strong desire for recreation, education, and other services. They have strong preferences for particular versions of basic goods and services.

Whatever the case, there is no doubt that modern man's needs and wants are staggering. In one year, in the United States alone, Americans purchased 67 billion eggs, 250 million chickens, 5.5 million hair dryers, 133 billion domestic air travel passenger miles, and over 20 million lectures by college English professors. These consumer goods and services led to a derived demand for more fundamental inputs such as 150 million tons of steel and 3.7 billion tons of cotton. These are a few of the wants and needs that get expressed in a \$1.3 trillion economy.

## Products

The existence of human needs and wants gives rise to the concept of products. Our definition of product is:

*A product is something that is viewed as capable of satisfying a want.*

A want describes a state of felt deprivation in a person. This deprivation produces discomfort and a wish to act to relieve this discomfort. The want energizes the person--puts him into an active state--and gives him direction. The person will perceive certain things outside of himself that would satisfy his want. These things can be called products. They take on value to the individual because of their capacity to satisfy his wants.

It is important not to limit our concept of product to physical objects. The key thing about a product is the service that it renders. A physical good is simply a physical means of packaging a service. A tube of lipstick is not bought for its own sake but rather in the hope of producing beauty. A drill bit is not bought for its own sake but rather to produce a needed hole. A product is really nothing more than a tool for solving a problem.

Anything capable of rendering a service, that is, satisfying a need, can be called a product. This includes *persons, places, organizations, and ideas*. Consumers make a decision among different entertainers to watch on television, different places to go on a vacation, different organizations to contribute to, and different ideas to support. These are alternative products from the point of view of a consumer. If the term *product* seems unnatural at times, we may

<sup>5</sup>Marketing Staff of the Ohio State University, "A Statement of Marketing Philosophy," *Journal of Marketing*, January 1955, p. 43.

substitute the term *resource* or *offering*. All of these terms describe something of value to someone.

#### Exchange

The fact that man has needs and wants and there are products capable of satisfying them is necessary but not sufficient to define marketing. Marketing exists when man decides to satisfy his needs and wants in a certain way that we shall call exchange. Exchange is one of four alternative options available to man to obtain a product capable of satisfying a particular need he has.

His first option is *self-production*. A hungry man can relieve his hunger through his own efforts at hunting, fishing, or fruit gathering. He does not have to interact with anyone else. In this case there is no market and no marketing.

His second option is *coercion*. The hungry man can forcibly take food from another person or steal it. He offers no benefit to the other party except the chance not to be harmed.

His third option is *supplication*. The hungry man can approach someone and plead for food as a gesture of charity. He has nothing tangible to offer except his gratitude.

His fourth option is *exchange*. The hungry man can approach someone who has food and offer some resource in exchange for the food. He may offer money, some good, or some service of value to the owner.

Marketing centers on the last approach, that of exchange, to the acquisition of products to satisfy human wants and needs. Exchange requires the following conditions:

- 1 There are two parties.
- 2 Each party has something that may be of value to the other.
- 3 Each party is capable of communication and delivery.
- 4 Each party is free to accept or reject the offer.

If these conditions exist, there is a potential for exchange. Whether exchange actually takes place depends upon whether the two parties can find *terms of exchange* that leave them both better off (or at least not worse off) than before the exchange. This is the sense in which exchange is described as a value-creating process, that is, an act of free exchange normally increases the value felt by both parties.

#### Market

The concept of exchange leads naturally into the concept of a market. Our definition of market is:

*A market is an arena for potential exchanges.*

An example will illustrate this concept. Suppose an artist spends three weeks creating a beautiful sculpture. He has in mind a particular price. The question he faces is whether there is anyone who will exchange this amount of money for the sculpture. If there is at least one such person, we can say there is a market. The *size of the market* will vary with the price. The artist may ask for so high a price that there will be no market for his sculpture. As he brings the price down, normally the market size increases because more people can afford the sculpture. The size of the market depends upon the number of persons who have both (1) an interest in the object and (2) a willingness to offer the resources required to obtain it

Wherever there is a potential for trade, there is a market. The term "market" is often used in conjunction with some qualifying term that describes a *human need* or *product type* or *demographic group* or *geographical location*. An example of a *need market* is the relaxation market, which exists because people are willing to exchange money for lessons on yoga, transcendental meditation, and bio-feedback control. An example of a *product market* is the shoe market, so defined because people are willing to exchange money for objects called shoes. An example of a *demographic market* is the youth market, so defined because young people possess purchasing power that they are willing to exchange for such products as education, bikinis, motorcycles, and stereophonic equipment. An example of a *geographic market* is the French market, so defined because French citizens are a locus of potential transactions for a wide variety of goods and services.

The concept of a market also covers exchanges of resources not necessarily involving money. The political candidate offers promises of good government to a *voter market* in exchange for their votes. The lobbyist offers services to a *legislative market* in exchange for votes for his cause. A university cultivates the *mass-media market* when it wines and dines editors in exchange for more and better publicity. A museum cultivates the *donor market* when it offers special privileges to contributors in exchange for their financial support.

Marketing

The concept of markets finally brings us full circle to the concept of marketing. *Marketing* means working with *markets*, which in turn means attempting to actualize *potential exchanges* for the purpose of *satisfying human needs and wants*. Thus we return to our definition of *marketing* as *human activity directed at satisfying needs and wants through exchange processes*.

## MARKETING MANAGEMENT

Coping with exchange processes calls for a considerable amount of work and skill. *Individuals* become fairly adroit at buying to meet their household needs. Occasionally, they also undertake selling—selling their car, selling personal services. *Organizations* are more professional in handling exchange processes. They must attract resources from one set of markets, convert them into useful products, and trade them in another set of markets. *Whole nations* also plan and manage exchange relations with others. They search for mutually beneficial trade relations and exchanges with other nations. In this book we will primarily take the perspective of *organizational marketing* rather than that of personal or national marketing.

