

BA4204- OPERATIONS MANAGEMENT

FACILITY LOCATION - Factors Influencing the Location

Facility Location is the right location for the manufacturing facility; it will have sufficient access to the customers, workers, transportation, etc. For commercial success, and competitive advantage following are the critical factors:

Overall objective of an organization is to satisfy and delight customers with its product and services. Therefore, for an organization it becomes important to have strategy formulated around its manufacturing unit. A manufacturing unit is the place where all inputs such as raw material, equipment, skilled labors, etc. come together and manufacture products for customers. One of the most critical factors determining the success of the manufacturing unit is the location.

Facility location determination is a business critical strategic decision. There are several factors, which determine the location of facility among them competition, cost and corresponding associated effects. Facility location is a scientific process utilizing various techniques.

Location Selection Factors

For a company which operates in a global environment; cost, available infrastructure, labor skill, government policies and environment are very important factors. A right location provides adequate access to customers, skilled labors, transportation, etc. A right location ensures success of the organization in current global competitive environment.

Industrialization

A geographic area becomes a focal point for various facility locations based on many factors, parameters and issues. These factors are can be divided into primary factors and secondary factors. A primary factor which leads to industrialization of a particular area for particular manufacturing of products is material, labor and presence of similar manufacturing facilities. Secondary factors are available of credit finance, communication infrastructure and insurance.

Errors in Location Selection

Facility location is critical for business continuity and success of the organization. So it is important to avoid mistakes while making selection for a location. Errors in selection can be divided into two broad categories behavioral and non-behavioral. Behavioral errors are decision made by executives of the company where personal factors are considered before success of location, for example, movement of personal establishment from hometown to new location facility. Non-behavioral errors include lack of proper investigative practice and analysis, ignoring critical factors and characteristics of the industry.

Location Strategy

The goal of an organization is customer delight for that it needs access to the customers at minimum possible cost. This is achieved by developing location strategy. Location strategy helps the company in determining product offering, market, demand forecast in different markets, best location to access customers and best manufacturing and service location.

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Factors Influencing Facility Location

If the organization can configure the right location for the manufacturing facility, it will have sufficient access to the customers, workers, transportation, etc. For commercial success, and competitive advantage following are the critical factors:

Customer Proximity: Facility locations are selected closer to the customer as to reduce transportation cost and decrease time in reaching the customer.

Business Area: Presence of other similar manufacturing units around makes business area conducive for facility establishment.

Availability of Skill Labor: Education, experience and skill of available labor are another important, which determines facility location.

Free Trade Zone/Agreement: Free-trade zones promote the establishment of manufacturing facility by providing incentives in custom duties and levies. On another hand free trade, agreement is among countries providing an incentive to establish business, in particular, country.

Suppliers: Continuous and quality supply of the raw materials is another critical factor in determining the location of manufacturing facility.

Environmental Policy: In current globalized world pollution, control is very important; therefore, understanding of environmental policy for the facility location is another critical factor.

Types of Facility Layouts Process Layout Product Layout Fixed Position Layout Cellular Manufacturing Layout Combination or Hybrid Layout

Types of Layouts in Industries -

Generally, there are five types of layouts that are widely in usage by industries. They are -

1. Plant Layout
2. Process Layout
3. Product Layout
4. Combination Layout
5. Fixed Position Layout

1.Plant Layout -

- It refers to arrangement of the various facilities and services of the plant within the area of the site selected previously.
- Plant layout design starts along with factory building

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- All the facilities like equipment's, raw materials, machinery, tools, fixtures, workers, etc. are placed at appropriate place.
- In deciding the place for equipment, the supervisors and workers are consulted and their due consideration is taken into account before they put into plant location
- However, consultation may not be mandatory but consideration will help organization to have co-operation with employees while in production as it will create a multiplier effect on production
- Placing the equipment where it is not convenient for employees while being in production will impact **the production levels.**

2. Process Layout:

- It is also referred as functional layout
- Process Layout focuses on keeping similar machines or similar operations at one place in layout
- Here, all similar functional Equipment's are placed at one location and are grouped into one department
- Process Layouts are more suitable for industries, as its production of goods is done based on series of activities or process a site

Suitability of Process Layout -

This type of Layout is most preferable when -

- Several types of products need to be produced.
- If volume of production of individual products is low
- When production of products needs continuous handling by mechanical methods
- If need of any intermittent production

Advantages of Process Layout -

- Flexibility in production
- As equipment's are grouped together supervisory is easy
- Reduction of Costs, as they are grouped together
- Production capabilities are increased
- Minimize movements of employees from one equipment to another equipment

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- Helps an organization to evaluate easily an employee at production levels, as employee works a more or less at constant location site and helps to determine his incentives for his/her production capabilities.

