

Exploring the Influence of Facility Location on the Operations of Service Organizations

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Abstract: Facility location selection decision is considered to be the most crucial decision for any organization. This decision not only defines the operating cost, production cost and the efficiency of the firm but also the benefits to the customers and the society in the long run. Numerous studies have been conducted to study the impact of location decision on the efficiency of the manufacturing firms. But the researches seem limited for the service organizations. The aim of this paper is to study the influence of facility location and facility layout on the operations of service organizations. Since the facility location both play a vital role in the smooth functioning of operations activities in service organization equally, this research work aims at studying its influence on the operations of the service organizations.

Keywords: Facility Location, Facility Layout, Operations Activities, Service Sector

I. Introduction

Facility Location is the place where all the resources required for manufacturing the product or generating services are brought together. Deciding on the location for the establishment of the facility is a strategic decision. Since the decision once made cannot be changed, as it involves a huge initial cost of investment. It is a decision of determining the best location for maximum operating economy and effectiveness. This decision may not be very crucial for small scale industries but for the large scale industries the decision of establishing a plant at a location is one time and long run. When all the factors, that are relevant and important with respect to the type of production, are considered meticulously, the operational efficiency of the whole system increases thereby improving productivity. Various cases have been observed by the manufacturing industry where a wrong or unplanned facility location has resulted in business failure. Unscientific and unplanned location decision not only impacts the organization but is also harmful to society. Hence the factors that affect the need for selection of a facility location need to be investigated properly. This need arises when a business is to be newly established or the existing business unit has outgrown its original facilities and expansion is not possible further.

The factors that are considered for the location selection are

- Availability of Raw Materials
- Proximity to Market
- Transportation Facilities
- Availability of Power, Fuel, Gas
- Water Supply
- Climatic and atmospheric conditions
- Availability of Labour
- Competition
- Political conditions, Local Laws, Regulations, and Taxation

These above-mentioned factors are controllable and non-controllable factors based on the extent to which the enterprise can reinforce these factors in decision making.

With respect to the specific factors for the service organizations, proximity to the market and the competition play an important role. Service firms like retail organizations must focus on retail service, residential density, location visibility and the traffic in the given region.

II. Literature Review

Abundant of researches have been done in studying the performance of the firms based on the facility location selection decision. Some of these research works are mentioned as under.

The research paper (Minai & Luck, 2011) argues the significance of location factor in entrepreneurship and small business development. Most studies focus on general features and categories that disregard facets of the location. However, unpredictable results on the relationship between entrepreneurial factors and firm performance have prompted the authors to propose a causal model in which the effects of individual determinants, external factors and strong performance on the firm's performance are driven by location. The study positions that the location factor should be given instantaneous contemplation as an important factor which will positively affect the performance of a small business. It is necessary to examine the role of location as a moderator that affect the association between individual element, external factor and firm features with performance.

The paper (Jandová, Puciato, & Gawlik, 2017) focuses on the relationship between a hotel location and its size in independent hotels operated in Poland. The purpose of the article was to point out the most important factors determining the location of newly built hotels in Poland based on their size. Factors determining the location of small hotels are different from those affecting the location of the group of medium and large hotel enterprises. According to our research, the most important factors affecting the location of small hotels are Communication availability, planning and administrative incentives, and tourist properties. Various researches have also been conducted in the past to study the importance of facility location for sustainability.

AUTHOR	Research objectives and findings	Research gap
(Chena, Olhagerb, & Tang, 2014)	The research for studying the manufacturing facility location and sustainability identified the environmental, social and economic perspectives and factors affecting location decisions	The authors have encouraged more case research to provide a better understanding of the enablers and barriers for sustainable global location experienced by industrial firms
(Terouhid, Ries, & Fard, 2012)	The study shows that the location literature has steadily progressed toward considering not only economic but also social and environmental criteria in location decisions	The author suggests that many steps remain to be taken toward developing location models that integrate all three aspects of sustainable development into decision making
(SNYDER, 2006)	The authors have explored the alternative measures for deciding facility location in uncertainty for minimizing expected cost (for stochastic problems) and minimizing maximum regret (for robust problems)	The author expects his survey paper helps to facilitate future research in the area of facility location under uncertainty

Table 1: Literature review presenting the research gap

III. Research Methodology

A. Statement of the Problem

The most important factor of any service organizations for the strategic location of the business includes the availability of raw material, accessibility to business premises, good road network, etc. An imperative for an effective location decision is that managers must assess each potential location in terms of its impact on key operational performance measures. For instance, with a new location, managers must evaluate the competence of the local workforce and its impact on the quality of its products and services. An optimal facility layout helps save time and costs associated with material handling, as it reduces the travel distance and time by effective and efficient sequencing of workstations. Systematically designed facility layout minimizes the material handling, time, cost and allows flexibility of operation, makes economical use of available areas, effective use of manpower, safety, etc. There has been extensive research on facility location in the service sector, but there is no study of the impact of facility location on the operation of the service sector. Hence this study focuses on the influence of facility location on the operation of various sectors in service organizations.

