

# Analyzing the Impact of Inventory Management System on Economic Growth of Manufacturing Firms in India

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## Abstract

Inventory management acts a strategy weapon for the economic growth of every manufacturing firm. The present study revealed proper inventory management practices leads to efficiency in operation, cost reduction and nurturing competitive advantages. Study is based on data collected from 120 respondents from different manufacturing firms having proficiency in inventory management practices. Findings of this research article reveal that economic performance of a firm increases through proper implementation of inventory management. The study had a practical implementation in manufacturing firms which can be extended to others sectors.

**Keywords:** Inventory Management, Competitive advantages, Efficiency in Operation, Cost reduction, Manufacturing Firm.

## 1. Introduction

Inventory management affect the financial as well as economic health of business. Based on this it was assumed that whether business will prosper or failure in long run. Towards driving economic growth company need to maintain good inventory management control systems by managing gap between supply and demand. In an effort to fasten economic growth through proper inventory management planning is required. Effective Inventory Management(EIM) has been considered as suitable strategy for achieving competitive advantages as well as increasing productivity (Ontita, 2016) As we know organizational growth is associated with different kind of tactical strategy i.e. organizational competitiveness, reduction cost of production, organizational efficiency(Chalotra, 2013) Inventory management control techniques & strategies involve incessant decision making by managers. Proper

management of the inventory items is very important for minimizing costs, providing competitive advantages and increasing productivity. According to Prempeh (2016) inventory management exhibits a strong relationship with profitability. Ontita, (2016) also highlighted that IM and profitability has direct relationship.

Study conducted by Naliaka and Namusonge (2015) explains that IM affect Competitive advantages (CA) of industries. Through CA firms can achieve quality and delivery of customer order on time(Atnafu, & Balda, 2018). CA shows the capability of any firm to differentiate itself from its competitor which is also a critical management decision (Li, et al., 2006). Lysons (2006) in his study explain Inventory control should contributed towards profitability by reducing costs related to storage cost and cost of materials handling. According to Isoppo, A. S., Almeida, S., &

Pacheco, D. (2015) companies are using ABC techniques for reducing cost effectively. This study reveals that among different techniques ABC is one of the effective technique for inventories optimization as well as cost reduction.

ABC classification identified the most common items in the company, giving the opportunity cost reduction. The results also provided for the company to realize the actual costs of obsolescence of its product mix.

From the previous study represent rule of thumb in most Manufacturing firms in direct material represent fifty percent of the cost of total production, which will affecting the firms profitability and competitiveness (Atnafu & Balda , 2018) many of the industry not consider the potential savings arises out of proper management of inventory and treat inventory as a evil rather than assets (Sander et al., 2010). According to Onyango (2013) IM is considered as fundamental pillar in an organization and proper care must be maintained for its effective utilization in an industry. SCM refers to the process of sourcing, producing, delivering commodities and services for customer (Cigolini et al., 2004) as well as coordination among the actors associated with the particular supply chain (Harland, 1996).

### 1.1 Problem statement

As we know purchasing is become more complicated cum strategic decision. It has its impact on cost factor, quality factor, time factor, responsive factor of purchasing firm (Chalotra, V. 2013). Efficient and effective IM decision through supply chain has significantly improves the role of customer (Chen and Paulraj, 2004). From above literature reviews revel gap i.e.IM has effect of organizational competitiveness and responsiveness in large steel manufacturing firms in the state of Odisha.

### 1.2 Objectives of the Study

Looking at problem statement following objectives were set.

1. To identify the impact of IM on efficiency of manufacturing firms.
2. To examine the impact of IM on the manufacturing firms' competitive advantage.
3. To analyze the impact of IM towards cost reduction efforts in steel manufacturing firms.

### 2. Review literature

Inventory has considered to be the debatable topic in SCM, which has increasingly created its own interest particularly in the area of global sourcing due to SCM risk (Christopher and Peck, 2004). Risk mitigation strategies contains different element towards use of inventory as one of the powerful tools (Chopra and Sodhi, 2004). According to Logistics Association of Europe, Kearney (2004) describe logistic costs in Europe identified the cost of inventory as 24 % of total cost of logistic. Proper IM can improve the response of SCM and ultimately improves organizational performance (Khan et.al.,2009).

Vipul Chalotra (2013) studied to find out the impact of competitive advantage and reduction in the cost of production of manufacturing unit. It concluded that significance of IM in building successful cum sustaining inter relationship between the firms. Study by Kimaiyo & Ochiri, (2014), focused how IM reduction techniques are affecting the performances of firms in Kenya. Raymond et al(2015) found the significance of IM techniques applied in manufacturing industry MRP was the most effective technique to measure IMP on performance of production department in many manufacturing firms.Tundura et al (2016) , showed Inventory control practice influences record accuracy of the inventories positively.

