CHAPTER –III

FACTORS OF LOCATION OF BRICK KILN INDUSTRY

SECTION-A

Theoretical Aspect of Factors of Location of Industries

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3.1. Theoretical Aspect of Factors of Location of Industries

3.1.1 Introduction:

Industrial location refers to the geographical locations where the enterprises are to be set up. The main purpose of an entrepreneur is to maximize the profits by minimizing the production cost. But this is a simple assumption as factors of industrial location are diverse and complex in nature and change with space and time. The location of any industry mainly depends on site and situation factors. Site factors include land, labour and capital whereas situation factors include inputs of industry. The main objects of a factory owner are to establish his enterprise near the inputs to reduce the cost of the production and making it cheaper for transportation. The factors of location of any industry may be divided into two broad categories such as-

- **Geographical factors:** Land, climate, water, power and raw materials.
- **Socio -Economic factors:** land, labour, capital, transportation, demand, market, government policies, revenue, entrepreneurship etc.

3.1.2 Theorytical Aspect of Industrial Location:

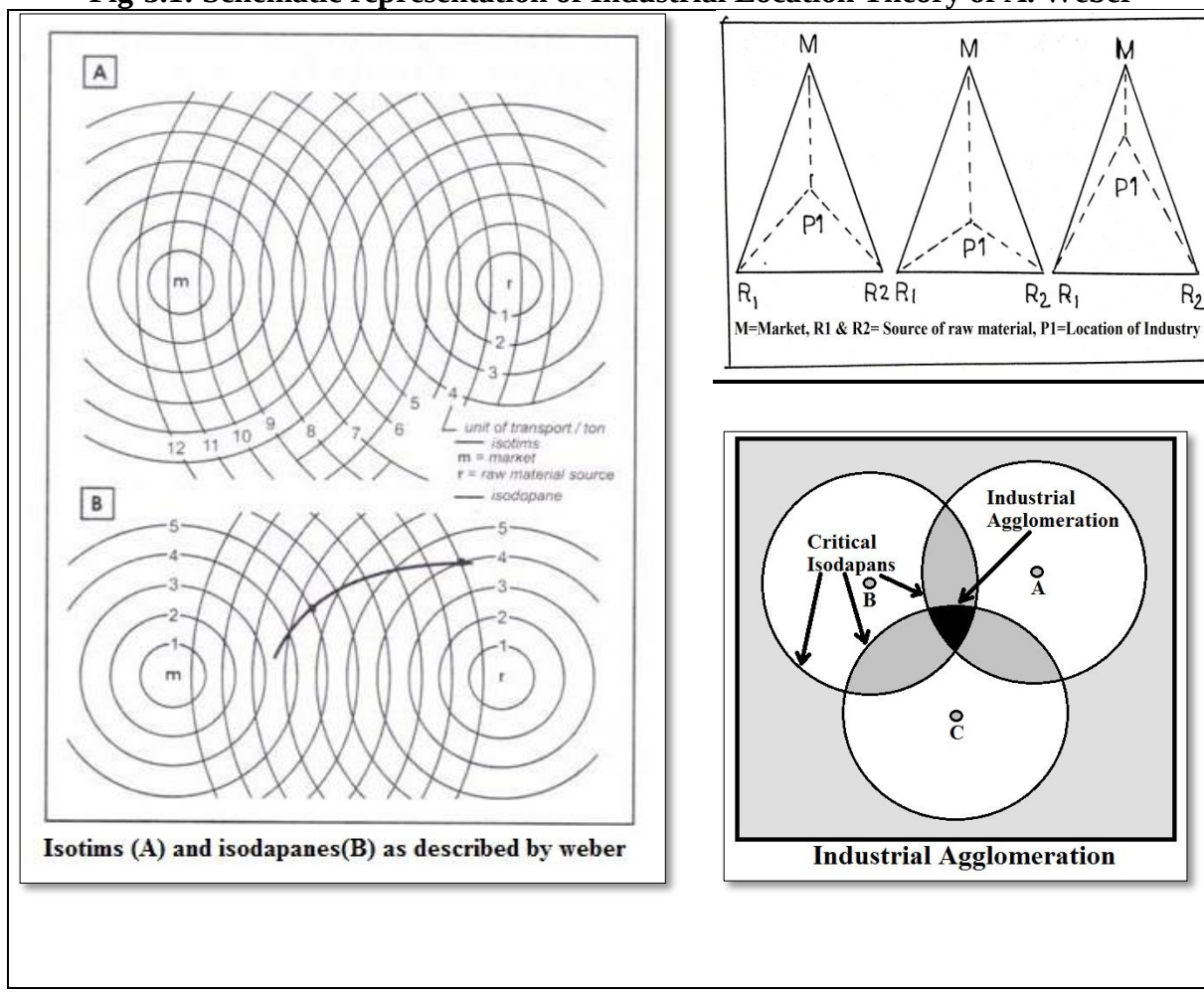
Various scholars and economists have been proposed several theories of industrial location. In this regard some of the theories of industrial location are discussed below:

3.1.2.1.Alfred Weber's Least Cost Theory (1909):

Alfred Weber in his book '*Uber den standort der Industrien'* 1909, translated into English in 1929) propounding the theory of the location of industries, emphasized on the industrial location where the transportation cost of raw materials and final production are minimum. In this theory Weber considered four issues:

a) Transportation cost b) labour cost c) Agglomeration and d) De-agglomeration cost of land. He illustrated his theory with diagrammatic way though his theory was criticized by many economists.

Fig-3.1: Schematic representation of Industrial Location Theory of A. Weber



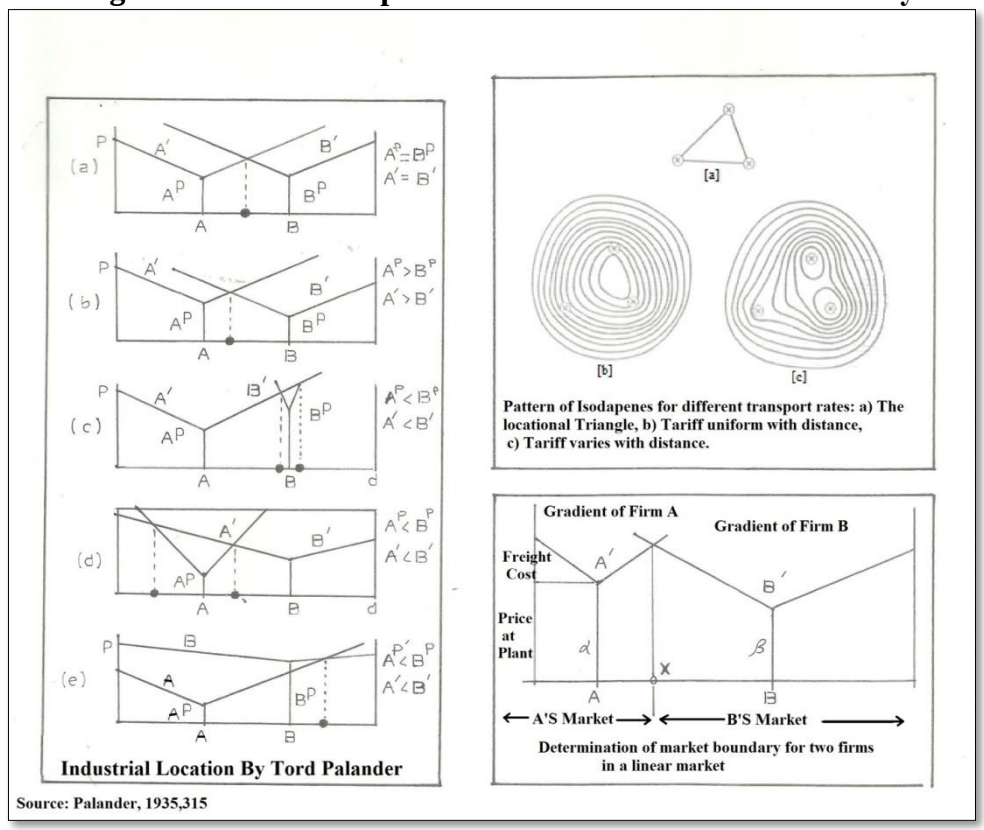
3.1.2.2. Edgar Hoover's Location Theory (1937&1948):