B. Objectives of the study

1. To study the importance of facility location decision in service organizations.
2. To study the influence of facility location on the operations of service organizations.

C. Hypothesis of the study:

H_0 : There is no significant difference between the factors considered and factors perceived important for the existing facility location by the service firms.

H_a: There is a significant difference between the factors considered and factors perceived important for the existing facility location.

D. Population and Sampling:

The sample for this study has been considered for 60 private service firms including the various service sectors such as transport, wholesale/distribution, retail, banking, hospitality, health care, information technology, education, and the professional services. But because of some limitations, the sample for the study has drawn from 24 service firms, encompassing the service sectors such as transport (courier), retail, banking, and hotel. The respondents were mainly personnel at the managerial position or those with primary functional responsibilities related to the daily operations of the firms.

The sampling technique used for the study are stratified and convenience sampling.

Stratified sampling is a probability sampling technique wherein the researcher divides the entire population into different subgroups or strata, then randomly selects the final subjects proportionally from the different strata. Using this sampling finally selected four service sectors (Hotel, Courier, Retail, and Bank) among various service organizations.

Convenience sampling method involves getting participants wherever you can find them and typically wherever is convenient.

E. Data collection

Primary data collection: For the primary data collection, a structured questionnaire was prepared comprising of 42 statements relevant to the study. A five-point Likert scale was employed for scoring responses.

The survey was conducted by visiting various service organizations like retails, hotels, couriers, banking. A structured questionnaire and interview method is used for gathering first-hand information form the service sector respondents. The respondents were the owners or the employees at the managerial level.

Secondary data has been collected from the research papers from the journals, books, and internet.

IV. Data Analysis/Present Work

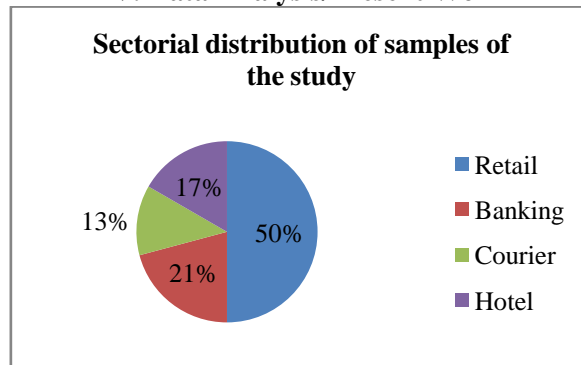


Fig 1.1 Sectorial distribution of samples of the study

Above figure 1.1, shows the sectorial division of the samples under the study. 50% is the retail sector, 21% is the banking sector, 12% are the courier services and 17% is hotel sector. The above graph shows the sample size of the service firms in percentage in each service sector which has taken into consideration for the study. In the retail, different types of enterprises like supermarket, small firms, apparel shops etc. were considered. In the hotel segment, star rated hotels with restaurant and accommodation facility were considered.

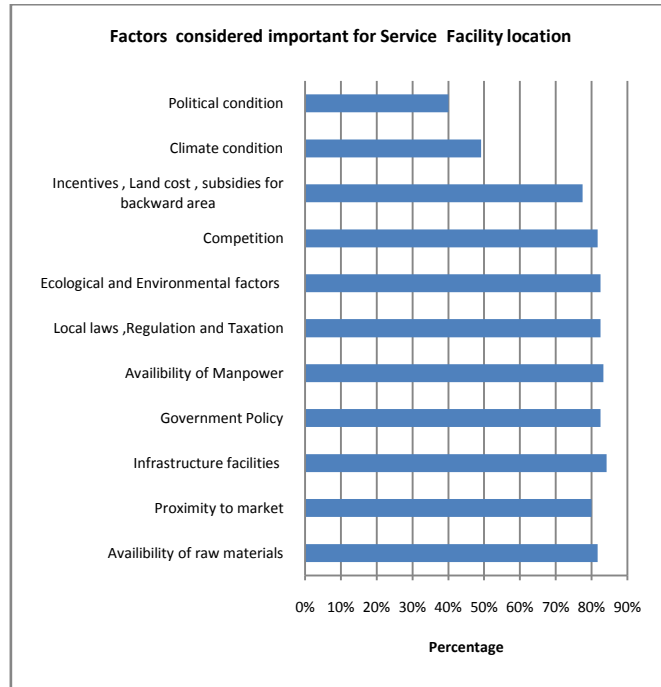


Fig. 1.2 Factors considered important for service facility location

Above figure represents factors that are important for business enterprise. In this infrastructure facility has a highest importance of 84% and climate condition and political condition has lowest ratings. Others factors has ranging from 78% to 83%. From the above graphical representation, it can be concluded that, for a service facility, important factor is infrastructure facility and least considered factor is political condition. Hence the overall importance of facility location to a service business enterprise is 75%.