Bawa Suleman et al (2018) found inventory period, size of firm, management efficiency had negative impact on profitability of firms . Firms growth rate have a positive influence on profitability

## 2.1 Theory and Hypotheses Development

In manufacturing firms proper management of stock / inventory should bring firms efficiency. Production economy can be done by applying right inventory management control techniques(Ghosh & Kumar 2003) .Business can bring improvement in economy and efficiency in its operation by adopting effective and frequent inventory control practices(Chalotra, 2013). Organization beliefs that Inventory management practices recognize as a fundamental pillar for every manufacturing firms. The operational or production manager must visualize the Economy in production by adopting appropriate IMCP(Onyango, 2013). Effective management of inventory inside the firms is essential. It also plays a significant role in business operation. Systematic production schedule, in time delivery, quality of product and proper vender management systems can bring efficiency in business (Choi, 2012). Study by Dean (2000) also advocated giving importance for selection of right inventory management practices for companies' inventory management performance. It leads to firm's efficiency. Organization to ensure all are working combined for achieving core business goals. It deals with assessing individual efficiency, reducing Individual unit cost, planning for production cum process, increasing individual units output. Hence, we propose our first hypothesis as follows.

H<sub>01</sub>: Economy and efficient business operation brings through Effective IM in supply chain.

Proper management of stock always gives advantage to serve the customer at right time. Inventory management affects competitive advantages in manufacturing firms. The study also

add that compete with other firms have to maintain best quality and timely delivery aspect.(Naliaka et al (2015)). Competitive advantage can't compromise on its capacity and capability for maintaining its public image because it helps to differentiate the company from its competitors. Firms should have the capacity to take right decision-making capacity with respect to adoption of inventory management control techniques.(Li et al 2006).Competitive advantage and Organizational Performance have enough contribution in improving the inventory management practice (IMP). To keep pace with competitive pressure firms compel to adopt high level of IMP in an manufacturing firms. (Atnafu & Balda, 2018).Proper IMP helps to provide enhanced competitive ability along with increase the market share of the company. Firms also keeps its constant effort for reduction of storage and revenue cost through proper use of IM techniques.(Chalotra, 2013). These led to frame our second hypothesis as follows.

H<sub>02</sub>: Effective use of IM helps to bring competitive advantages among in manufacturing firms.

Inventory management is considered as a technique used by firms to organize, store and replenish inventory. It also highlights that adequate supply of goods as per requirement can helps to bringing down the cost(Deveshwar & Modi,2013). Inventory control is very important part to determine the items to indent along with time, amount and optimum stock that should be maintained so as to minimize the purchase and storage cost(Mallick et al., 2012). Hence, the third hypothesis is proposed as follows.

H<sub>03</sub>: IM is positively related towards reducing overall operation cost of the firms.

## 3. Methodology

The study is based on quantitative survey approach, which deals with quantify and explain

the existing practices as well as describing measure to find out the impact of IM on economic growth of manufacturing firms. The targeted respondents of this study comprise all operation manager, quality control manager, sales manager, distribution and marketing manager, production manager, store cum warehouse manager, senior officers of production and operation department of steel manufacturing Industry. In this study, five manufacturing industry in the state of odisha have been surveyed i.e *SAIL, TATA Steel, Jindal Steel, MSP Steel, MESCO Steel*. The manufacturing firms located within the geographical proximity with respect to easy accessibility were selected

### 3.1 Conceptual Framework

Conceptual framework is described as a structure of both concept as well as theories, which are arranged together as a map of the study. It basically describes as relationship of research variables (Mugenda &Mugenda,2008). As per this article a framework as shown in figure 1, is used to explain the beautiful relationship between independent variable and the dependent variable.

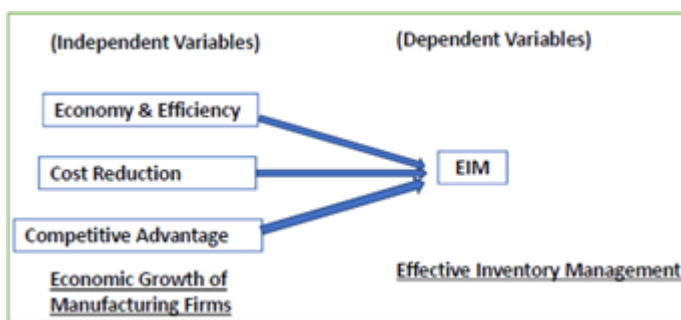


Figure.1 Conceptual frame work for the study

### 3.2 Sampling Plan and Data Collection

Target population of the study was based on 5 steel manufacturing units of odisha. Study was based on purposive sampling techniques to select 120 respondent from 5 firms . Descriptive statistics was used to identify the contribution of IM on economic growth of manufacturing firms. The questionnaire was piloted for validity and

Cronbach’s alpha coefficient used to test the reliability of used measurement scale giving a coefficient value of 0.822, which is above the minimum acceptable threshold of value of coefficient 0.70 (Santos, 1999). Data was collected by the use of 24 structured questionnaire developed by Chalotra(2013) as per suitability of the study. Statement of the question in descriptive in nature , open ended and five-point likert scale was used, 1 represent as not contributed and 5 represent as highly contributed.

