

## IMPACT OF MAKE IN INDIA ON THE MSME SUPPLY CHAIN- A STUDY OF THE JAMSHEDPUR AUTO CLUSTER

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**Abstract:** The quest for development has led to the introduction of a lot of initiatives by the central government of various countries across the world. India has long been known to be the hub for services export, but the quest to boost its manufacturing sector led to the introduction of the Make in India campaign in September 2014. The proposed investments have spurred a debate across the manufacturing circles about what would be the fate of MSMEs and how should they embrace the challenge in terms of the enormous opportunity and how should their Supply Chain change to ensure they are in better stead to face the challenges, and deliver most efficiently when the tangible results of the investments under the Make in India campaign start flowing in. In the present study, we have tried to understand the comparative change which the Make in India campaign will bring about in the Supply Chain of the MSMEs supplying to the manufacturing Original Equipment Manufacturers. The Jamshedpur (Adityapur) auto cluster has been chosen for data collection regarding the Key Performance Indicators (KPIs) of their Supply Chain for the past 5 years (2010-15) and for the next 5 years (2016-2021) when the effects of the proposed investments will start to realize. Exploratory Factor Analysis was utilized to investigate the systematic covariation between performance indicator variables for both the past 5 years and the next five years. Comparison between the obtained indicators was carried out and the suggestions for the Supply Chain of the auto clusters were proposed. The concept of Supplier/Vendor Park has also been discussed along with the various advantages it has to offer for Indian Manufacturing firms.

**Keywords:** Make in India, MSME, Manufacturing, Supply Chain, Vendor Park.

### 1. INTRODUCTION

The Indian economy which after independence started out with a protective and isolated approach finally adopted the liberalization route in 1991. The share of manufacturing in national Gross Domestic Product (GDP) had been about 15.8% in 1991, whereas that of the services sector was about 41.9% [8]. The corresponding numbers have increased marginally to about 16% for manufacturing sector but the jump for the services sector has been staggering to around 57% in 2014. The numbers clearly indicate that the focus over the years has been on the services

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sector as India has always had the potential to become a services export hub. The slow growth of the manufacturing sector over the previous few decades pushed the government to come out with the National Manufacturing Policy in 2011 which focussed on increasing the share of manufacturing in Indian GDP from 16% to 25% by 2022<sup>[7]</sup>. Although not a lot of work on pushing the reforms to achieve such an ambitious target was done in the years 2011 to 2014, the new government which came to power in May 2014 launched a specific campaign to show the commitment towards achieving the set target. The campaign was named Make in India to boost manufacturing in the country and invite foreign investors to set up their manufacturing base in India. As per the official statement, Make in India is “A major new national program designed to facilitate investment, foster innovation, enhance skill development, protect intellectual property and build best-in-class manufacturing infrastructure<sup>[9]</sup>.”

The success in the area of globalized manufacturing hub activities more often than not relies on the ability of the manufacturing unit's to be flexible in adapting to the ever dynamic changes in customer needs and preferences. In this era of globalized manufacturing and ever expanding markets, increased competition and extended Supply Chains, there are various challenges facing the manufacturing firms. The major challenges confronting the supply chains of the MSMEs may be broadly classified under these heads: need of waste elimination, adopting fast to new technologies, efficient inventory management, better supplier-OEM relations, and being cost efficient. Donovan et al 2005 have argued about the effects of lack of visibility and velocity which results in the bullwhip effect. Even a small amount of unplanned demand from any one customer oscillates back through the SC often resulting in costly disturbances to manufacturers who need to quickly acquire and process more raw materials and reschedule production which negatively resounds on business performance through excess inventories, overtime expenses and shipping costs<sup>[2]</sup>.

If we look at the figures of FDI inflows after the launch of the campaign, the figures only suggest the need for Indian Supply Chain to become stronger. FDI inflows in the automobile sector have witnessed a 164% growth in the period from the launch of Make in India campaign in September 2014 to April 2015. In the automobile Industry itself, foreign investment jumped to US\$2189.15 million (October 2014- April 2015) from US\$ 830.69 million (October 2013- April 2014)<sup>[6]</sup>. Although these numbers are just indicative of the future, going by these numbers alone, if the Indian manufacturing industry has to embrace the Make in India campaign and live up to exploiting its full potential, working on the above mentioned areas becomes critical. The performance of the Micro, Small and Medium Enterprises (MSMEs) becomes critical as it is an important leg of the Indian

manufacturing industry. Singh et al., 2005 have mentioned that the MSME sector contributes about 35 percent towards industrial production and around the same portion to the total exports of the Indian economy. The total proposed investment in the automobile sector is in the range of Rs 34,630 crore <sup>[6]</sup>. If the true benefits of the investments in manufacturing have to be realized, the Indian MSMEs have to be ready for the task.