Edgar Hoover in his book 'The Location Theory and Shoe and Leather Industry (1937) and 'The Location of Economic Activity (1948)' discussed on cost factors and demand factors. He argues that if the production cost is constant than transport cost, it determines the price of commodity. He also mentions 'laws of diminishing returns of production. He, like Weber, assumes that the best location will be at the point of least transport cost. For him the best location of any industry would be market oriented and such places where transport cost is minimum. But it is a fact that the market price of any product is different in various locations due to the difference of production cost and transport cost. He did not make the labour cost or agglomerative factors of Weber. He emphasized more on cost factors rather than demand factors.

3.1.2.3. Tord Palander's Theory of Location:

Swedish economist Tord Palander in his book '**Beitragezur Standors theory**' (1935) explained the suitable location of industry. Palander emphasized on the boundary between two market areas and also described how two plants making the same product for a linear market are distributed horizontally in an isotropic plain. He explained his theory by the following diagram.

Fig-3.2: Schematic Representation of Tord Palander's theory



a) If two plants with similar production cost and transportation cost per unit distance, the market area boundary will lie at the middle position of A and B.
b) If the transportation cost changes at both plants but the production cost is lower at plant B location, the market area will be larger at plant B location.
c) If firm B shows higher production cost and transportation cost than A, the plant B will have small market area because it will witness hgher transportation cost from firm A to firm B.
d) If plant A shows lower production cost and higher rate of change of transportation than firm B, the plant B will exert control over the market area of firm A and, thus, the plant B will have larger market area than plant A

3.1.2.4. Sargent Florence's Theory of Location (1948):

Sargent Florence in his book 'Investment, Location and Size of Plant' (1948) tried to measure of industrial location by inductive approach. He emphasized that economic activities are mainly depended on population rather than geographic location. To him, distribution of population determines the distribution of industry. He explained his theory with the help of 'Location Quotient' and 'co-efficient of localization'. He explains the political boundaries of a region for industrial location and also tries to explain decentralization of industries rather than concentration of industries in a particular region. This is the main drawback of this theory.

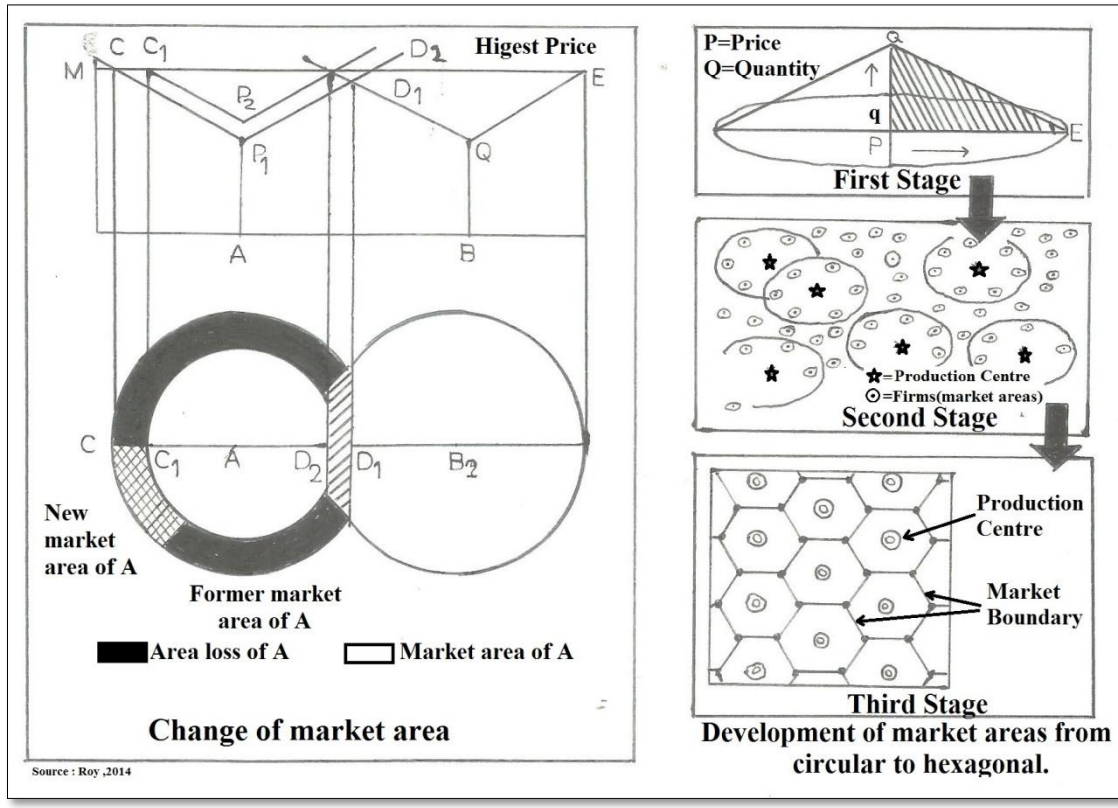
3.1.2.5. Profit Maximization Theory of August Losch (1954):