Our position is that *marketing management* takes place when at least one party to a potential exchange gives thought to his objectives and means of achieving desired responses from other parties. Our formal definition of marketing management is:

*Marketing management* is the analysis, planning, implementation, and control of programs designed to bring about desired exchanges with target markets for the purpose of achieving organizational objectives. It relies heavily on designing the organization's offering in terms of the target market's needs and desires and using effective pricing, communication, and distribution to inform, motivate, and service the market.

Although various managers in a company deal with markets of different types, marketing management is historically identified with the specialized job of dealing with the customer market for the final products of the firm. We shall adopt this same convention, although everything that we shall say about marketing principles applies with equal force to all market managers.

Formal marketing work is carried out in companies by sales managers, salesmen, advertising managers, marketing research managers, customer service managers, product managers, and the marketing vice-president. Each of these job positions goes along with well-defined missions and responsibilities. Many of these job positions center around the management of a particular marketing resource such as advertising, sales force, or marketing research. On the other hand, product managers, market managers, and the marketing vice-president manage programs. *Their job is to analyze, plan, and implement programs that will produce a desired level of transactions with specified target markets.*

Marketing-management  
tasks

The popular image of the marketing manager is that of someone whose task is primarily to stimulate demand for the company's products. However, this is too limited a view of the range of marketing tasks carried out by marketing managers. *Marketing management is the task of regulating the level, timing, and character of demand in a way that will help the organization achieve its objectives.* Simply put, marketing management is demand management.

The organization forms an idea of a *desired level of transactions* with a market. At any point in time, the *actual demand level* may be below, equal to, or above the *desired demand level*. This leads to the eight distinguishable demand states listed in Table 1-1. The marketing task and the formal name of each task is shown next to each demand state.

*Conversional marketing* Conversional marketing grows out of the state of negative demand. *Negative demand is a state in which all or most of the important segments of the potential market dislike the product or service and in fact might conceivably pay a price to avoid it.*

Negative demand, far from being a rare condition, applies to many products and services. Vegetarians feel negative demand for meats of all kinds. Numerous Americans feel negative demand for kidneys and sweetbreads. People

Table 1-1  
The basic marketing tasks

<i>Demand state</i>	<i>Marketing task</i>	<i>Formal name</i>
I. Negative demand	Disabuse demand	Conversional marketing
II. No demand	Create demand	Stimulational marketing
III. Latent demand	Develop demand	Developmental marketing
IV. Faltering demand	Revitalize demand	Remarketing
V. Irregular demand	Synchronize demand	Synchromarketing
VI. Full demand	Maintain demand	Maintenance marketing
VII. Overfull demand	Reduce demand	Demarketing
VIII. Unwholesome demand	Destroy demand	Countermarketing

## MARKETING-MANAGEMENT PHILOSOPHIES

We have described marketing management as the conscious effort to achieve desired exchange outcomes with target markets. Now the question arises, What is the philosophy that guides these marketing efforts? What is the relative weight given to serving the interests of the *organization*, the *customers*, and *society*? Very often these conflict. It is desirable that marketing activities be carried out under a clear concept of responsive and responsible marketing.

There are four alternative concepts under which business and other organizations can conduct their marketing activity.

### The product concept

The product concept is the oldest concept guiding producers.

✓ The *product concept* is a management orientation that assumes that consumers will respond favorably to good products that are reasonably priced and that little company marketing effort is required to achieve satisfactory sales and profits.

The implicit premises of the product concept are:

- ✓ 1 The company should concentrate its attention on the task of producing good products that are fairly priced.
- 2 Consumers are interested in buying products rather than solving particular problems.
- 3 Consumers know the available competing brands.
- 4 Consumers choose among competing brands on the basis of their quality in relation to their price.

The best-known example of the product concept is the manufacturer who built a better mousetrap.<sup>7</sup> He followed Emerson's advice: "If a man . . . makes a better mousetrap . . . the world will beat a path to his door." But to his surprise, he found few customers panting at his door. People do not automatically learn about new and improved products, believe that they are really superior, or show a willingness to pay a higher price. The inventor of a better mousetrap will get nowhere unless he takes positive steps to design, package, and price his new product attractively, place it into convenient distribution channels, bring it to the attention of persons concerned with rodent problems, and convince them that it has superior qualities.

Companies can be found in all fields that tend to operate on a product concept. Railroad management was so sure that it had a superior form of transportation that it underserved the customers and overlooked the emerging challenge of the airlines, buses, trucks, and automobiles. The story is told of an office-filer manufacturer who complained to his sales manager that his files should be selling better. "Our files are the best in the world. They can be dropped from a four-story building and not be damaged." "Yes," agreed his

<sup>7</sup>See "So We Made a Better Mousetrap," *The President's Forum*, Fall 1962, pp. 26-27.

sales manager, "but our customers aren't planning to push their files out of four-story buildings."

Nonprofit organizations also frequently exhibit a product orientation. Opera companies assume that the public will want the standard fare of Mozart, Verdi, and Puccini year after year. Colleges and universities assume that high school graduates will continue to want their product. Churches, police departments, the post office, and many other nonprofit organizations feel that they are offering the public the right product and that the public should be grateful. Obviously, this concentration on the purity and immutability of the product eventually gets these organizations into deep trouble, as many are finding out.

## The selling concept

The selling concept is a second hallowed way in which producers have sought to guide their exchange activity.

The *selling concept* is a management orientation that assumes that consumers will normally not buy enough of the company's products unless they are approached with a substantial selling and promotion effort.

The implicit premises of the selling concept are:

- 1 The main task of the company is to get sufficient sales for its products.
- 2 Consumers will not normally buy enough on their own.
- 3 The consumers can be induced to buy through various sales-stimulating devices.
- 4 The customers will probably buy again, and even if they don't, there are many other consumers out there.

Companies practicing the selling concept typically assume their goods are "sold, not bought." For example, insurance salesmen hold that people do not feel a strong need for insurance and do not beat a path to their door; therefore, it is necessary to aggressively search out potential customers and hard-sell them on the benefits of insurance. The same philosophy guides the thinking of encyclopedia and bible companies, land developers, and home repair contractors.