## **2. LITERATURE REVIEW**

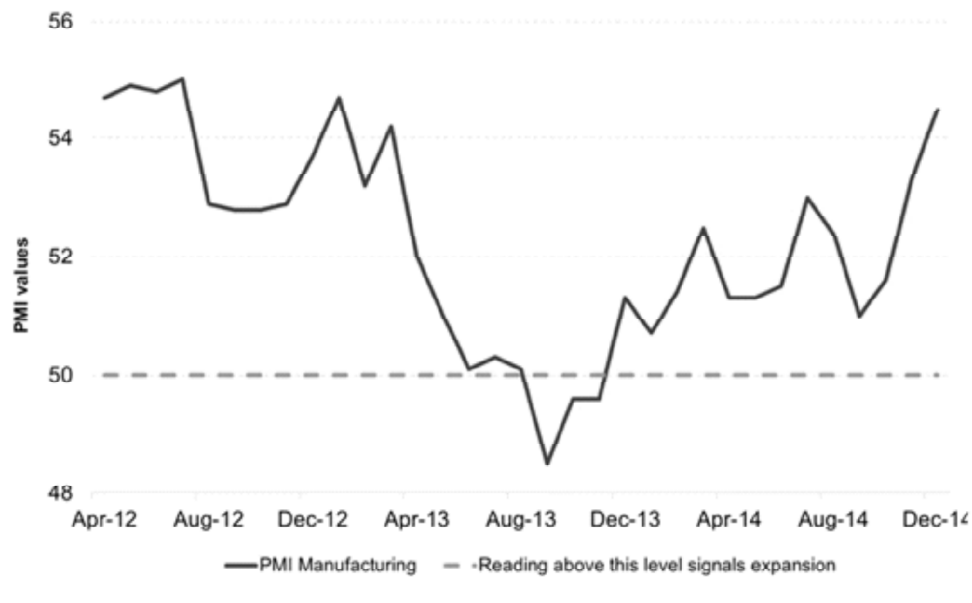
It is empirical that a campaign such as Make in India invites huge potential for the manufacturing firms producing in India. It would put the entire supply chain of the manufacturing firms to the test. The nature of the supply chain has also been changing. It is always a dilemma for firms to choose between efficiency based supply chain and a responsive supply chain.

As an alternative to the efficiency-based supply chain, Heikkilä (2002), Reichhartand Holweg (2007) and Gunasekaran *et al.* (2008) have examined the responsive state of supply chain which may assist in coping better with today's demand variations. Joshi *et al.* (2011) have discussed the determinants of competitiveness or Performance Indicators with regards to the significance of the Indian automobile sector for national competitiveness. Thakkar et al. (2008) have at length provided a detailed analysis and review of the existing literature on the issues in MSME supply chain. Joshi *et al.* (2013) have also discussed the various management strategies to improve the overall supply chain competitiveness of the firms which might prove relevant to the Indian MSMEs and bigger firms in implementing the changes to the Supply Chains as a result of the Make in India campaign. Constantine *et al.* (2011) in their research present a technique for the strategic management of the chain addressing supply planning to meet the desired performance. These techniques may go a long way in paving the structure for Indian manufacturing units in matching up to the quality standards and ensuring they adjust to the needs of the supply chains due to the investments in different pockets of the nation.

### **2.1 Importance of present study**

PMI known as Purchasing Managers' Index is released by HSBC for India compiled by Mark it. PMI includes these five indices <sup>[1]</sup>:

- New orders - 30% weight
- Output - 25% weight
- Employment - 20% weight
- Suppliers' delivery times - 15% weight
- Stocks of items purchased - 10% weight



**Figure 1: India's Manufacturing PMI (Source: HSBC)**

The composite index provides an assessment of the current conditions of the Indian manufacturing industry. A composite index score of above 50 indicates a general expansion in the manufacturing activity. On the other hand, an index score below 50 generally indicates a contraction in the manufacturing activity.