German Economist August Losch in his book ***'Die Raumlische ordnung der wirtchaft'*** (1939) which was translated in English in 1954 as 'Economics of Location' propounded the concept of 'market area' and 'profit maximization'.

Losch assumed the hexagon as the ideal market shape which are best suited to serve all the centres without any unnerved area or problem of overlapping as in case of circular market. He also propounded the concept of demand cone. The spatial variation in demand for the good is expressed as a conical surface with the highest demand at the point of production, 'P' and sloping evenly in all direction to the perimeter at 'F'.

Another proposition was made by August Losch that if the production cost of any one centre rises than other, the market area will decrease at the previous centres as profit of that centre will reduce. This is explained by Losch in the following diagrams.

Fig 3.3: Schematic Representation of Theory of August Losch



The Losch's theory of industrial location has been criticized as a simplified, rare occasion in reality and more applicable to agricultural form rather than complex industrial situation.

3.1.2.6. Walter Isard's Theory (1956):

In the book 'Location and Space Economy (1956), Walter Isard discussed the general theory of Economics through substitution in industrial location. He noted that successive influences of scale of Economics, localization economics and principle of substitution determine the location of industries. To him, if two materials (M1&M2) are required for production of any firm, the materials may be substituted by each other in terms of manufacturing cost. He determines the optimum location of industry on the application of the principle of alteration between the factors of production (substitution principle), (Labour and capital) or replaces the share of raw materials of M1 &M2. His theory is illustrated in the following diagram.

Fig-3.4: Schematic Representation of the Theory of Walther Isard

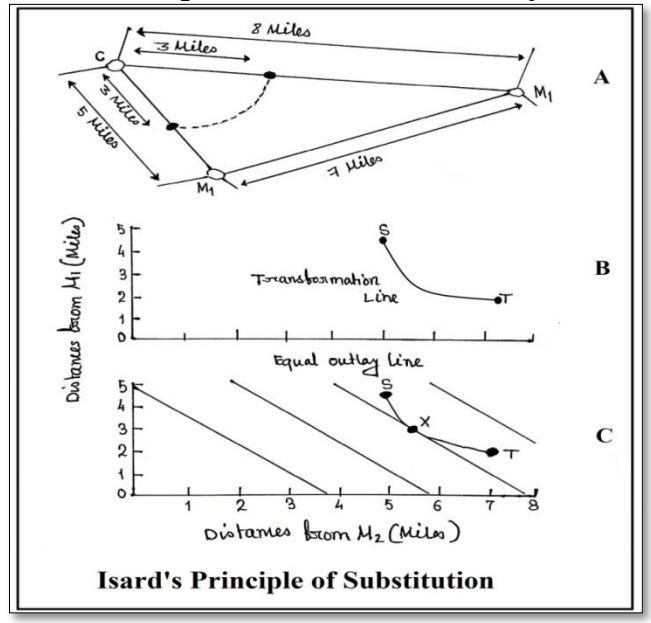


Fig-3.4. (A) shows the Weberian situation of one market C, and two material M1&M2. The TS represents a set of possible locations arbitrarily chosen at 3 miles from the market point C. In Fig-3.4(B) M1 is plotted along Y axis at 5 mile distance and M2 is plotted at 8 miles distance on X axis TS line plotted. It is called **Isoquant** (Equal level of output) or transformation line.