A prime practitioner of the selling concept is the American automobile industry. From the moment the customer walks into the showroom, the salesmen will put on an act for the customer, which includes "psyching him out," exaggerating, baiting, and occasionally lying.<sup>2</sup> The new model is described as an excellent car. If the customer likes the floor model, he may be told that there is another customer about to buy it and that he should therefore make up his mind as fast as possible. If the customer balks at the price (which is artificially high to begin with), the salesman says he will talk to the manager to get a special concession only for him. The customer waits ten minutes and the salesman returns with "the boss doesn't like it but I got him to agree." The aim is "work up the customer" so that he is ready to sign then and there. If he walks out of the showroom without buying, he may be lost forever.

Obviously, there are great risks in practicing the selling concept, especially in its hard-driving form where customer satisfaction is considered secondary to getting the sale. It would seem to be a practice that would spoil the market for

<sup>2</sup>See Irwin J. Rein, *Rudy's Red Wagon: Communication Strategies in Contemporary Society* (Glenview, Ill.: Scott, Foresman & Company, 1972).

this seller; he would eventually find no more customers who would trust him. For the selling concept to work for an extended period of time, the following circumstances would have to be present:

- 1 Many of the customers come in knowing that the dealers are hard sellers and feel they can handle the situation.
- 2 Customers who are dissatisfied soon forget their dissatisfaction.
- 3 Dissatisfied customers do not talk very much to other customers.
- 4 Dissatisfied customers probably will not complain to consumer organizations.
- 5 There are a great number of potential customers out there; the company does not have to depend upon repeat business.

Although we have used business organizations to illustrate the selling concept, it is frequently practiced by nonprofit organizations as well. A perfect example is the political party seeking votes for its candidate. Having chosen a candidate on whatever grounds, it is stuck with him and must vigorously sell him to the voters as a fantastic person for the job.<sup>9</sup> The candidate and his supporters stomp through voting precincts from early morning to late evening shaking hands, kissing babies, meeting power brokers, making breezy speeches. Countless dollars are spent on radio and television advertising, posters, leaflets, and so on. Any flaws in the man are shielded from the public because the aim is to get the sale, not worry about postpurchase satisfaction. After he is elected, the new official continues to take a sales-oriented view toward the citizens. There is little measurement of what the public wants and a lot of selling effort to get the public to accept policies that a few want.

#### The marketing concept

The marketing concept is a rather new idea in the history of exchange relations.<sup>10</sup>

The *marketing concept* is a management orientation that holds that the key task of the organization is to determine the needs, wants, and values of a target market and to adapt the organization to delivering the desired satisfactions more effectively and efficiently than its competitors.

The underlying premises of the marketing concept are:

- 1 The organization conceives of its mission in terms of satisfying a defined set of wants of a defined group of customers.
- 2 The organization recognizes that satisfying wants requires an active program of marketing research to learn of these wants.
- 3 The organization recognizes that all customer-impinging company activities must be placed under integrated marketing control.

<sup>9</sup>See Joseph McGinness, *The Selling of the President* (New York: Trident Press, 1969).

<sup>10</sup>See John B. McKitterick, "What Is the Marketing Management Concept?" *The Frontiers of Marketing Thought and Action* (Chicago: American Marketing Association, 1957), pp. 71-82; Fred J. Borch, "The Marketing Philosophy as a Way of Business Life," *The Marketing Concept: Its Meaning to Management*, Marketing Series, No. 99 (New York: American Management Association, 1957), pp. 3-5. Also see the statement by a former president of Pillsbury: Robert J. Keith, "The Marketing Revolution," *Journal of Marketing*, January 1969, pp. 35-39.

# Market and Demand Analysis

In most cases, the first step in project analysis is to estimate the potential size of the market for the product proposed to be manufactured (or service planned to be offered) and get an idea about the market share that is likely to be captured. Put differently, market and demand analysis is concerned with two broad issues: What is the likely aggregate demand for the product/service? What share of the market will the proposed project enjoy?

These are very important, yet difficult, questions in project analysis. Intelligent and meaningful answers to them call for an in-depth study and assessment of various factors like patterns of consumption growth, income and price elasticity of demand, composition of market, nature of competition, availability of substitutes, reach of distribution channels, so on and so forth. Yet, in many cases project feasibility studies seem to make a short shrift of market and demand analysis. It is not uncommon to find cursory statements like "the market is attractive" or "the demand is expected to exceed supply" as substitutes for a thorough market and demand analysis in project evaluation exercises.

Given the importance of market and demand analysis, it should be carried out in an orderly and systematic manner. The key steps involved in market and demand analysis are depicted in Exhibit 4.1. This chapter discusses these steps. It is organised into seven sections as follows:

- Situational analysis and specification of objectives
- Collection of secondary information
- Conduct of market survey
- Characterisation of the market
- Demand forecasting
- Uncertainties in demand forecasting
- Market planning

