



**LOGISTICAL PRACTICES AND ITS IMPACT ON THE OPERATIONAL EFFICIENCY OF MANUFACTURING FIRMS, MIDC, NAGPUR**

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**ABSTRACT**

Manufacturing has appeared as one of the high growth sectors in the country. With the contribution of various government projects like MIDC, the growth in the sector is prominent. MIDC aims at setting up industrial areas for planned and systematic industrial development in the state of Maharashtra. There are numerous manufacturing firms working in MIDC nagpur area. It becomes important on the part of Operations Management professionals to study their working culture and practices of the manufacturing firms. With this objective this research work is conducted to study operations aspect of logistics practices and its impact on the Operational efficiency of these firms. The study concludes that Logistics practices leads to improvement in the product and the process quality. And warehousing practices leads to improved operational efficiency.

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**INTRODUCTION**

**Logistics Practices**

Logistics is the management of the flow of things between the source and destination to meet the end requirement of the user. In manufacturing, Logistics management deals with the physical movement of raw material from the supplier to the manufacturing firm, the movement of material from the inventory and warehouse to the site of production, and the movement of finished product from the firm to the customer through different channels. Logistics activities involve materials handling, production, packaging, inventory, transportation, warehousing, and often security. Logistics management is the part of supply chain management that plans, implements, and controls the efficient, effective advancing, and converse flow and storage of goods, services, and related information between source and destination. (Logistics Management ).

Set of activities that organisations execute as the Logistics practices are inventory management, supplier management, transportation and warehousing. To implement logistics practices in the organisation, it must practice the above said activities in its best capacity. Inventory management practices include

- Correct identification of all materials in the stock/inventory information
- Availing lowest inventory driven cost( use of EOQ) model
- Replenishment planning and inventory deployment
- Ensuring the stock levels within the established maximum stock level
- Having a system for wastage free utilization of available material inventory
- Supplier practices deal with having a strong partnership with the suppliers and treating them as the part of the organisation. These practices include
- Sending and receiving of electronic communication with suppliers
- Effective implementation of purchase order processing
- Effective communication with suppliers on new product development
- Transparent information sharing about inventory status with suppliers
- Collaborating with your suppliers development /training program
- Creating long term relationship with your suppliers
- Frequently measuring and analyzing suppliers performance
- Rewarding your suppliers based on their performance
- Transportation as a part of logistics practices deal with physical movement of material or finished product to and

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from the suppliers to the ultimate customers. Transportation practices include

- Transportation of finished products to your local customers in an environment friendly manner
- Collaborative relationships with transparent companies
- Strategic use of third -party logistics providers
- Measure of transport performance for local delivery of finished product
- Measure transport performance of transport companies and reward them

Warehousing as a component of logistics include the practices of storing product according to recommended storage guidelines, storage space optimization, applying warehouse management system software for stock control, accurate identification of all storage locations, making the records and reports of warehouse up to date, use of advance equipments / Robotics in material handling.

All these practices contribute of the effective logistics practises in the manufacturing organisations.