It is observed that at point 'T' the distance from market to M1 is 2 miles and M2 is about 5 miles. If one moves along the T-S line, the distance from market will change.

In fig 3.4. (C) some Isocost lines are drawn and these are regarded as transport cost lines. In this case the transport costs for one source are being substituted by the transport cost of second material source.

For determining the optimal location, the place selected will lie at the point X, which is the least cost point in the transformation line T-S as Isocost or inlay line is tangent at 'X' point

3.1.2.7. Smith's Theory of Industrial Location:

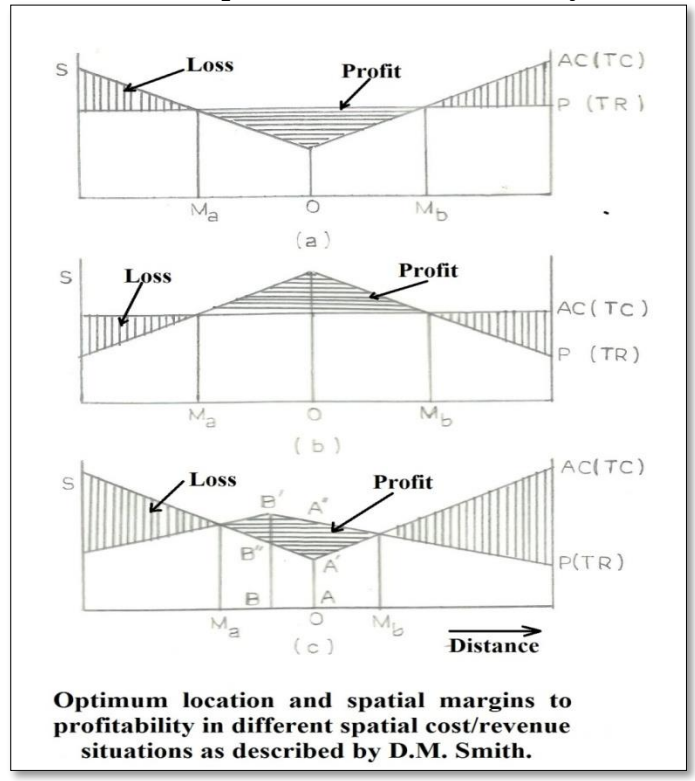
D.M Smith postulated his theory as 'Area-Cost Curve theory' in 1956 in which he combined Weberian 'Least Cost Theory' and Loschian 'Profit Maximization Theory'. He adopted perfect competition least cost approach and monopolistic competition market area approach.

He used the term **cost isopleths** (line joining the places of equal cost) and **cost contour** (line sum of all outlays that a company may experience anywhere in a region)

Because of lack of knowledge about cost and revenue in a particular region and the consumers do not act in economical rationality, the entrepreneur hardly find the exact least cost location (LCL) for the industry.

On both side of the least cost location (LCL) a two spatial margins have been identified. Maximum profit will be possible within this location. Smith considered three optimum conditions where a firm can profit.

Fig-3.5: Schematic Representation of the Theory of D. M Smith



Optimum location and spatial margins to profitability in different spatial cost/revenue situations as described by D.M. Smith.

i) When the total revenue is constant and total cost is variable, TR>TC= Profit maximum, Optimum location is 'O' profitable area is indicated by 'Ma' and 'Mb' where TC=TR. Beyond the margin where TC>TR, a plant witnessed as loss.

ii) When total cost is constant and revenue is variable, the situation is just reverse of the fig-1. Again 'O' is the location of maximum profitability and Ma and Mb is the boundary of zone of profitability.

iii) When total cost and total revenue are likely to vary from place to place.