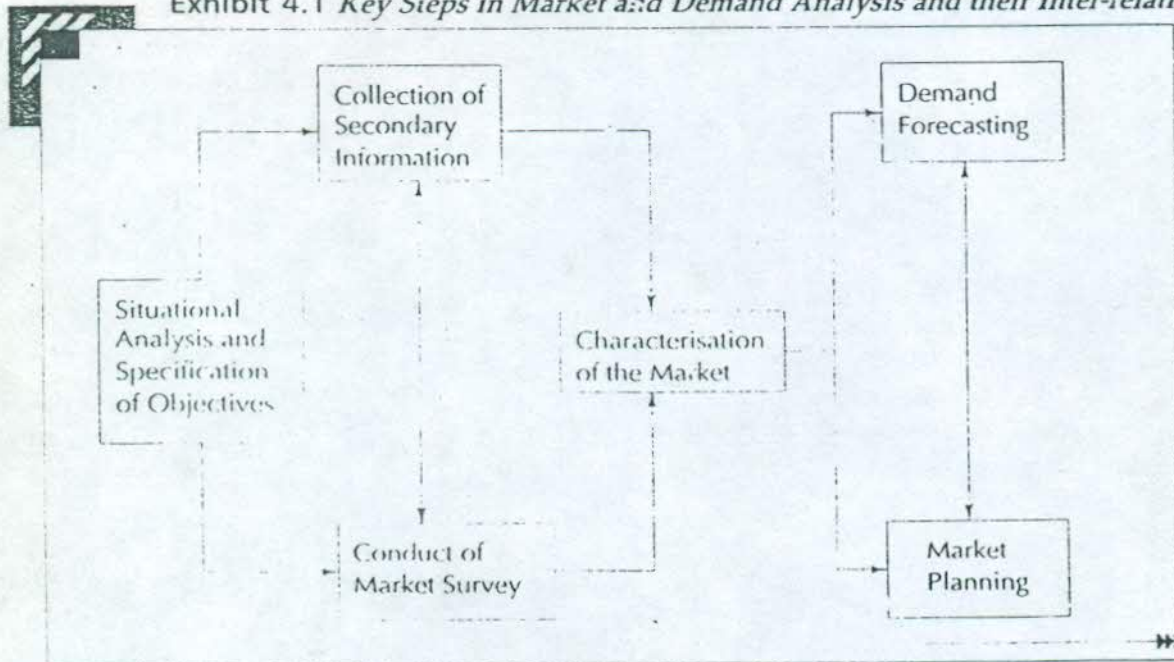
## 4.1 SITUATIONAL ANALYSIS AND SPECIFICATION OF OBJECTIVES

In order to get a "feel" of the relationship between the product and its market, the project analyst may informally talk to customers, competitors, middlemen, and others in the industry. Wherever possible, he may look at the experience of the company to learn about the preferences and purchasing power of customers, actions and strategies of competitors, and practices of the middlemen.

If such a situational analysis generates enough data to measure the market and get a reliable handle over projected demand and revenues, a formal study need not be carried out, particularly when cost and time considerations so suggest. In most cases, of course, a formal study of the market and demand is warranted. To carry out such a study, it is necessary to spell out its objectives clearly and comprehensively. Often this means that the intuitive and informal goals that guide situational analysis need to be expanded and articulated with greater clarity. A helpful approach to spell out objectives is to structure them in the form of questions. Of course, in doing so, always bear in mind how the information generated will be relevant in forecasting the overall market demand and in assessing the share of the market that the project will capture. This will ensure that questions not relevant to the market and demand analysis will not be asked unnecessarily.

To illustrate, suppose that a small but technologically competent firm has developed an improved air cooler based on a new principle that appears to offer several advantages over the conventional air cooler. The chief executive of the firm needs information about

Exhibit 4.1 Key Steps in Market and Demand Analysis and their Inter-relationships



where and how to market the new air cooler. The objectives of the market and demand analysis in this case may be to answer the following questions:

- Who are the buyers of air coolers?
- What is the total current demand for air coolers?
- How is the demand distributed temporally (pattern of sales over the year) and geographically?
- What is the break-up of demand for air coolers of different sizes?
- What price will the customers be willing to pay for the improved air cooler?
- How can potential customers be convinced about the superiority of the new cooler?
- What price and warranty will ensure its acceptance?
- What channels of distribution are most suited for the air cooler? What trade margins will induce distributors to carry it?
- What are the prospects of immediate sales?

## 4.2 COLLECTION OF SECONDARY INFORMATION

In order to answer the questions listed while delineating the objectives of the market study, information may be obtained from secondary and/or primary sources. Secondary information is information that has been gathered in some other context and is already available. Primary information, on the other hand, represents information that is collected for the first time to meet the specific purpose on hand. Secondary information provides the base and the starting point for the market and demand analysis. It indicates what is known and often provides leads and cues for gathering primary information required for further analysis. This section looks at secondary information and the following at primary information.

### General Sources of Secondary Information

The important sources of secondary information useful for market and demand analysis in India are mentioned below:

*Census of India* A decennial publication of the Government of India, it provides, *inter alia*, information on population, demographic characteristics, household size and composition, and maps.

*National Sample Survey Reports* issued from time to time by the Cabinet Secretariat, Government of India, these reports present information on various economic and social aspects like patterns of consumption, distribution of households by the size of consumer expenditure, distribution of industries, and characteristics of the economically active population. The information presented in these reports is obtained from a nationally representative sample by the interview method.

*Plan Reports* Issued by the Planning Commission usually at the beginning, middle and end of the five-year plans, these reports and documents provide a wealth of information on plan proposals, physical and financial targets, actual outlays, accomplishments, etc.

*Statistical Abstract of the Indian Union* An annual publication of the Central Statistical Organisation, it provides, *inter alia*, demographic information, estimates of national income, and agricultural and industrial statistics.

*India Year Book* An annual publication of the Ministry of Information and Broadcasting, it provides a wide range of information on economic and other aspects.

*Statistical Year Book* An annual publication of the United Nations, it provides world statistics relating to various aspects like population, demography, gross domestic product, industrial production, international trade, etc.

*Economic Survey* An annual publication of the Ministry of Finance, it provides the latest data on industrial production, wholesale prices, consumer prices, exports, agricultural production, national income, etc.

*Guidelines to Industries* This is an annual publication of the Ministry of Industrial Development.

*Annual Survey of Industries* An annual publication of the Central Statistical Organisation, it contains information on various aspects of industry: number of units and statewise distribution, average number of working days, employment, materials consumption, quantity of products, etc.

*Annual Reports of the Development Wing, Ministry of Commerce and Industry* An annual publication, it gives a detailed review of industries under the purview of the wing. It also provides information about new items manufactured for the first time in India and the list of protected industries.

*Annual Bulletin of Statistics of Exports and Imports* An annual publication of the Ministry of Commerce, it provides data on imports and exports for a very large number of items and as per international classification.