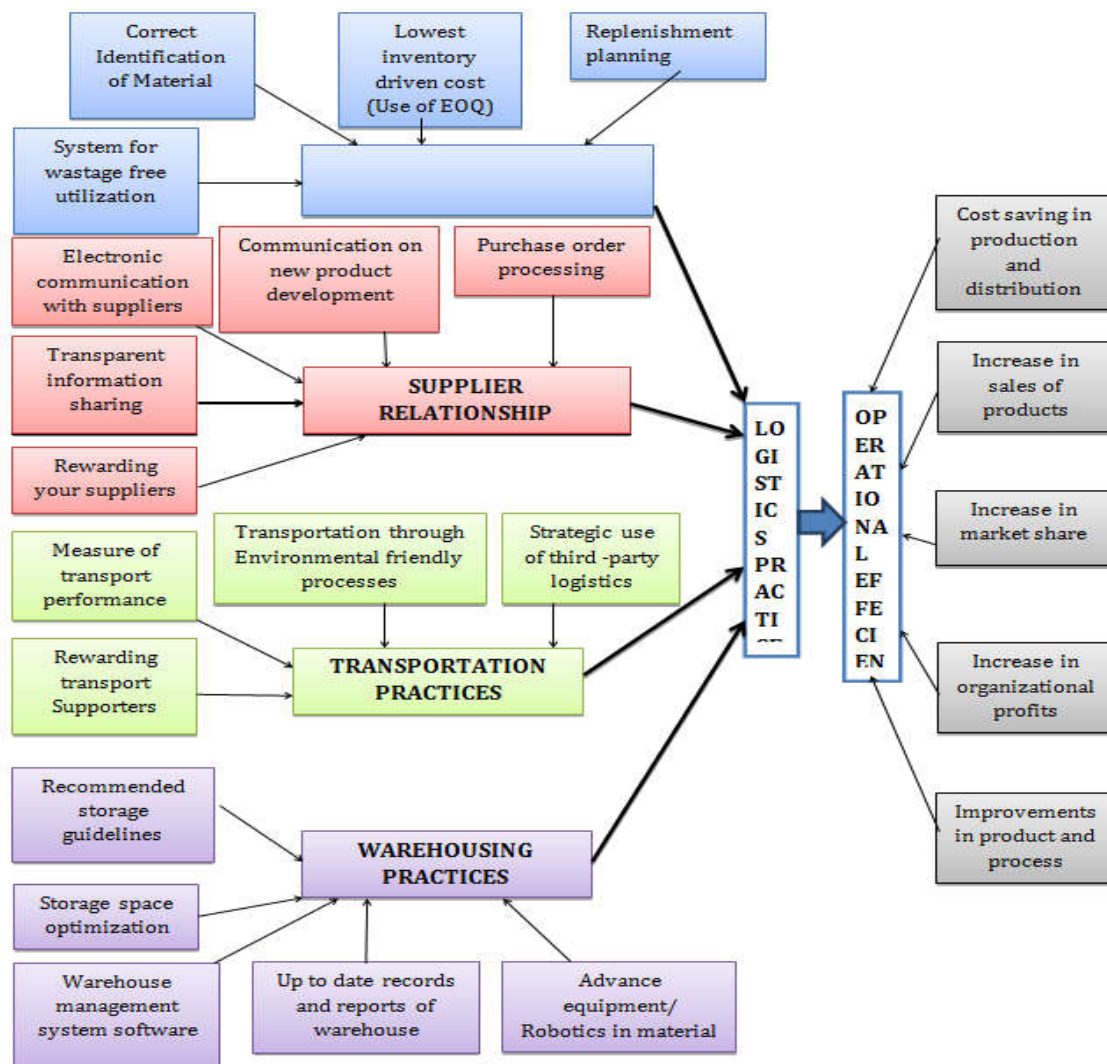
### Operational Efficiency

Operational efficiency of any organisation is its capability to deliver its products or services in the most effective manner to its customers. It had to achieve this through ensuring the high quality of its products or services. It results in the oprimum utilization of its assets like achines, human, etc.

The terms "operational efficiency", "efficiency" and "productivity" are often used interchangeably. To complicate the meaning, operational excellence, which is about continuous improvement, not limited to efficiency, is occasionally used when meaning operational efficiency. Occasionally, operating excellence is also used with the same meaning as operational efficiency (Operational efficiency).

Operational efficiency has to achieved in the most cost effective manner. It can be attended by restructuring a company's core practices to respond to the ever changing martet needs. Thus utilizing its resources like human force, processes, technology, machines etc at the most efficient level is needed. In order to attain operational efficiency a company needs to minimize redundancy and waste while leveraging the resources that contribute most to its success and utilizing the best of its workforce, technology and business processes. The reduced internal costs that result from operational efficiency enable a company to achieve higher profit margins or be more successful in highly competitive markets (Operational Efficiency).

Operational effeciency is the ratio of the output achieved by the organisation in terms of new client or customer, quality, opportunity to the input in terms of money in the form revenue, margin, cash etc.



Improving the operational efficiency has a direct impact on the organisation's performance in terms of cost saving in production and distribution, increase in sales of products, increase in market share, increase in organizational profits, improvements in product and process quality.

**Research Framework**

**RESEARCH METHODOLOGY**

**Statement of Problem**

- Nagpur is the 3<sup>rd</sup> largest city in Maharashtra. As nagpur is becoming a biggest Manufacturing hub in India, it becomes necessary to study the manufacturing practices of the city. One such important practise od Logistics management.
- There are numerous manufacturing firms working in MIDC nagpur area, so it becomes important to study their working culture and practices.
- For all the firms, it is important to compete successfully in today's challenging environment. Companies need to focus on logisites management practices that have direct impact on the operational efficiency.
- This study tries to examine the level at which the manufacturing firms in MIDC are involved in logistical practices as well to determine the effect of these practices on overall performance.