As per the graph which shows the PMI value, manufacturing activity had been slowing down gradually since July 2012 and reached its bottom in September 2013. The then index score had been 48.5 which as per the above mentioned details indicated a contraction in the manufacturing activity. The index scores have been on a constant rise since August 2014 and in December 2014 the index increased to 54.5. The new export businesses also surged at the fastest pace in 3 years. These recent index scores are indicative of the fact that the sentiments among the manufacturing fraternity are high, buoyed by the fact that huge investment commitments are flowing in from abroad. The automobile clusters are witnessing the most important impetus in terms of news of investments due to pour in in the next 5 years.

In the present study we try to analyse the future of the Make in India campaign, its effects on the supply chain of MSME manufacturing firms in India and how would it change the way Indian Supply Chain functions. There are many Key Performance Indicators (KPIs) for the Indian supply chains but a study of one of

the Indian automobile clusters would reveal the KPIs which are going to shape up the supply chains of the manufacturing firms in India. A comparative study has been conducted keeping in mind the scenario of the last 5 years (2010-15) and the possible scenario in the next 5 years (2016-21) due to the Make in India Campaign. The results will be indicative of the change the Indian Manufacturing supply chain will be undergoing in the coming few years as a result of the campaign and how should the MSMEs brace themselves for the future. Also, our study would be helpful to the policy makers as to which areas to focus upon while planning the policy initiatives for schemes such as Make in India.

### **3. RESEARCH METHODOLOGY**

There are a lot of KPIs which shape up any industry but whenever there is a change in government policy or any initiative which calls for huge investments to pour in, the KPIs have a scope to undergo change. There are no ground rules to decide the KPIs for a specific industry but the experience of the Indian MSMEs dealing with the OEMs over the years makes the identification of the KPIs easier. Content Analysis of the already carried out research was also used to identify the KPIs for the supply chain of MSMEs. The Indian automotive industry has undergone huge transformation over the decades. After the economic liberalization of 1991 which opened up the Indian market to a lot of foreign players, competition set in which led to the evolution of quality as an important KPI. The various options available to the consumers forced the makers to take consumer choices into consideration. The supply chain was forced to focus also on the responsive side rather than focussing on only the cost-effective aspect of the supply chain.

In our research we study one of the auto clusters in India and try to analyse the kind of changes they would witness as a result of the Make in India campaign and the investment by foreign players.

Statements were framed to capture the feedback regarding the identified KPIs in two different time frames. The first one is over the last 5 years (2010-15) and the second over the next 5 years (2016-21) to bring about a comparative analysis for these two different time frames. A scale of 1-10 was adopted and the respondents had to mark their choices based on 1 being highly disagree and 10 being highly agree. Pilot study was carried out to analyse the relevance of the adopted scale. A comparative scaling has been done to clearly establish the difference between the various parameters used in the questionnaire. The 7 Supply Chain performance indicators used in the questionnaire are operational efficiency, quality, cost-effectiveness, innovation, technology, proximity, and communication flow with OEM.

### **3.1. Data Collection**

Data was collected across different companies in the Adityapur Auto cluster who were responsible for supplying parts to OEMs all over the eastern region and across. Only the middle level managers who have been a part of the organizational set-up for the last 5 years and expect to continue serving in the MSMEs were asked to participate in the data collection process. 40 different managers were contacted across different MSMEs in the Adityapur auto cluster.

### **3.2. Analysis**

To analyse the responses recorded by the managers of the firms, we utilize Exploratory Factor Analysis (EFA) to investigate the systematic co-variation between performance indicator variables. Factor Analysis is a data reduction technique which is often used to obtain a smaller set of variables from a larger set. Any co-variation between the larger variable set doesn't exist in the smaller data set and we can clearly identify the leading variables which are the key parameters. The rotation adopted is varimax by default which gives us orthogonal factors which ensures that the factors obtained wouldn't be correlated to each other. We also performed the Cronbach alpha test to check for the reliability of the scale. Factor Analysis was conducted in SPSS version 21.0.40 data points each for both pre Make in India period and post Make in India period were used for the analysis.

## **4. RESULTS**

The Principal Component Analysis (PCA) was carried out separately for pre Make in India responses (for the period 2010-15) and post Make in India responses (for the period 2016-21). While carrying out the PCA, we limited the number of factors generated to 2 and further looked into the percentage of variance explained by both the factors and the corresponding eigen values.