*Techno-Economic Surveys* The National Council of Applied Economic Research has conducted and published techno-economic surveys for various states.

*Industry Potential Surveys* The Industrial Development Bank of India in consortium with other financial institutions has conducted and published industrial potential surveys for several backward areas.

*The Stock Exchange Directory* This directory, published by the Bombay Stock Exchange, provides a ten-year picture of performance and financial statements for all listed compa-

nies and other important companies. It contains very valuable information for comparative analysis. It is periodically updated.

*Monthly Studies of Production of Selected Industries* A monthly publication of the Central Statistical Organisation, it provides all-India data on production, number of units installed, capacity, state-wise break-up, stock level, etc., for several selected industries.

*Monthly Bulletin of Reserve Bank of India* This provides information on production indices, prices, balance of payment position, exchange rates, etc.

*Publications of Advertising Agencies* The leading advertising agencies like Clarion, McCann and Thompson have published test markets, marketing rating indices of towns of India, consumer index of markets, and other studies which throw valuable light on Indian markets.

*Other Publications* Among other publications, a mention may be made of the following: (i) Weekly bulletin of Industrial Licences, Import Licences and Export Licences (published by the Government of India); (ii) Studies of the State Trading Corporation; (iii) Commodity reports and other studies of the Indian Institute of Foreign Trade; (iv) Studies and reports of export promotion councils and commodity boards; and (v) Annual Report on Currency and Finance (issued by the Reserve Bank of India).

#### **Industry Specific Sources of Secondary Information**

The important industry-specific sources of secondary information are given in Exhibit 4.2.

#### **Evaluation of Secondary Information**

While secondary information is available economically and readily (provided the market analyst is able to locate it), its reliability, accuracy, and relevance for the purpose under consideration must be carefully examined. The market analyst should seek to know:

- Who gathered the information? What was the objective?
- When was the information gathered? When was it published?
- How representative was the period for which the information was gathered?
- Have the terms in the study been carefully and unambiguously defined?
- What was the target population?
- How was the sample chosen?
- How representative was the sample?
- How satisfactory was the process of information gathering?
- What was the degree of sampling bias and non-response bias in the information gathered?
- What was the degree of misrepresentation by respondents?

Exhibit 4.2 *Some Important Industry-Specific Sources of Secondary Information*

<i>Industry</i>	<i>Title</i>	<i>Publisher</i>
Automobiles	<i>Annual Reports of Association of Indian Automobile Manufacturers Automobile Ancillary Industry (Yearly)</i>	Indian Automobile Manufacturers Association, Army and Navy Bldg., Mahatma Gandhi Road, Mumbai 23 All India Automobile and Ancillary Industries Association, 80, Dr Annie Besant Road, Mumbai 18 Fertiliser Association of India, JN University, New Delhi 57
Chemicals (including Fertilisers, Drugs and Pharmaceuticals)	<i>Fertiliser Statistics</i>	Fertiliser Association of India, JN University, New Delhi 57
	<i>Annual Reports of Organisation of Pharmaceutical Producers of India</i>	Organisation of Pharmaceutical Producers of India, Cook's Building, DN Road, Mumbai 1
	<i>Indian Drugs and Pharmaceutical Industries Chemical Age of India</i>	Chary Publications, 18B, Bharucha Marg, Mumbai 43 Technical Press Publications, 5 Convent Street, Mumbai 1
Electrical and Electronics	<i>Annual Electric Power Survey of India</i>	Central Electricity Authority, Government of India
	<i>Annual Report of Indian Electrical Manufacturers Association</i>	Indian Electrical Manufacturers Association, Hakad Chambers, Dr A. Besant Road, Mumbai 18
	<i>Electric India (Fortnightly)</i>	Indian Electrical Manufacturers Association, Hakad Chambers, Dr A. Besant Road, Mumbai 18
	<i>Electronic Digest</i>	All India Radio and Electronics Association, Sukh Sagar, NS Patkar Marg, Mumbai 7
Industrial Machinery	<i>Electronics Information and Planning (Monthly)</i>	All India Radio and Electronics Association, Sukh Sagar, NS Patkar Marg, Mumbai 7 Information, Planning and Analysis Group of Electronics Commission, New Delhi
	<i>Build Machine-Build India Textile Machinery Accessories and Scores Journal</i>	Directorate General of Technical Development, Chary Publications, 18B, Bharucha Marg, Mumbai 43
	<i>Annual Report of Indian Machine Tool Manufacturers Association</i>	Indian Machine Tool Manufacturers Association, 82 Jolly Maker Chambers, No. 2, 225 Nariman Point, Mumbai 21
Metallurgical	<i>Iron and Steel Control Bulletin (Quarterly)</i>	Ministry of Steel and Mines
	<i>Steel Furnace (Monthly)</i>	Steel Furnace Association of India, 3/D, Vandana, 11 Tolstoy Marg, New Delhi 1
	<i>Annual Reports of Steel Wire Manufacturers Association of India</i>	Steel Wire Manufacturers Association of India, 6 N. Subhas Road, Kolkata 1

Textiles

*Minerals and Metals Review*  
*Annual Reports of Steel Re-rolling Mills Association*  
*Indian Textile Bulletin*  
*Silk and Rayon Industries of India*

*Wool and Woollens of India*

*Man-made Fibres*

*Synthetic Fibres*

*Jute Chronicle*

*Monthly Summary of Jute and Gunny Statistics*

*Annual Reports of Indian Cotton Mills Federation*

Other Industries

*Cement*

*Glass Udyog*

*Hotel Guide-India*

*Indian Packaging Directory*

*Packaging India (Quarterly)*

*Rubber India*

*Statistics of Marine Products Exports*

*Yearbook of Fishery Statistics*

Asian Industry and Information Services (P) Ltd., Kolkata  
 Steel Re-rolling Mills Association, C-50, Anand Niketan, New Delhi 23

Textile Commissioner, Bombay  
 Silk and Art Silk Mills Research Association, Dr A. Besant Road, Mumbai 18