- This study therefore opted to fill this gap by assessing how logistics management practices influence the operation efficiency
- The findings and recommendations of this study will be useful to the operations managers in understanding logistics management practices and their contribution in operational efficiency which improves logistics management decision.

**Objectives**

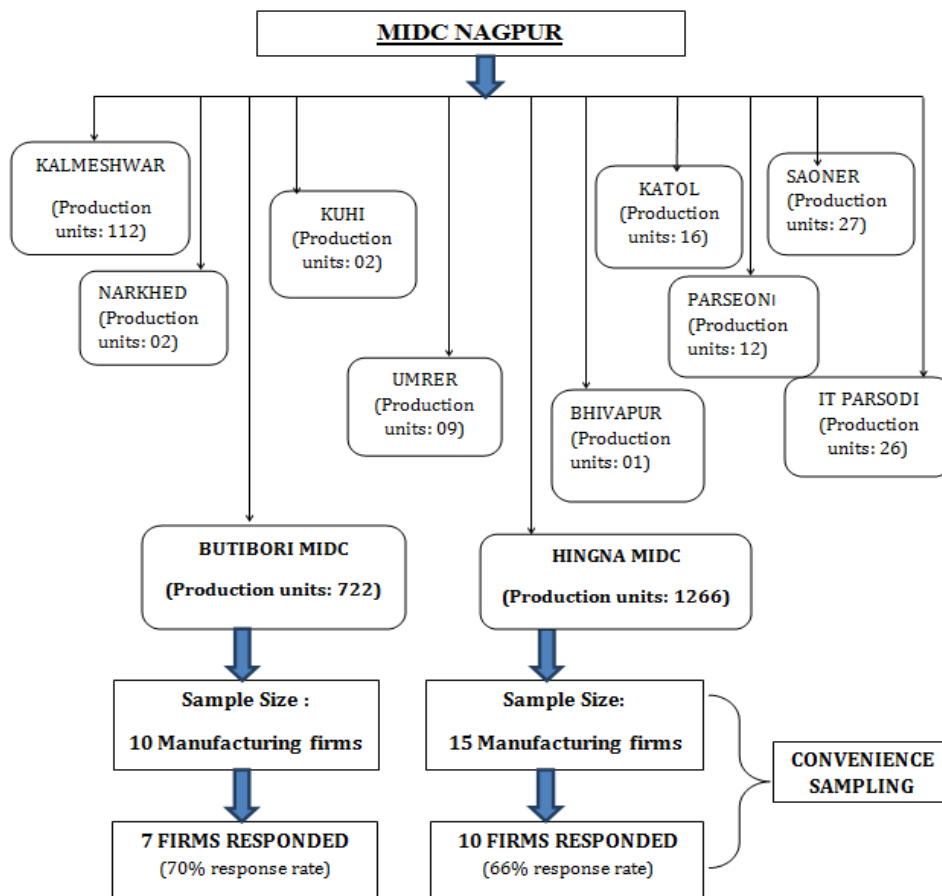
1. To study the logistics practices implemented by the manufacturing firms in MIDC, Nagpur.
2. To study the impact of Logistics Practices on the Operational Efficiency of the manufacturing firms.

**Population of The Sample**

- There are approximately 2500 registered manufacturing Firms in MIDC, Nagpur.
- Many of the firms are not working right now.
- Some of them are shut down. Some of them are shifted.
- Many of the firms do not share their any kind of information.

**Sample Size**

As it is difficult to get the data from all the firms working. Out of total registered firms in the area 25 firms were taken as sample to collect the data.



A structured Questionnaire comprising 30 questions on Logistics practices and operational efficiency was used for data collection

Out of the sample of 25 firms, 17 firms responded, and shared the required data for this report.

**Sampling Technique**

1. Sample is taken through cluster technique. The clusters taken were zone wise. First cluster was Butibori zone, second cluster was Hingna zone.
2. Then the sample firms were taken by convenience technique.

**Limitations of the Study**

- Actual statistical data with respect to performance was not given by the firms, because firms need to secure their important data from getting published anywhere.
- Sample size taken was 25 out of 250, because it was difficult to collect the data from all the firms. But only 17 firms responded as other companies were not willing to share any kind of information.
- Study is limited to manufacturing firms in MIDC, Nagpur, as logistics takes place in manufacturing firms at highest level than any other firms.
- Data collection is confined to only manufacturing firms in MIDC industrial area, Nagpur.
- Respondents were hard to reach due to their tight schedules while others were unwilling to co-operate due to organizational policies on divulgence information.