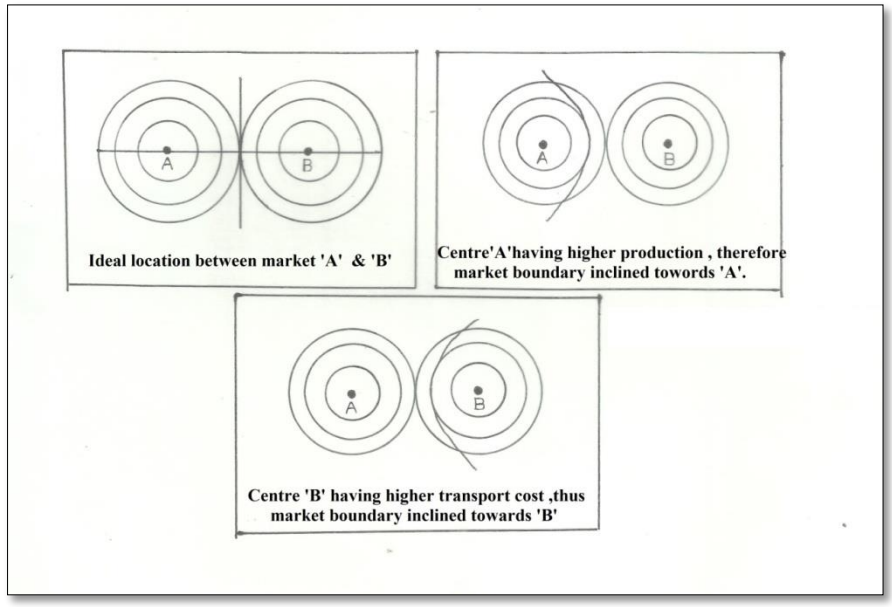
In this situation cost is rising away from 'A' and revenue is reduced.

Away from ‘B’ demand falls. Maximum profit is obtained at ‘A’ as the lower cost of production than ‘B’ where demand is highest so, an entrepreneur will choose ‘A’ for least cost location. Thus Smith concluded that the total cost and total revenue varies in different space and it determines the optimum location of industries where profit will be maximum. Beyond this margin the establishment of a firm is not possible due to the deficiency of profit. Within this margin the firm may locate anywhere.

3.1.2.8. Fetter’s Law of Industrial Location:

Frank. A. Fetter in his article (1924) **‘The Economic Law of Market Areas’** argued that all the production can be sold in the markets which have unlimited demand. According to him location of industries is determined by demand and consumption of the product. He illustrated his law in the following diagram.

Fig-3.6: Schematic Representation of Fetter’s Law of Industrial Location



i) If two centres have similar production cost and transportation cost, the industry is being located at the centre of the line.

ii) If production is higher than transportation cost, the market boundary will be inclined towards the centre of production.

iii) If transport cost is higher than the production cost, then the market boundary will be inclined towards the transportation centre.

3.1.2.9. Renner's theory of industrial location:

In his book 'World Economic Geography': "An Introduction to Geonomics" (1960), Renner developed some general principles of industrial location. According to him there are four types of industries 'extractive' (It consists of any operations that remove metals, mineral and aggregates from the nature), 'reproductive' (mining, quarrying, fishing, hunting, logging etc. which uses the forces of nature in cyclical way to yield the products), 'fabricative' (It is the manufacturing process in which raw materials are commercial and output is the finished or processed goods. e.g. Smelling, refining, assembling of parts etc,) and 'facilitative'.

Elements of industrial location: George Renner identified six elements for industrial location—

i) Raw material, ii) Market, iii) labour, (management skilled, unskilled) iv) Power, v) Capital and vi)) Transportation.

Renner emphasized on interrelations among the industries by I) Disjunctive and ii) conjunctive in nature. This is called symbiosis. Disjunctive symbiosis means without relationship among the industries e.g the location of Iron industry and Dairy industry in a particular region. Conjunctive symbiosis is a situation where industries exist together because of organic relationship among then. For example, blast furnace steel converter, rolling mill, the wire factory, the galvanizing factory lie together as they are mostly interrelated because one industries product's is used by another.