Indian Woollen Mills Federation, Churchgate Chambers, 4 New Marine Lines, Mumbai 20

Association of Man-made Fibre Industry, 78 Veer

Nariman Road, Mumbai 20

Association of Synthetic Fibre Industry, Raj Mahal, 84 Veer Nariman Road, Mumbai 20

Indian Jute Mills Association, Royal Exchange, 9 N Subhas Road, Kolkata 1

Indian Jute Mills Association, Royal Exchange, 9 N Subhas Road, Kolkata 1

Indian Cotton Mills Federation, 34, P.D. Mello Road, Wadi Bunder, Mumbai 9

Cement Manufacturers Association, Express Building, Opp. Churchgate Rly Station, Mumbai 20

All India Glass Manufacturers Federation 812, ND House, Barakhamba Road, New Delhi 1

Federation of Hotel and Restaurant Association of India, 503/56, Nehru Place, New Delhi 24

Indian Institute of Packaging, E-2, Marol Industrial Estate, Mumbai 93

Indian Institute of Packaging, E-2, Marol Industrial Estate, Mumbai 93

All India Rubber Industries Association, Navjivan Society

Building, Lamington Road, Mumbai 8

Marine Products Export Development Authority, M.Gandhi Road, Cochin 16

FAO, United Nations Organisation

- How accurately was the information edited, tabulated, and analysed?
- Was statistical analysis properly applied?

### 4.3 CONDUCT OF MARKET SURVEY

Secondary information, though useful, often does not provide a comprehensive basis for market and demand analysis. It needs to be supplemented with primary information gathered through a market survey, specific to the project being appraised.

The market survey may be a census survey or a sample survey. In a census survey, the entire population is covered. (The word 'population' is used here in a particular sense. It refers to the totality of all units under consideration in a specific study. Examples: All industries using milling machines, all readers of the *Economic Times*) *Census surveys* are employed principally for intermediate goods and investment goods when such goods are used by a small number of firms. In other cases a census survey is prohibitively costly and may also be infeasible. For example, it would be inordinately expensive—in fact almost impossible—to cover every user of Lifebuoy or every person in the income bracket Rs 10,000—15,000.

Due to the above mentioned limitations of the census survey, the market survey, in practice, is typically a *sample survey*. In such a survey a sample of population is contacted or observed and relevant information is gathered. On the basis of such information, inferences about the population may be drawn.

The information sought in a market survey may relate to one or more of the following:

- Total demand and rate of growth of demand
- Demand in different segments of the market
- Income and price elasticities of demand
- Motives for buying
- Purchasing plans and intentions
- Satisfaction with existing products
- Unsatisfied needs
- Attitudes toward various products
- Distributive trade practices and preferences
- Socio-economic characteristics of buyers

#### Steps in a Sample Survey

Typically, a sample survey consists of the following steps:

**Define the Target Population** In defining the target population the important terms should be carefully and unambiguously defined. The target population may be divided into

various segments which may have differing characteristics. For example, all television owners may be divided into three to four income brackets.

**Select the Sampling Scheme and Sample Size** There are several sampling schemes: simple random sampling, cluster sampling, sequential sampling, stratified sampling, systematic sampling, and non-probability sampling. Each scheme has its advantages and limitations. The sample size, other things being equal, has a bearing on the reliability of the estimates—the larger the sample size, the greater the reliability.

**Develop the Questionnaire** The questionnaire is the principal instrument for eliciting information from the sample of respondents. The effectiveness of the questionnaire as a device for eliciting the desired information depends on its length, the types of questions, and the wording of the questions. Developing the questionnaire requires a thorough understanding of the product/service and its usage, imagination, insights into human behaviour, appreciation of subtle linguistic nuances, and familiarity with the tools of descriptive and inferential statistics to be used later for analysis. It also requires knowledge of psychological scaling techniques if the same are employed for obtaining information relating to attitudes, motivations, and psychological traits. Industry and trade market surveys, in comparison to consumer surveys, generally involve more technical and specialised questions.

Since the quality of the questionnaire has an important bearing on the results of the market survey, the questionnaire should be tried out in a pilot survey and modified in the light of problems/difficulties noted.

**Recruit and Train the Field Investigators** Recruiting and training of field investigators must be planned well since it can be time consuming. Great care must be taken in recruiting the right kind of investigators and imparting the proper kind of training to them. Investigators involved in industry and trade market surveys need intimate knowledge of the product and technical background, particularly for products based on sophisticated technologies.

**Obtain Information as per the Questionnaire from the Sample of Respondents** Respondents may be interviewed personally, telephonically, or by mail for obtaining information. Personal interviews ensure a high rate of response. They are, however, expensive and likely to result in biased responses because of the presence of the interviewer. Mail surveys by snail mail or e-mail are economical and evoke fairly candid responses. The response rate, however, is often low. Telephonic interviews, common in western countries, have very limited applicability in India because telephone tariffs are high and telephone connections few.

**Scrutinise the Information Gathered** Information gathered should be thoroughly scrutinised to eliminate data which is internally inconsistent and which is of dubious validity. For example, a respondent with a high income and large family may say that he lives in a one room tenement. Such information, probably inaccurate, should be deleted. Sometimes data inconsistencies may be revealed only after some analysis.

**Analyse and Interpret the Information** Information gathered in the survey needs to be analysed and interpreted with care and imagination. After tabulating it as per a plan of analysis, suitable statistical investigation may be conducted, wherever possible and necessary. For purposes of statistical analysis, a variety of methods are available. These may be divided into two broad categories: parametric methods and non-parametric methods. Parametric methods assume that the variable or attribute under study conforms to some known distribution. Non-parametric methods do not presuppose any particular distribution.

Results of the data based on the sample survey will have to be extrapolated to the target population. For this purpose, appropriate inflationary factors, based on the ratio of the size of the target population to the size of the sample studies, will have to be used.

The statistical analysis of data should be directed by a person who has a good background in statistics as well as economics.

