

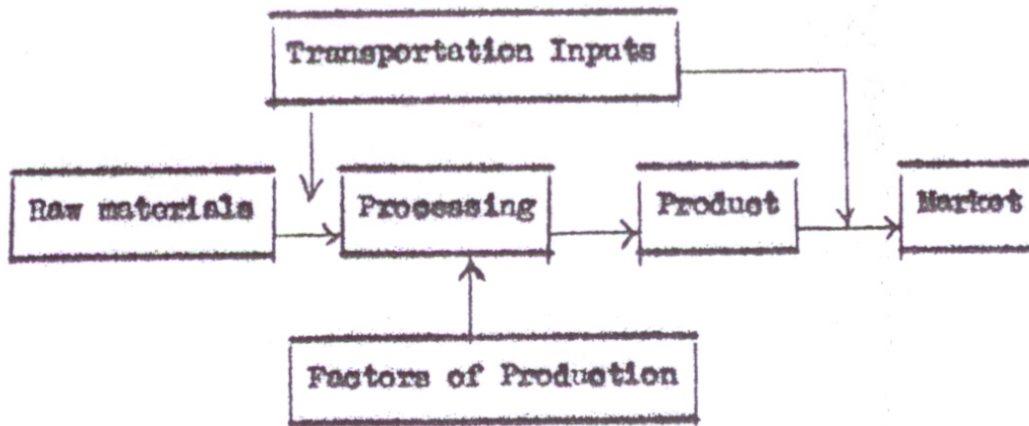
CHAPTER - 1

Introduction

1.1.1 Planning for Plant Location and Its Strategic Importance :-

Decisions of any organisation about the locations of its plants (or units) have a strategic importance for its success. Anthony says "Objectives, policies, organisation structure, product lines, plant location and capacity and so on, all are decided in the strategic planning process". Once implemented, these decisions are not generally reversible. Even in cases where these decisions are reversible, the relocation of a plant involves substantial costs. Thus because of this irreversible nature of the decisions and their strategic importance, the analysis for location of a plant demands an high degree of skill and effort.

1.1.2 The Factors in the Analysis : An organization's aim in location analysis is to minimise (or maximise) the sum of all costs (or benefits) affected by its location. The various costs that enter the location analysis broadly are costs of purchasing and assembling the raw materials, cost of processing (or transforming the raw materials into the product) and cost of distributing the product. The different stages of manufacturing corresponding to these costs are illustrated in Fig. 1-1, from Smith (1971).



(Other than raw materials)

Fig. 1-1

The cost of processing includes the costs of various factors of production (other than raw materials) namely, land, capital labour, utilities like power, water etc. These costs are influenced by the degree of infrastructure facilities, urbanisation economies, tax concessions etc. available at a particular location. A detailed discussion of these various costs may be found in Hoover (1948), Smith (1974), Yassen (1960) and Karaska and Brashall (1969). In addition to minimising the costs, by efficiently locating its plant, an organisation may increase the market for its product.

The problem of plant location is generally attacked at two levels : (i) choosing a region (or a geographic area) and (ii) choosing a specific site in that region. The two sub-problems are at different levels in a hierarchy of decision-making. The problem of choosing a region is generally solved at an higher level of hierarchy in the organisation. This is done by searching, in line with the organisational goals, for a region where broadly the sum of above mentioned costs is minimum. The choice of a specific site in that region generally involves a good deal of techno-economic considerations.

The considerations like availability, suitability, and cost of land, water etc. and availability of infrastructure facilities, transportation facilities etc. may become more important at this level. It is not possible to make a general statement regarding whether a particular factor is more important at the first level or at the second level. The influence of any factor at a particular level depends on the type of industry.

Our interest in this thesis is at the first level of the problem (i.e. choosing a specific region or regions).

1.1.3

Interaction with Other Strategic Choices :- Along with the problem of choice of location, an organisation planning for creation of new capacity for a product, faces the problems of choice of technology, choice of size and choice of timing for the new plant. These choices are also strategic in nature. If some or all of these choices are mutually dependent which is not uncommon, then the problem becomes more complex as the choice of location has to be considered simultaneously with the other choices interacting with it.

The choice of technology which involves the appropriate combination of raw materials and other factors of production may influence the choice of location. For example, when there is a choice between labour-intensive technology and capital-intensive technology, the selection of labour-intensive technology may force the location to a region where labour is cheap and vice-versa.

The choice of size means the choice of scale of operations, including how much is to be produced. The scale depends on the expected demand for the product which partly depends upon the price

at which the product is to be offered to the customer. The choice of size and choice of technology may be inter-linked because a technology which may not be economical at a lower scale of production may become economical at a higher scale of production. In addition to the linkage through the choice of technology, the choice of size and choice of location may also be interlinked directly. When markets for the product are geographically dispersed over a wide area it may be more economical to set up a number of small plants dispersed geographically, each plant producing for a specific geographic market than a single large plant producing for all the markets. Similarly, when there is variety in the characteristics of the product demand it may be more economical to set up a number of small plants, each producing a product of particular characteristic than a single plant producing all the products of different characteristics. In the former case, it is possible to achieve economies of long production run lengths and of "straight-line" operation.

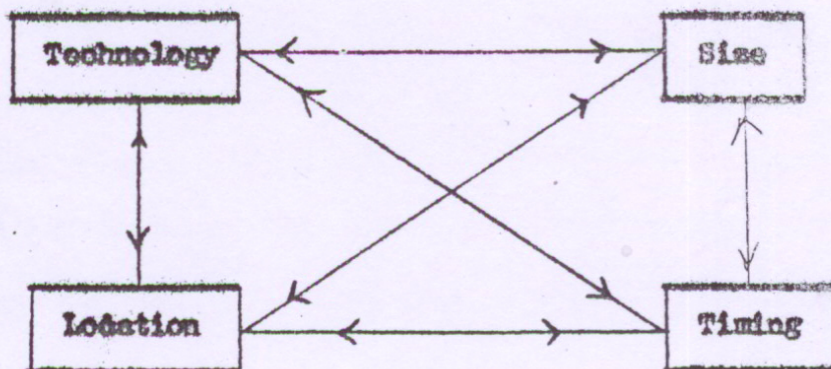
The choice of timing is when to establish the new capacity. The choice of timing is generally interlinked with the choice of size and location. For example, when the demand for the product is growing, some alternative choices available to an organisation are :

- i) Now, create capacity enough to meet the present demand and later, when the demand has grown up, create new capacity at the same location or at a different location,
- ii) Build a large plant with additional capacity to meet expected growth in demand, now itself,

iii) If the present demand is much smaller than the production capacity of 'minimum optimal size' plant, the organisation may obtain the product from outside agencies (sub-contracting) till the demand has sufficiently grown and then build a plant of 'optimal size'.

The second alternative may be more attractive than the first if the economies of scale are high enough. The problem of timing becomes more complicated when there is interaction between replacement and expansion investments.

The inter linkage among these various choices is shown in Fig. 1-2. In the next section we briefly review the various approaches available in the literature for the different choices mentioned above.



Inter-dependence between Technology, Location, Size and Timing of Plants.