**Data Analysis**

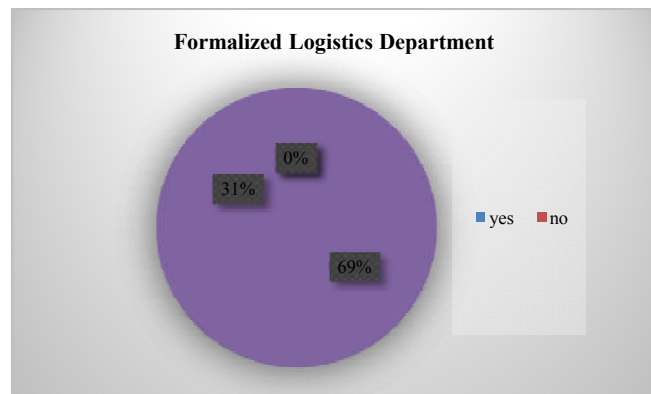


Figure 1 Formal Logistics Department

The above figure shows the percentage of the firms surveyed that have formalized logistics department. It can be seen that 69% of the firms have a Logistics department. The formal department implies a finite set of resources sourced for the department in terms of human, finance and material. Other firms did not have a formal logistics department, the reasons being little scope and importance of Logistics activities and financial and space constraints. Those firms that do not exercise separate Logistics department, executing logistics practices with other departments like Stores department, service department and dispatch department.

Above figure shows the percentage firms that measure Logistics performance. Only 37% of the firms surveyed measure the performance of the organisation in terms of Logistics practices. The firms measure Logistics Performance based on

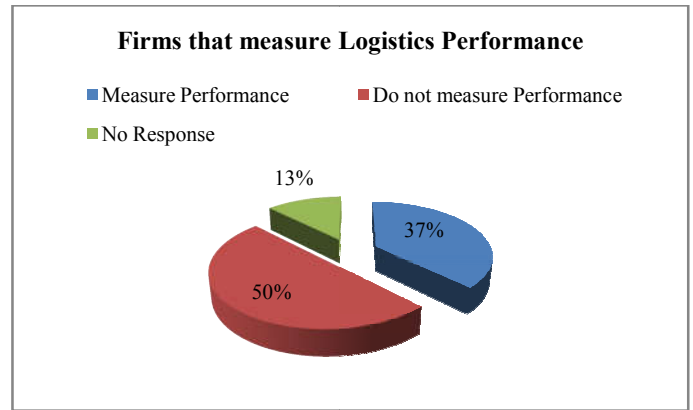


Figure 2 Firms that measure Logistics Performance

- By on time delivery
- cost incurred per KG of material handled
- amount and quality of raw material is checked & loading and unloading is done properly.

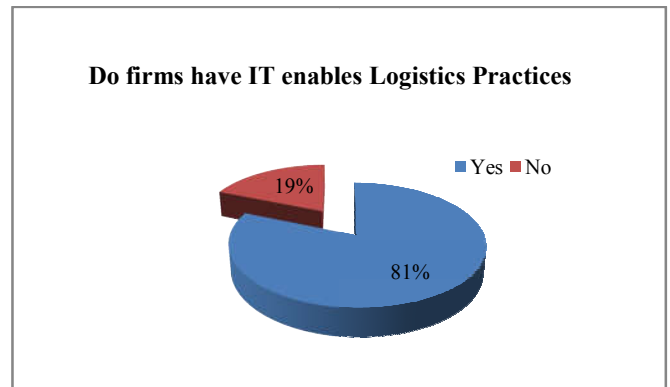


Figure 3 Do firms have IT enables Logistics Practices

IT enabled Logistics Practices means use of Information Technology (IT) for information sharing across supply chains and Information sharing and knowledge exchange via the Internet to link between companies, their suppliers and customers. 81% of the firms surveyed use IT technology for supporting Logistics practices.

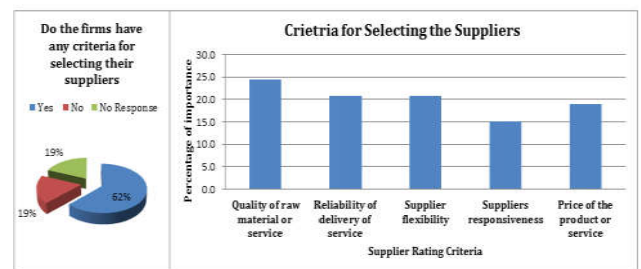


Figure 4 Supplier selection criteria

The above figure shows the number of firms that have selection criterion for the suppliers. 62% firms have certain criteria for identifying the best suppliers.