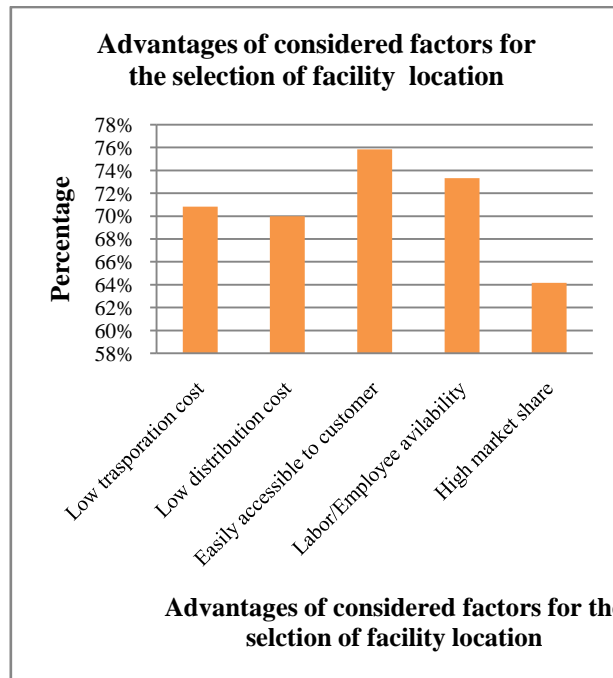


Fig 1.3 Advantages of considered factors for the selection of facility location

The above figure shows the advantages of considered factors for the selection of facility location. It is seen that 'Easily accessible to customers' i.e. the market becoming proximal to the service firm is the principal

advantage of selecting the facility location after the factors consideration. It means that accessibility to the customers is important advantage of service organisations.

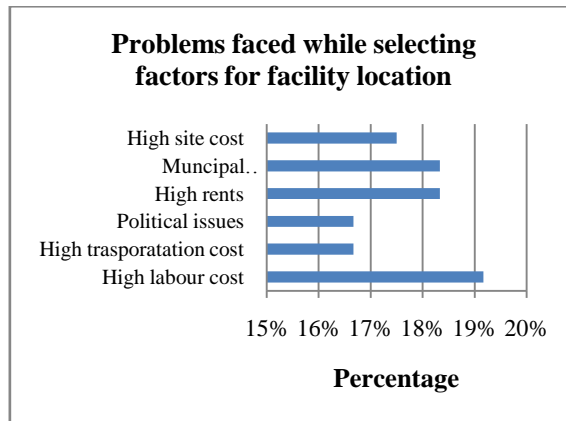


Fig. 1.4 Problems faced while selecting factors for facility location

The above figure represents that problems faced while selecting factors for facility location. High manpower cost is seen to be the most frequent problem faced by the service enterprises. Municipal restrictions, high tax rates and high rental costs are seen as secondary problems to the service enterprises.

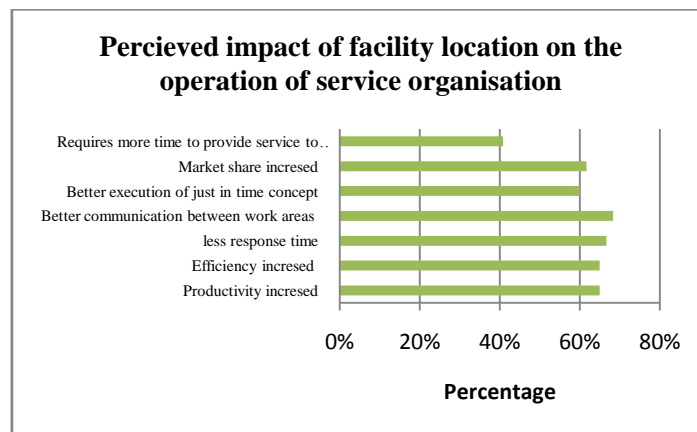


Fig.1.5 Percieved impact of facility location on the operation of service organisations

The above figure represents the perceived impact of facility location selection decision on the operations of service organizations. The highest impact of a good location is better communication between work areas and second highest is less response time. The data reveals that the time to provide service to the customer would be least impacted by the current facility location.