### 4. Results and Discussion

Raw data collected from key official of manufacturing firms for factor analysis and subsequently KMO value, Bartlett’s test of spherhity and p Value was used for indicating common variance and correlation matrix according to (Dess et.al., 1977; Field, 2000, pp.619-672). Regression model with Principal Component Analysis (varimax rotation) was applied for reducing factors of from 27 to 12, which is kept for this article. The KMO value (0.702) and Bartlett Test of Sphericity (156.49) indicated that It is highly significant and achieve the acceptable criterion.

[Insert Table 1]

#### Factor :1 (Economy & Efficiency)

This factor comprises of four key items such as “Effective inventory control (IC) brings potential saving to the firms, IC avoid costly interruption in operation, Inventory should be maintained as per size of the firm and IC strategy facilitate in economic purchase”. Mean values are fall in the range of 3.13 to 3.31 and factor loading from 0.684 to 0.986. highest factors represent the significant contribution to IM, which will assist key officials in the decision related to potential saving, costly interruption in operation and purchase economy. 1<sup>st</sup> items Effective inventory control brings potential saving to the firms have highest factor loading 0.986, which shows highly



influential items towards bringing economy and efficiency in manufacturing operation, this is also proved by earlier researcher in his analysis(Chalotra, 2013).

### **Factor :2 (Cost Reduction)**

Items underlying this factor includes “Inventory planning and management reduces storage costs, high inventory turnover brings revenue, SCM assist to maintain adequate inventories”. The mean value for the aforesaid items are highly significant, which ranges from 3.11 to 3.50 and factor loading from 0.730 to 0.961. 3<sup>rd</sup> item SCM assist to maintain adequate inventories to reduce cost of production have highest factor loading of 0.961 shows greater impact IM.

### **Factor :3 (Competitive Advantage)**

Factor:3 deals with 5 key items are which are of “ Inventory control paves for competitive ability, The firm offers high quality products and services to its customers, The firm has fast product development, The firm is always the first in the market to introduce new products and services, Effective inventory control enhances market share”. These items with significant mean value ranges from 3.13 to 3.84 and factor loading from 0.774 to 0.986. The firm is always the first in the market to introduce new products and services (0.986) and Effective inventory control enhances market share (0.977), In previous study of Chalotra, (2013) was highlight enhances market share with highest factor loading (0.873).

**H<sub>01</sub>: Economy and efficient business operation brings through Effective IM in supply chain.**

**[Insert Table 2]**

Table 2 Represent impact of IM on economy and efficiency. The result of linear regression depicts the correlation between Economic Growth and Effective Inventory Management is positive 0.910, which signifies good correlation between predictor and outcome of the model. R-Square for

this regression model is 0.826, which explain 82.8% variation in dependent variable (Effective IM) on independent variable (EG). Adjusted R square is 0.826, which explain if we add another Independent variable to this Regression model then R-Square will increase. Change in R-Square is found significant with F value at 5% confidence level. So it can be conclude that Proper IM brings in economy & efficiency in business operation and the same is accepted at a significant level 5% ( $p < 0.05$ )

**H<sub>02</sub>: Effective use of IM helps to bring competitive advantages among in manufacturing firms.**

**[Insert Table 3]**

Table 3 Represent impact of IM on Competitive Advantages. The result of linear regression depicts the correlation between Competitive Advantages and Effective Inventory Management is positive 0.743, this is an indication of presence of correlation between predictor and outcome of our model. R-Square for this regression model is 0.552, which explain 55.2% variation in dependent variable (Effective IM) on independent variable (CA). Adjusted R square is 0.548, which explain if we add another Independent variable to this Regression model then R-Square will increase. Change in R-Square is found significant with F value at 5% confidence level. So it can be conclude that Proper IM brings in economy & efficiency in business operation(Chalotra, 2013) and the same is accepted at a significant level 5% ( $p < 0.05$ )

**H<sub>03</sub>: IM is positively related towards reducing overall operation cost of the firms.**

**[Insert Table 4]**

Table 4 represents impact of IM on Reduction of Cost. An analysis of the linear regression model depicts the correlation between Cost Reduction and Effective Inventory Management is positive