It may be emphasised that the results of the market survey can be vitiated by: (i) non-representativeness of the sample, (ii) imprecision and inadequacies in the questions, (iii) failure of the respondents to comprehend the questions, (iv) deliberate distortions in the answers given by the respondents, (v) inept handling of the interviews by the investigators, (vi) cheating on the part of the investigators, (vii) slipshod scrutiny of data, and (viii) incorrect and inappropriate analysis and interpretation of data.

### ■ Some Problems

A market researcher in India has to contend with the following problems:

**Heterogeneity of the Country** Since it is impossible to cover all the states in an all India survey, the country has to be divided into broad territories going beyond the state boundaries. However, the heterogeneity of the country makes the task difficult. Presently, the research agencies divide the country in a way they think is appropriate. This causes problems in comparing the findings of different research agencies.

**Multiplicity of Languages** Related to the above difficulty is the problem of multiplicity of languages confronted by a research agency interested in conducting an all India survey.

**Design of Questionnaire** Scaling techniques, commonly recommended in marketing research literature, involve a 5-point scale or a 7-point scale. Such refined scales are not easily amenable to translation in regional languages. More important, they are often not comprehensible to a vast majority of respondents who may lack the education and sophistication to understand them. Hence when refined scaling techniques are used, answers tend to be erratic and inconsistent. It is perhaps desirable to rely more on open-ended questions and less on pre-coded questions on definite scales.

## 4.4 CHARACTERISATION OF THE MARKET

Based on the information gathered from secondary sources and through the market survey, the market for the product/service may be described in terms of the following:

- Effective demand in the past and present
- Breakdown of demand
- Price
- Methods of distribution and sales promotion
- Consumers
- Supply and competition
- Government policy

### Effective Demand in the Past and Present

To gauge the effective demand in the past and present, the starting point typically is apparent consumption which is defined as:

$$\text{Production} + \text{Imports} - \text{Exports} - \text{Changes in stock level}$$

The figure of apparent consumption has to be adjusted for consumption of the product by the producers and the effect of abnormal factors. The consumption series, after such adjustments, may be obtained for several years.

In a competitive market, effective demand and apparent consumption are equal. However, in most of the developing countries, where competitive markets do not exist for a variety of products due to exchange restrictions and controls on production and distribution, the figure of apparent consumption may have to be adjusted for market imperfections. Admittedly, this is often a difficult task.

### Breakdown of Demand

To get a deeper insight into the nature of demand, the aggregate (total) market demand may be broken down into demand for different segments of the market. Market segments may be defined by (i) nature of product, (ii) consumer group, and (iii) geographical division.

*Nature of Product* One generic name often subsumes many different products: steel covers sections, rolled products, and various semi-finished products; commercial vehicles, cover trucks and buses of various capacities; so on and so forth.

*Consumer Groups* Consumers of a product may be divided into industrial consumers and domestic consumers. Industrial consumers may be sub-divided industry-wise. Domestic consumers may be further divided into different income groups.

*Geographical Division* A geographical breakdown of consumers is helpful, particularly for products which have a small value-to-weight relationship and for products which require regular, efficient after-sales service.

Why is segmental analysis required? Segmental information is helpful because the nature of demand tends to vary from one segment to another. The demand from consumers in high income brackets may not be sensitive to price variations whereas the demand from consumers in low income brackets may be very sensitive to price variations and different marketing strategies may be appropriate for different market segments.

**Price**

Price statistics must be gathered along with statistics pertaining to physical quantities. It may be helpful to distinguish the following types of prices: (i) manufacturer's price quoted as FOB (free on board) price or CIF (cost, insurance, and freight) price, (ii) landed price for imported goods, (iii) average wholesale price, and (iv) average retail price.

**Methods of Distribution and Sales Promotion**

The method of distribution may vary with the nature of the product. Capital goods, industrial raw materials or intermediates, and consumer products tend to have different distribution channels. Likewise, methods used for sales promotion (advertising, discounts, gift schemes, etc.) may vary from product to product.

The methods of distribution and sales promotion employed presently and their rationale must be specified. Such a study may explain certain patterns of consumption and highlight the difficulties that may be encountered in marketing the proposed products.

**Consumers**

Consumers may be characterised along two dimensions as follows:

<i>Demographic and sociological</i>	<i>Attitudinal</i>
Age	Preferences
Sex	Intentions
Income	Habits
Profession	Attitudes
Residence	Responses
Social background	

**Supply and Competition**

It is necessary to know the existing sources of supply and whether they are foreign or domestic. For domestic sources of supply, information along the following lines may be gathered: location, present production capacity, planned expansion, capacity utilisation level, bottlenecks in production, and cost structure.

Competition from substitutes and near-substitutes should be specified because almost any product may be replaced by some other product as a result of relative changes in price, quality, availability, promotional effort, and so on.



#### ▣ Government Policy

The role of the government in influencing the demand and market for a product may be significant. Governmental plans, policies, and legislations, which have a bearing on the market and demand of the product under examination should be spelt out. These are reflected in: production targets in national plans, import and export trade controls, import duties, export incentives, excise duties, sales tax, industrial licensing, preferential purchases, credit controls, financial regulations, and subsidies/penalties of various kinds.

#### ▣ 4.5 DEMAND FORECASTING

After gathering information about various aspects of the market and demand from primary and secondary sources, an attempt may be made to estimate future demand. A wide range of forecasting methods is available to the market analyst. These may be classified in three categories as shown in Exhibit 4.3. The methods listed in this exhibit are described in some detail below:

##### Exhibit 4.3 *Methods of Demand Forecasting*

- 
- I **Qualitative Methods** These methods rely essentially on the judgment of experts to translate qualitative information into quantitative estimates. The important qualitative methods are:
    - Jury of executive method
    - Delphi method
  - II **Time Series Projection Methods** These methods generate forecasts on the basis of an analysis of the historical time series. The important time series projection methods are:
    - Trend projection method
    - Exponential smoothing method
    - Moving average method
  - III **Causal Methods** More analytical than the preceding methods, causal methods seek to develop forecasts on the basis of cause-effect relationships specified in an explicit, quantitative manner. The important causal methods are:
    - Chain ratio method
    - Consumption level method
    - End use method
    - Leading indicator method
    - Econometric method
- 

#### ▣ Jury of Executive Opinion Method

This method, which is very popular in practice, involves soliciting the opinions of a group of managers on expected future sales and combining them into a sales estimate.