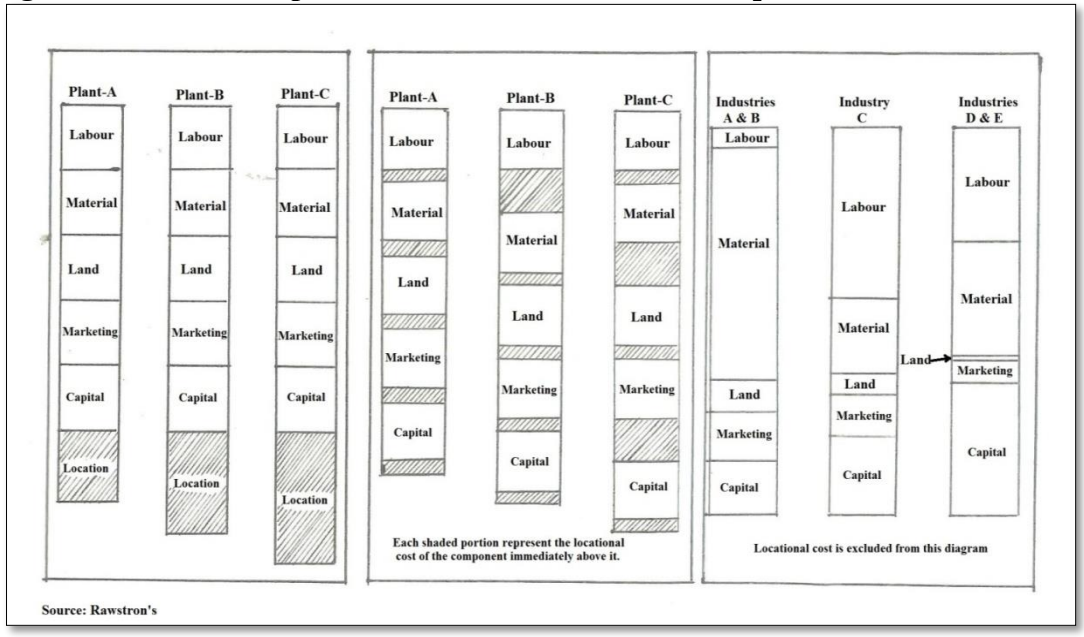
Above mentioned factors play a vital role in different types of industries. These are explained elaborately by George Renner in his paper.

3.1.2.10. Rawstron's Principle of Industrial Location:

Based on geographical factors, E. M. Rawstron introduced the theory of industrial location. He explains that the location of least cost or minimum profit will be the best location of industries. His basic axioms were-

- Mining is considered to be an industry.
- Transport system plays an important role.
- There are some restrictions for the developed of industries.

Fig-3.7: Schematic Representation of Rawstron's Principle of Industrial Location



He described the restrictions as:

3.1.2.10.1 Physical restriction:

Physical restriction is the initial restriction on choice of industrial location. The location of industries is mainly controlled by physical factors such as availability of occurrences of natural resources. According to Rawstron 'physical restriction is the initial limitation on choice of location.'

3.1.2.10.2 Economic restriction:

It is the most important restriction for location of industries. It involves cost structures of industries and spatial margin of profitability. The elements of cost structures include the cost of labour wages, raw material, marketing, land value, land types, power and transport cost.

3.1.2.10.3. Technical Restrictions:

It is the effect of level of technological advancement at the probable site of industrial location. Technical improvement is necessary for the location of industries as it reduces the cost of plant. According to Rawstron "for examples, such revolutionary changes as from charcoal to coke or coal in iron smelting and from coal to atomic power in electricity generation resulted in great attention being paid to choosing new location for reasons of cost."

3.1.2.11. Other Locational Models:

There are several other model and theories for the location of industries. These include Harold Hotelling theory (1929), Allen Pred's theory of behaviourial approach (1967), The Game theory, Linear Programming, Multiplier Model, Product cycle model etc.