WEBER’S THEORY OF LOCATION OF INDUSTRY

PLANNING THEORY AND TECHNIQUES

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ABSTRACT
Alfred Weber, a German economist and sociologist who used historical analysis to reintroduce a rather old school method in the economic field, published, “Theory of the Location of Industries” in 1909. His general theory formulated three necessary analyses in order to reach the minimal cost involving labour and transportation, the material index, and agglomeration economics. By analyzing these three factors of production, a firm will be able to minimize input costs via manufacturing by obtaining the optimal geographic location for factories, industries, and other such facilities.

INTRODUCTION
Alfred Weber identified the most significant factors which determine industrial location in 1929. It is important to remember the ideas which Von Thunen, Christaller and Losch focused upon in order to understand Weber's focus upon transportation influencing industrial location. INDUSTRIAL activity is considered a secondary economic activity, and is also discussed as manufacturing. Industrial activity can be broken down further to include the following activities:

- Processing
- The creation of intermediate parts
- Final assembly

When Alfred Weber writes about industrial location in the 1920's, he is examining large companies whose industrial activities ALL take place within our national borders. This is not true of industrial activity today. With multi-national corporations, the three activities listed above may occur outside the national border.

Weber's industrial location theory demonstrates the unique way that geographers look at the world. Weber asked the following question; "where is industry located? Why there?" much in the same manner that a physical geographer asks why a mountain is located where it is. Given this focus, Weber found through his examination of industrial activity that similar industries located in the area where he found it the least cost to produce. What this means is that you find industries that produce the same good, clustered in regions that enable them to reduce their costs of manufacturing (materials, labour, transport) and locate the largest market.

This strategy would earn them the greatest volume of sales. Least cost location then implies marketing the product at the least cost to the consumer. Much like retailers, such as Wal-Mart, Target, and Costco, attempt to obtain large market shares today. It is explained economically as one way to make a profit, creating the cheapest product for the consumer market would lead to greater volume of sales.
and hence, greater profits. Therefore, companies which did not take the time to locate the cheapest inputs or the largest markets, would go out of business since their product would cost more to produce and cost the consumer more at the market. Given consumer rationality and corporate wants for profits, Weber found that the most successful businesses had located in regions which allowed the least cost of production to be actualized. Like businesses often followed the lead of pioneering companies, leading to the clustering of similar activities. Weber called this clustering agglomeration.

ASSUMPTIONS

1. There is an uneven distribution of natural resources on the plain. Raw materials are concentrated in specific sites.
2. The size and location of markets are given at fixed points on the plain.
3. There are fixed locations of labour where wage rates are fixed and labour is immobile and unlimited (capitalists love that).
4. The area has a uniform culture, climate and political system.
5. Entrepreneurs minimise costs of production.
6. Perfect competition exists.
7. Costs of land, structures, equipment and capital do not vary regionally.
8. There is a uniform system of transport over a flat surface.

OPTIMUM LOCATION OF INDUSTRY BASED ON 3 FACTORS

1. **Transportation**: the site chosen must entail the lowest possible cost of A) moving raw materials to the factory, and B) finished products to the market. This, according to Weber, is the most important.
2. **Labour cost**: higher labour costs reduce profits, so a factory might do better farther from raw materials and markets if cheap labour is available (e.g. China – today)
3. **Agglomeration**: when a large number of enterprises cluster (agglomerate) in the same area (e.g. city), they can provide assistance to each other through shared talents, services, and facilities (e.g. manufacturing plants need office furniture).

Weber theorizes that once these three variables are analyzed, a firm can make a mathematical model over spatial geometry to form a perfect equilibrium to minimize transportation costs at their absolute value. This geometric space usually forms a triangle, where the three points represent the locations of the raw materials, factories and refineries, and the market. A point, \(P\), represents the least-cost location, which is usually centered between the three points of the triangle.
If M is the market or point of consumption and S1 and S2 are the most deposits of two necessary raw materials than the location of production is at point P where the cost of getting materials to the factory and the finished product to market is minimized. Each corner of the triangle exerts a pull on the point P, measured by the weight to be moved from or to that corner. In the above figure one unit of production needs x amount of material from S1 and y amount of the material from S2, with the final product of z to be moved to M. If a,b and c represent the distance between the known locations of M,S1 and S2, then the problem is to find that location P, which minimizes xa+yb+zc.

**SPECIAL WEIGHT CASES**

1. The weight of the final product is less than the weight of the raw material going into making the product. This is the weight losing case.
2. The final product is heavier than the raw material that require transport. Usually this is a case of some ubiquitous (everywhere available) raw material such as water being incorporated into the product. This is called the weight-gaining case.

**Figure 1** shows the situation in which the processing plant is located somewhere between the source and the market. The increase in transport cost to the left of the processing plant is the cost of
transporting the raw material from its source. The rise in the transportation cost to the right of the processing plant is the cost of transporting the final product. Note the line on the left of the processing plant has a steeper slope than the one on the right.

**Figure 2** shows the situation if the processing plant is moved closer to the source of raw material. Note that the transport cost of the final product delivered to the market is lower than in the previous location.

The transportation cost for the product delivered to the market will be lowest of all if the processing plant is located at the source of the raw material, as shown in **Figure 3**.

![Figure 2](image1)

![Figure 3](image2)

The weight gaining case is illustrated in **Figures 4, 5 and 6**. The optimal location of the processing plant in this case is at the market.

**ANALYZING SURAT CITY WITH WEBER’S THEORY**

**INDUSTRIAL PROFILE OF SURAT CITY**

- Industrial development in Surat district could be attributed to the presence of a large number of diamond processing, textiles and chemical & petrochemical industries.
- During 2006-07, Surat contributed a maximum of 11.5% of Gross Domestic Product (GDP) to the State, as compared to any other district of India.
- The processes 10 out of 12 varieties of diamonds in the world contributing to INR 45,000 crore (USD 10.71 billion), which is approximately 65% of total diamond exports from India.
- Surat – The synthetic capital of India hosts over 45,000 power looms and provides over 7 lakh jobs.
- It contributes 18% to the total man made fiber exports and 40% of man made fabric production in India.
- Surat has been very successful in attracting a sizeable amount of Foreign Direct Investment (FDI) in various sectors like energy, oil, and petroleum. A significant investment of INR
3,000 crore (USD 726 million) in Hazira LNG terminal project is one of the largest greenfield FDIs in India.

CONCLUSION

By comparing the triangle model given by Weber, the industrial city profile of Surat district follows the pattern. As we can see in the above fig, Weber model has two source S1 and S2 one production unit P and a market M.

Talking on a very large scale of Surat district the location of textile industry is similar to the triangle model proposed by Weber. The source for getting raw material is a Hazira industrial zone which is denoted by S. This is the only source of raw material which fulfills all the needs of textile industry. The production unit is situated in the GIDC zone denoted by P. The required labour is provided from the surrounding area and the market for sale denoted by M is the whole city.
Here we can see that, the secondary source in weber model is completely absent, in spite of that the cost of production is less due the transport of secondary source for raw material is not needed. Thus the secondary source itself becomes the production unit and the overall cost is saved.

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