The *advantages* of this method are: (i) It is an expeditious method for developing a demand forecast. (ii) It permits a variety of factors like economic climate, competitive environment, consumer preferences, technological developments, and so on, to be included in the subjective estimates provided by the experts. (iii) It has immense appeal to managers who tend to prefer their judgment to mechanistic forecasting procedures.

The *disadvantages* of this method are: (i) The biases underlying subjective estimates cannot be unearthed easily. (ii) The reliability of this technique is questionable.

### ▣ Delphi Method

This method is used for eliciting the opinions of a group of experts with the help of a mail survey. The steps involved in this method are:

1. A group of experts is sent a questionnaire by mail and asked to express their views.
2. The responses received from the experts are summarised without disclosing the identity of the experts, and sent back to the experts, along with a questionnaire meant to probe further the reasons for the extreme views expressed in the first round.
3. The process may be continued for one or more rounds till a reasonable agreement emerges in the view of the experts.

Delphi method appeals to many organisations for the following reasons: (i) It is intelligible to users. (ii) It seems to be more accurate and less expensive than the traditional face-to-face group meetings.

While the Delphi method is appealing, there are certain questions marks: What is the value of the expert opinion? What is the contribution of additional rounds and feedback to accuracy?

### ▣ Trend Projection Method

The trend projection method involves (a) determining the trend of consumption by analysing past consumption statistics, and (b) projecting future consumption by extrapolating the trend.

When the trend projection method is used, the most commonly employed relationship is the linear relationship.

$$Y_t = a + bT \quad (4.1)$$

where  $Y_t$  = demand for year  $t$

$T$  = time variable

$a$  = intercept of the relationship

$b$  = slope of the relationship

To estimate the parameters  $a$  and  $b$  of the linear relationship, the least squares method is used. To illustrate the use of this method, the following demand data for a product will be used as shown in Exhibit 4.4.

Exhibit 4.4 Demand Data

Year	Demand	Year	Demand
1988	10 <sup>1</sup>	1995	20
1989	13	1996	22
1990	14	1997	23
1991	17	1998	22
1992	18	1999	24
1993	18	2000	24
1994	19	2001	25

For purposes of linear trend analysis, it is convenient to change the time axis as shown in Exhibit 4.5.

Exhibit 4.5 Change in Time Axis

Actual Year	Year for Analysis	Actual Year	Year for Analysis
1988	0	1995	7
1989	1	1996	8
1990	2	1997	9
1991	3	1998	10
1992	4	1999	11
1993	5	2000	12
1994	6	2001	13

According to the least squares method, the linear relationship is chosen in such a manner that the sum of the squared deviations of the observations from the line is minimised. The parameters,  $a$  and  $b$ , of the linear relationship are estimated with the help of the following equations:<sup>2</sup>

1. In thousand units.
2. The equations for  $a$  and  $b$  are derived as follows. The sum of the squared deviations is

$$\Sigma(Y - a - bT)^2 \tag{1}$$

To minimise this with respect to  $a$  and  $b$ , the partial derivatives of this sum with respect to  $a$  and  $b$  are set equal to zero. This gives:

$$\frac{\partial}{\partial a} \Sigma(Y - a - bT)^2 = -2 \Sigma(Y - a - bT) = 0 \tag{2}$$

$$\frac{\partial}{\partial b} \Sigma(Y - a - bT)^2 = -2 T \Sigma(Y - a - bT) = 0 \tag{3}$$

From the above equations we get the following:

$$\Sigma Y = \Sigma(a + bT) \tag{4}$$

$$\Sigma TY = \Sigma(aT + bT^2) \tag{5}$$

Solving these two equations, referred to as normal equations, we get the values of  $a$  and  $b$  given in Eqns (4.2) and (4.3).

$$b = \frac{\Sigma TY - n\bar{T}\bar{Y}}{\Sigma T^2 - n\bar{T}^2} \quad (4.2)$$

$$a = \bar{Y} - b\bar{T} \quad (4.3)$$

The calculation of  $a$  and  $b$ , for our example, is shown in Exhibit 4.6. The least squares line is shown in Exhibit 4.7.

The *advantages* of the least squares method are: (i) It uses all the observations. (ii) The straight line is derived by an objective, statistical procedure. (iii) A measure of goodness of fit is available.

The *limitations* of the least squares method are: (i) The method is somewhat more complicated than the methods discussed earlier. (ii) The results of such an analysis are valid only when certain conditions are satisfied.

**Exhibit 4.6** *Calculations in the Least Square Method*

$T$	$Y$	$TY$	$T^2$
0	10	0	0
1	13	13	1
2	14	28	4
3	17	51	9
4	18	72	16
5	18	90	25
6	19	114	36
7	20	140	49
8	22	176	64
9	23	207	81
10	22	220	100
11	24	264	121
12	24	288	144
13	25	325	169
$\Sigma T = 91$	$\Sigma Y = 269$	$\Sigma TY = 1998$	$\Sigma T^2 = 819$
		$\bar{T} = 6.5$	$\bar{Y} = 19.21$

$$b = \frac{\Sigma TY - n\bar{T}\bar{Y}}{\Sigma T^2 - n\bar{T}^2} = \frac{1998 - 1748.5}{819 - 591.5} = 1.097$$

$$a = \bar{Y} - b\bar{T} = 19.21 - 1.097 \times 6.5 = 12.08$$

where  $T$  = time

$Y$  = demand

$n$  = number of observations

$\bar{T}$  = mean of  $T$

$\bar{Y}$  = mean of  $Y$