### **4.1. For the Pre Make in India period (2010-15)**

We ran PCA on the recorded responses, and analysed for the eigen values and the variance explained by them. Component 1 explained around 35.7% of the total variance with an eigen value of 2.498. Component 2 with an eigen value of around 1.324 explained around 18.9% of the total variance. Together, these 2 components explained around 54.6% of the total variance. The Cronbach alpha value based on the standardized items for the data set was 0.882 which clearly states that the items have high internal consistency.

The dimensionality of Component 1 was explained the most by Quality, with the highest loading. The dimensionality of Component 2 was explained the most

by Cost Effectiveness, with the highest loading. Results have been included in the Appendix. Although the third component also had an Eigen value of over 1, we have looked into the top two components only to have comparative ground with the outcomes of the post Make in India period.

#### **4.2. For the Post Make in India period (2016-21)**

We analysed for the Eigen values and the variance explained by them after running the PCA. Component 1 explained around 60.7% of the total variance with an Eigen value of 4.253. Component 2 with an Eigen value of around 0.913 explained around 13% of the total variance. Together, these 2 components explained around 70.3% of the total variance. Since the Kaiser criterion suggests retaining components with an Eigen value of more than 1, we ignore component 2 here. The Cronbach alpha value based on the standardized items for the data set was 0.894 which clearly states that the items have very high internal consistency.

The dimensionality of Component 1 was explained the most by Operational Efficiency, with the highest loading, followed closely by Technology. The variable suggested by component 2 was proximity, with the highest factor loading. Component 2 had an Eigen value of below 1, but for comparative grounds with the pre make in India period, we have considered the variable with the highest factor loading of component 2 as well to have two variables for comparison.

### **5. CONCLUSION**

- a) As per the results obtained from carrying out PCA on the obtained data, we conclude that as per the managers from the various MSMEs, the variables which have guided the supply chain of the MSMEs in the pre Make in India period are quality and cost effectiveness. This seems quite logical as well, keeping in mind that the orders generated from the OEMs for the MSMEs are basically centred around cost traditionally. Quality concern has also become one of the important criterion due to the competition from a number of players, both foreign and domestic. Hence, the quality concern of the OEMs in their final product has led to the MSMEs also leading to maintain their quality standards.
- b) As per the results obtained from carrying out PCA on the obtained data, we conclude that as per the managers from the various MSMEs, the variables which are supposed to guide the supply chain of the MSMEs in the post Make in India period are Operational Efficiency and Technology. Although the results obtained aren't too surprising, keeping in mind that new foreign and private investment would ensure competition among the MSMEs as well and operational efficiency would gain even greater prominence. The most important variable to focus upon is that of Technology. Foreign OEMs investing in the

Indian manufacturing sector would demand greater technological prowess from the Indian MSMEs. This is the expectation of the MSME sector as well. Also, technology up-gradation will also result in an improvement in the overall efficiency of the MSMEs.

- c) The results obtained are in perfect sync with the general perception of the effects of investments in the manufacturing sector under the Make in India scheme. These results also indicate that there is a greater urgency on the part of the government to ensure adequate credit flow to the MSMEs so that they reap the benefits of the investment in this sector. Technology upgradation isn't a short-term process and it would need sufficient timely credit along with infrastructural support.

Apart from the conclusions which could be abstracted from the factor analysis, there are various changes which are likely to occur as a result of the proposed investments. Previous OEMs although established without proper clustering, the new OEMs while setting up are wary of the huge inventories, the associated costs, logistics costs and the uncertainties associated with the transportation from the supplier end to the OEM end. Supplier/vendor parks although a concept new to the Indian manufacturing industry is fast picking up. A live example of this is located in the eastern cluster. Tata Hitachi Construction Machinery which set up a new manufacturing facility at Kharagpur (West Bengal) in 2009 has set-up a dedicated vendor park besides its premises. This has enabled it to have a better control on the delivery times, has helped it manage the inventory levels better and have a better control on quality of the parts delivered.