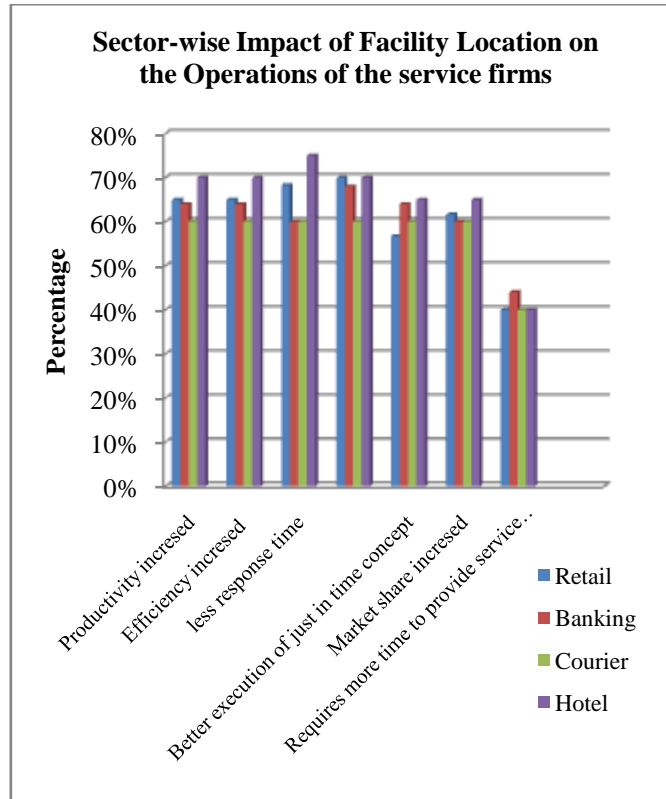


Fig 1.6 Sector-wise Impact of Facility Location on the Operations of the service firms

The above figure shows the sector-wise impact of facility location on the operations of the service firms. The data reveals that for the hotel sector, the productivity, efficiency, response time, better communication between work areas, execution of Just-in-Time, and market share has the highest positive impact. In case of the courier services the overall impact is less in terms of productivity, efficiency, response time, communication between work areas, and market share. Execution of just in time concept is less impacted in the retail sector.

Testing of hypothesis:

H₀: There is no significant difference between the factors considered and factors perceived important for the existing facility location.

H_a: There is a significant difference between the factors considered and factors perceived important for the existing facility location.

The hypothesis framed for the study was tested using the Chi- Square Test for the goodness of fit. It was of the interest of the researcher to understand whether the actual factor considered while selecting the existing facility location supports the assumption about the distribution of the service industry population.

Factors	O	E	O-E	(O-E) ²	(O-E) ² /E
Availability of raw materials	4.8	19.6	-14.8	219.04	11.17551
Proximity to market	4.8	19.2	-14.4	207.36	10.8
Infrastructure facilities	4.9	20.2	-15.4	237.16	11.74059
Government Policy	4.8	19.8	-15	225	11.36364
Availability of Manpower	4.8	20	-15.2	231.04	11.552
Local laws, Regulation, and Taxation	4.8	19.8	-15	225	11.36364

Ecological and Environmental factors	4.8	19.8	-15	225	11.36364
Competition	4.8	19.6	-14.8	219.04	11.17551
Incentives, Land cost, subsidies for backward area	4.8	18.6	-13.8	190.44	10.23871
Climate condition	3.8	11.8	-8	64	5.423729
Political condition	3	9.6	-6.6	43.56	4.5375
Total $X^2 = \sum [(O_i - E_i)^2 / E_i]$					553.67

O-Factors considered/ Observed Frequency

E-Perceived importance of factors/ Expected frequency

Table 3: Computation of sample chi-square value at a 5 % significance level.

$$X^2 = \sum [(O_i - E_i)^2 / E_i]$$

At 5% level of significance, the table value of $X^2=18.308$.

Since the calculated value of Chi-Square goodness of fit test is greater than the table value, we will reject the null hypothesis and conclude that there is a significant difference between the observed and the expected frequency. This means that there is a significant difference between the factors considered and the factors that were perceived as important for the selection of the existing service facility.

V. Conclusion

It can be concluded that while selecting a facility location for service organization, the infrastructure facility available in the given region has a significant importance to the service organisation. Specifically in the case of hotel sector, where the resources like water, electricity, proper roads and transportation services for the raw material delivery are important, infrastructural facilities are the prime requirements. Government policies, Local laws, Regulation, and Taxation, Ecological and Environmental factors are considered secondary factors while selecting the facility location. The factors that demand attention with respect to the policies of the state governments and local bodies are concerning to labor laws, building codes, safety, etc. With the incentive packages for the new enterprises from the government, in the form of soft loans and subsidies, this factor attains importance. While political and climate conditions considered as a less important factor while selecting facility location. Appropriate selection of facility location can result in increased productivity, efficiency and market share, effective communication between work areas, less delivery time. The final conclusion that can be made from this research study is that facility location is very important for the smooth functioning of operation in service organizations. Since the research has limited to the service firms of a specified region, further studies are suggested that may cover sector specific importance of facility location decision.

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