0.710, which confirms a good correlation exists between predictor and outcome of our model. R-Square for this regression model is 0.506, which explain 50.6% variation in dependent variable (Effective IM) on independent variable (CR). Adjusted R square is 0.501, which explain if we add another Independent variable to this Regression model then R-Square will increase. Change in R-Square is found significant with F value at 5% confidence level. So, it can be conclude that Proper IM brings in economy & efficiency in business operation (Chalotra, 2013) and the same is accepted at a significant level 5% ( $p < 0.05$ )

#### [Insert Table 5]

It could be observed from table 5, that the F-value is 56.763 of ANOVA on regression model, which explain the model is highly significant at 5% ( $p < 0.05$ ) the P value is 0.0005, which less than 5%. This result is an indication that overall regression model is significant statistically to predict the outcome variable, i.e. (EG) have significant effect on effective inventory management of manufacturing firm is justified.

#### [Insert Table 6]

In Table 6: The ANOVA on regression model yield a F-value of 145.37, which explain the equation is highly significant at 5% ( $p < 0.05$ ) the P value is 0.0005, which less than 5% . it indicates that overall regression model is statistically significant to predict the outcome variable, i.e. (CA) have significant effect on effective inventory management of manufacturing firm is justified.

#### [Insert Table 7]

In Table 7: The ANOVA on regression model yield a F-value of 107.014 which explain the equation is highly significant at 5% ( $p < 0.05$ ) the P value is 0.0005, which less than 5% . it indicates that overall regression model is statistically significant to predict the outcome variable, i.e.

(CR) have significant effect on effective inventory management of manufacturing firm is justified.

### 5.1 Conclusions

This study brings positive insight and also support the existing literature on Inventory management control. It also provide additional valid points for large manufacturing firms. This paper provide empirical justification regarding the relationship among economic growth of industry with effective Inventory Management. Economic growth includes efficiency, competitive advantages, cost reduction as identical parameters provides enough strength towards effective IM. Current study explores that business economy and efficiency helps to enhanced frequent inventory control. Reduction of storage cum revenue cost is ensure with suitable inventory control. EIM strategic planning must cover different dimension apart from 3 dimension taken in this study i.e market positioning, warehousing optimisation, material handling, cost economies, (Chalotra, 2013). This extended dimension will helps to predict economic growth of firms through Inventory Management.

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## Annexes

**Table 1: Result of Factor loading, Mean and Standard Deviation and variance**

Factor-wise Dimensions	Mean	S.D.	F.L.	Variance
<b>Economy &amp; Efficiency</b>	<b>3.235417</b>	<b>1.235055</b>		
EG1	3.13	1.206	.986	1.455
EG2	3.31	1.249	.973	1.560
EG3	3.25	1.245	.684	1.550
EG4	3.26	1.240	.911	1.538
<b>Cost Reduction</b>	<b>3.29</b>	<b>1.245</b>		
CR5	3.28	1.322	.730	1.747
CR6	3.50	1.243	.953	1.546
CR7	3.11	1.201	.961	1.442
<b>Competitive Advantage</b>	<b>3.44</b>	<b>1.174</b>		
CA8	3.84	1.123	.774	1.260
CA9	3.78	1.065	.531	1.134
CA10	3.14	1.225	.977	1.501
CA11	3.13	1.206	.986	1.455
CA12	3.31	1.249	.973	1.560

Source: Author's calculation on field survey



**Table 2: Regression Result of Economic growth and EIM**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.910 <sup>a</sup>	.828	.826	.23098	.828	567.633	1	118	.000	2.189

**Table 3: Regression Model summary of Competitive advantages and EIM**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.743 <sup>a</sup>	.552	.548	.37268	.552	145.371	1	118	.000	1.853

**Table 4: Regression Model summary of Cost Reduction and EIM**

Model Summary										
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.710 <sup>a</sup>	0.506	0.501	0.40319	0.476	107.014	1	118	.000	2.093

**Table 5 : ANOVA<sup>a</sup> of the regression model**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	30.284	1	30.284	567.633	.000 <sup>b</sup>
	Residual	6.295	118	.053		
	Total	36.580	119			

**Table 6: ANOVA<sup>a</sup> of the regression model**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	20.191	1	20.191	145.371	.000 <sup>b</sup>
	Residual	16.389	118	.139		

	Total	36.580	119			
a. Dependent Variable: Effective Inventory Management						
b. Predictors: (Constant), CA						

**Table 7: ANOVA<sup>a</sup> of the regression model**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	17.397	1	17.397	107.014	.000 <sup>b</sup>
	Residual	19.183	118	.163		
	Total	36.580	119			

a. Dependent Variable: IMP

b. Predictors: (Constant), CR