The total logistics cost which our country bears is around 14% of the GDP. The corresponding figures for North America are 8.7% of their GDP. Here in lies a huge potential in terms of cost savings and avoiding unnecessary delays leading to huge tangible and intangible losses. Thakkar et al.(2011) and Mitra 2006 have estimated that the savings in India would be around \$20 billion, resulting in a potential 4.3 percent drop in the price of Indian goods globally, making Indian goods more competitive<sup>[4]</sup>. India ranks 10th on the parameters of product quality, design and on-time delivery and 9th in the case of after sales service and managing distribution among ten developing countries<sup>[3]</sup>, which further boosts up the prospects of setting up of more and more supplier parks.

## CONCLUSION

The money blocked in the form of inventories - raw material, work-in-process and finished goods are a measure of the responsiveness of the supply chain to market demand. If we look at the numbers on an average, an Indian firm carries a total raw material inventory of 33.41 days and a Work In Progress (WIP) inventory



of 14.25 days. Finished goods inventory total up to that of 16.09 days <sup>[3]</sup>. These numbers also point towards how the supply chain of manufacturing firms should work towards the supplier-OEM relationship. A collaborative approach would indeed help boost confidence in the OEM for the suppliers which in-turn would lead to reduced inventories, improved quality.

**Appendix**

For the Pre-Make in India period (2010-15)

**Reliability Statistics**

<i>Cronbach's Alpha</i>	<i>Cronbach's Alpha Based on Standardized Items</i>	<i>N of Items</i>
.871	.882	7

**Total Variance Explained**

<i>Component</i>	<i>Initial Eigenvalues</i>			<i>Extraction Sums of Squared Loadings</i>			<i>Rotation Sums of Squared Loadings</i>
	<i>Total</i>	<i>% of Variance</i>	<i>Cumulative %</i>	<i>Total</i>	<i>% of Variance</i>	<i>Cumulative %</i>	<i>Total</i>
1	2.498	35.679	35.679	2.498	35.679	35.679	2.185
2	1.324	18.914	54.593	1.324	18.914	54.593	1.637
3	1.239	17.694	72.287				
4	.692	9.888	82.175				
5	.596	8.512	90.687				
6	.368	5.261	95.949				
7	.284	4.051	100.000				

**Rotated Component Matrix<sup>a</sup>**

	<i>Component</i>	
	<i>1</i>	<i>2</i>
OE	.584	.251
Quality	.734	-.016
CostEffectiveness	.343	.812
Innovation	-.007	.794
Technology	.588	.219
CommunicationFlow	.633	-.364
Proximity	.665	.320

For the post-Make in India period (2016-21)

### Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.892	.894	7

### Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	4.253	60.755	60.755	4.253	60.755	60.755	2.718
2	.913	13.048	73.803	.913	13.048	73.803	2.449
3	.568	8.115	81.918				
4	.499	7.133	89.051				
5	.321	4.584	93.634				
6	.229	3.277	96.911				
7	.216	3.089	100.000				

### Rotated Component Matrix<sup>a</sup>

	Component	
	1	2
OE	.918	.148
Quality	.687	.436
CostEffectiveness	.435	.688
Innovation	.575	.560
Technology	.856	.289
CommunicationFlow	.375	.738
Proximity	.091	.906

### Scale

S.No.	Question	Currently (2010-15)	Due to Make in India (2016-21)
1	How important is operational efficiency for your survival		
2	How critical is quality enhancement to your performance		
3	How critical is responsive supply chain to your survival (delivery on time)		
4	How critical is efficient supply chain to your survival and performance (cost-effectiveness in SC)		
5	How do you rate innovation in terms on effect on gaining orders and on performance		
6	How much effect does in-house technology has on gaining orders and on performance		
7	The importance of nature of supplier-OEM relationship		
8	How important is the communication flow between supplier and OEM and vice-versa		
9	How important is technology collaboration with the OEM		
10	The criticality of proximity of your premises to OEM's plant for approaching for order & shipment		
11	How important is profit maximization in comparison with long-term relationship with OEM		
12	How important is the brand name of the OEM in approaching for orders		
13	How much involvement has been to achieve an export led strategy after making in India		
14	The extent of positive impact on your inventory levels (10 for highly favorable, 0 for highly unfavorable)		
15	Importance of featuring in vendor parks of OEMS		
<b>NOTE:</b>			
1	Mark responses for each question on a scale of 1 to 10		
2	1 indicates highly disagree/highly unfavorable		
3	10 indicates strongly agree/highly favorable		

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