The criteria used for selecting the vendors are quality of raw material or service, reliability of delivery of the service, supplier flexibility, supplier responsiveness and price of the material being offered by the supplier. The criteria that is prime to the manufacturing firms is quality of raw material being provided. This is calculated from the quantity of raw material supplied and the quantity of raw material accepted.

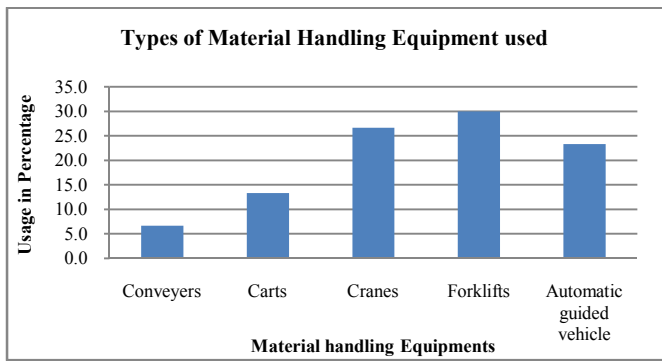


Figure 5 Types of Material Handling Equipment used

For the logistics activities like material handling and material movement, various material handling equipment are used. These equipment range from conveyors, carts, cranes, forklifts and Automatic Guided Vehicles. Forklifts are the most commonly used material handling equipment as said by the respondents.

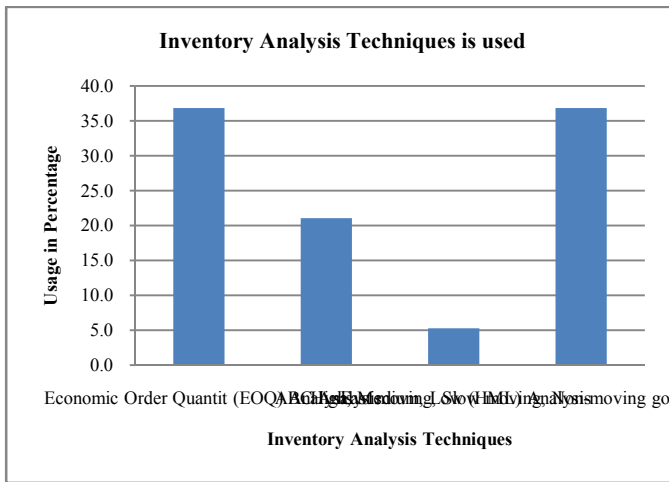


Figure 6 Inventory Analysis Techniques is used

Above figure shows the inventory analysis techniques used by the organisation for segregation and storage of inventory.

- EOQ is a tool used to determine the volume and frequency of orders required to satisfy a given level of demand while minimizing the cost per order.
- ABC analysis categorizes items based on their annual consumption value, sometimes Inventory Managers can use Pareto’s Principle for classification.
- FSN analysis classifies inventory based on quantity, rate of consumption and frequency of issues and uses.
- HML Analysis classifies inventory based on how much a product costs/its unit price.
- The study confirms that EOQ analysis and FSN analysis are the most commonly used techniques in the firms.

The above figure shows the effect of implementing the Logistics Practices by the manufacturing firms on the Operational efficiency.

Logistics Practices helps to improve the product and process quality, at the same time it also saves cost, stimulates sale of products, helps to raise market share, and organizational profit. This graph shows that the highest impact of improved logistics practices on operational efficiency results in improvement in product and process quality.