Disadvantages of Process Layout -

- More floor space is required to keep all equipment together
- Sometimes, it becomes difficult to control activities of production
- Generally, these are said to be utilized as WIP units, meaning Work in progress, where an production material comes as input here, it processes those and then sends that material to another equipment as input. In such cases, there are chances of Congestion at production site.
- Automatic material Handling becomes difficult
- Process Layout takes more time to finish or complete the product production at its stage
- It needs regular inspection or constant supervisory
- Effective cooperation and coordination is required at production site among employees.

3.Product Layout -

- Product Layout refers to sequential arrangement of machines and components parts in one line based on sequence rules of production
- In simple terms, we can say that it is layout where a raw material moves in straight line from one equipment to another equipment in order to complete it as finished good
- Look at below picture to understand product Layout

Raw material → Machine 'A' → Machine 'B' → Finished Product

- Product layout is also called as “Line Type Layout” or “Straight Line layout”

Suitability of Product Layout

This layout is most preferable in below cases:

- If production is of continuous nature in mechanical methods
- If product layout needs a standardize for one or few products
- Applied in large volume of production
- Inspection on series of operations is less

Advantages of Product Layout -

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- As this type of layout prefers mechanical feeding into devices, it brings down cost of production
- Takes less time for production
- Considered as highly economical among layouts
- Better Production controls
- Small floor space for single machine
- Reduction in WIP (work in progress) areas
- Does not require a Skillful human resources at site operations
- Better coordination
- Production process is simple in nature
- Workers movement completely low

Disadvantages of Product layout -

- Lack of Flexibility in production operations
- Supervisory on operations are bit low
- Less Scope for expansion of this layout
- As the production is done in sequence manner, any break down of one equipment in the process, the production will be down or stopped until it is repaired or replaced
- Investment in this type is expensive, as production units need to keep a spare or extra equipment at handy to replace any equipment in case of failure while in production process

4. Combined Layout

- This type of layout is a combination of Product layout and Process layout
- Also called as “Group Technology Layout”, or “Hybrid Layout”
- Most of organizations use this type of layout in their production units
- For example, files, hacksaws, circular metal saws, wood saws etc.

Suitability:

- When production of products is in various shapes and sizes
- The equipment in layouts are arranged as per requirements of design of product and its final

outcome

- Used when several items of products are produced but not in bulk

Advantages and Disadvantages:

- This type of layout inherits the advantages and disadvantages from Product and process Layouts
- However, its usage in organizations purely based on its products produced for market and its business

5. Fixed Position Layout

- This type of layout is about transfer of productional resources like- human resources, or machines towards the production site which is already fixed and stable
- This layout is also called as Static Layout or fixed Location Layout
- Example - In hospital, the robotics (equipment) are fixed in operation theatre and they are flexible to move as per doctor's directions while performing a surgery

Suitability:

- Widely applicable to use if industry is of heavy type like in manufacturing of Locomotives, ships, aircrafts etc
- If manufacturing of few pieces of items
- Used where transfer of bulk volume of material is required

Advantages of Fixed Position Layout -

- Low investment for layout
- Helps to produce differentiated products (ex- Aircrafts produced in various models)
- Very Flexible in nature, the workers get easily associated with it
- Production centers work can be designed in independent manner

Disadvantages of Fixed Position layout -

- Transfer of machines from one place of another place, if required is a loss of time and costly
- These type of Layout need very expensive equipment's for its operations
- High Skilled Professional are needed to operate the machines in layout

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- Optimum utilization can be obtained in this layout, as the equipment's are fixed in nature and its movements will be some constraints.