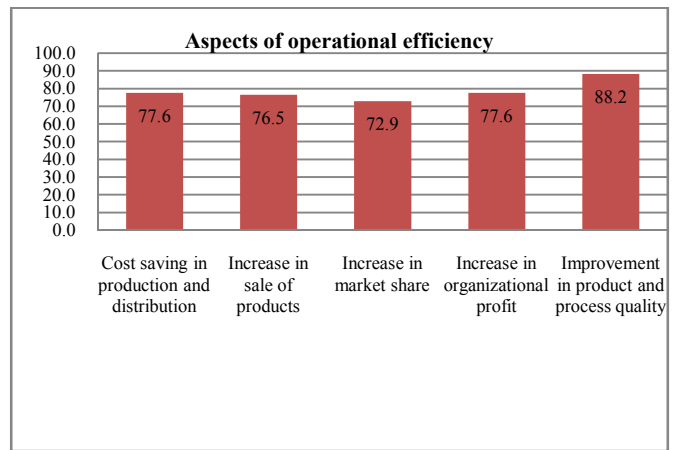


Figure 7 Aspects of operational efficiency

Table 1 Descriptive Statistics on the Logistics practices

Logistics Practices	N	Range	Mean	Std. Error	Std. Deviation
Inventory management practices	17	2	4.09	.198	.816
Supplier practices	17	1	4.02	.116	.477
Transportation practices	17	3	3.24	.201	.828
Warehousing practices	17	2	3.91	.123	.509
Aspects of Operational Efficiency	17	2	3.93	.181	.748

Mean values for logistics practices are as follows,

- Inventory management practices is 4.09
- Supplier practices is 4.02
- Transportation practices is 3.24
- Warehousing practices is 3.91
- Aspects of Operational Efficiency is 3.93

The standard deviation is the quantity expressing by how much the members of a group differ from the mean value of the group.

We can see that standard deviation of inventory management practices is 0.816 from the mean value.

- Standard deviation of suppliers’ practices from the mean value is 0.477.
- Standard deviation of transportation practices is 0.828.
- Standard deviation of warehousing practices from mean value is 0.509.
- Standard deviation of operational efficiency from the mean value is 0.748.

Table 2 Correlation analysis between Logistics Practices and Operational Efficiency

		Correlations				
		Inventory management practices	Supplier practices	Transportation practices	Warehousing practices	Aspects of Operational Efficiency
Inventory management practices	Pearson Correlation	1	.352	.276	.332	.069
	Sig. (2-tailed)		.166	.284	.194	.793
	N	17	17	17	17	17
Supplier practices	Pearson Correlation	.352	1	.081	.239	.305
	Sig. (2-tailed)	.166		.759	.356	.234
	N	17	17	17	17	17
Transportation practices	Pearson Correlation	.276	.081	1	-.405	-.327
	Sig. (2-tailed)	.284	.759		.107	.201
	N	17	17	17	17	17
Warehousing practices	Pearson Correlation	.332	.239	-.405	1	.610**
	Sig. (2-tailed)	.194	.356	.107		.009

	N	17	17	17	17	17
Aspects of Operational Efficiency	Pearson Correlation	.069	.305	-.327	.610**	1
	Sig. (2-tailed)	.793	.234	.201	.009	
	N	17	17	17	17	17

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Here we can see correlation between logistics practices and the operational efficiency.

Correlation analysis was conducted to establish the effects of Warehousing Management, Transport Management and suppliers and inventory Management on Operational Efficiency. The results were as presented:

- The correlation between inventory management practices on operational efficiency is 0.069 which is very less
- The correlation between suppliers’ practices on operational efficiency is 0.305 which is moderate.
- The correlation between transport practices on operational efficiency is -0.327 which shows that there is negative relation between them, i.e. when the transportation practices are improved it does not have any effect on operational efficiency.
- Warehousing practices has a great impact on operational efficiency, this means when the warehousing practices are improved it directly improves the operational efficiency of the firm. This portrays that warehousing has the largest effect on Operational Efficiency.

**CONCLUSION**

- The study concludes that all the logistics practices including inventory management, warehouse management and supplier’s management affects overall efficiency of the organization.
- Results of this study showed that the logistics practices have direct impact on operational efficiency, whereas, Inventory and supplier’s practices have moderate impact on operational efficiency.
- Inventory management practices of
  - a. Correct identification of all materials in the stock/inventory information, Availing lowest inventory driven cost( use of EOQ) model,
  - b. Replenishment planning and inventory deployment,
  - c. Ensuring the stock levels within the established maximum stock level
  - d. Having a system for wastage free utilization of available material inventory

Contribute to the increased operational excellence of the firm.

- From the various supplier relationship practices like Sending and receiving of electronic communication, purchase order processing, Effective communication, Transparent information sharing about inventory status, suppliers development /training program, rewarding system, etc., having an electronic communication for sharing information with the supplier has contributed more towards organization efficiency.

- Transportation practices do not affect operational efficiency.
- Warehousing practices has huge effect on operational efficiency, major contribution made by storing product according to recommended storage guidelines
- Automation of warehousing activities greatly enhances accuracy, speed of operations and reduces wastage
- Thus, it is concluded that when the warehousing management practices are improved then the operational efficiency will also improve.

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