

Article Info

Received: 25 Sept 2015 | Revised Submission: 20 Oct 2015 | Accepted: 28 Nov 2015 | Available Online: 15 Dec 2015

Implementation Difficulties of JIT Distribution Process in Supply Chain Management of Indian Industries

Harvinder Singh, Aneesh Goyal** and Jeewan Singh****

ABSTRACT

Distribution of the finished product quickly and on time has become more and more important and requires the support of a logistics system. To carry out the distribution process we need to have quick Order processing mechanism, Quick and reliable transportation system, Quick delivery, Use of latest technology, efficient Ware housing and dedicated human factors. Companies can take advantage of the just-in-time (JIT) approach to integrate those requirements to achieve in cost reduction, lead-time reduction, quality assurance, and overall customer's satisfaction. And that is how company establishes a long lasting relationship with the customers. This paper examines the important factors attributing the JIT distribution process (JDP) in Indian Industries. To know the difficulties faced by Indian firms in implementing the concept is explored by the survey method. It is concluded that the implementation problem of JDP are short sightedness of top management, Well connectivity of Warehouses, Cross docking, Small shipment size, Multi functional workers and JIT adopting as culture.

Keywords: *Distribution Process; Just in Time (JIT); JIT Distribution Process (JDP).*

1.0 Introduction and Literature Review

Recent years, both academicians and practitioners are keen to understand the mechanism of supply chain in collaboration of different methods. As there is always search in Finding ways of matching supply with demand, while maintaining minimum levels of inventories Throughout the entire supply chain. Several researchers have examined many theoretical, as well as practical issues involving buyer-supplier and customer coordination, as a means of attaining successful implementation of just-intime supply chain (JSCM) (fig 1). In order to achieve an efficient SCM planning in the process of supply of raw material, its processing and distribution is to be revised time to time.

Kannan and Tan, (2010), report the Supply chain is as a function of various factors such as Human behaviour, suppliers, manufacturers and distributors and sharing of information. This paper considers the problem of effectively distribution of finished goods to customers. The distribution network consists of multi warehouses and multi-retailers where the finished goods are temporarily stored prior to reaching the end users and can be called as

warehouse. A warehouse is generally located centrally to cater the demand and replenishment of multi retailers according to their requirements (Korepla and Lehmusvaara, 1999). Owing to the limited supply capacity in each warehouse, an optimal distribution requirements planning is a done in SCM (Bowersox, 2007). To maximize the profit of all stake holders in the supply net work distribution process is to be enabled with latest use of IT, so that the tracking and record of material at each instances is maintained (Zimmer, 2002). As soon as the new demands arise the manufacturing firms are aligned with producing and dispatching the same (Bushuev and Alfred, 2012),. The finished goods are positioned (warehoused) at the convenient place so that delivery may be possible when and where ever is required by the customer (Wang, et al., 2004). The paper is organized as section one is introduction and a brief literature reviews of the topic, section two is defining of the research agenda and a brief of methodology used, section three is recognition of the factors and sub factors, section four is data collection and analysis through SPSS-17 software and displaying

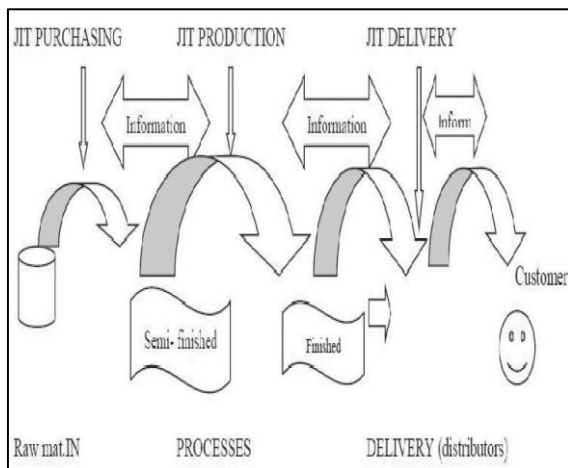
*Corresponding Author: Department of Mechanical Engineering, CGC College of Engineering, Landran, Mohali, India (E-mail: Honey.17aug@gmail.com)

**Department of Mechanical Engineering, CGC College of Engineering, Landran, Mohali, India

***Department of Mechanical Engineering, CGC College of Engineering, Landran, Mohali, India

of results in tabulated form, section five is discussion of findings and section six is conclusion.

Fig 1: Flow of Material and Information (Adopted from Mishra et al., 20013)



2.0 Defining of the Research Problem and Methodology

A distribution network consists of multi-warehouses and multi-retailers. The warehouses supply different kinds of products to the retailers, such that retailers get the exact of their demand on its due date, at place and on fare price (Wang, et al. 2004). Owing to the fact that the same product has different prices in the different markets, different manufacturers produce the same kind of product at different costs. The products from different Manufacturers are transported to the warehouses, which in turn supply the products to the retailers under different pricing arrangements. Understanding the distribution process (DP) In India is very important as it is an emerging economy. The frequent breakdown of the supply chain remained our regular news. Recently the sharp and sudden hike of onion price can be taken as mismanaged distribution problem which could have been looked amount available with country. From the literature we have recognized some factors (table 1.) which are affecting the distribution process and most critical problems are recognized so that care full planning can be done.

A survey of the Indian Industries is carried out to know the critical factors. In survey a questionnaires are floated to indicate the degree of difficulty; faced in implementation of JIT distribution process (JDP) in their firm. Keeping Research objectives, questionnaire based on a five point Likert scale is designed with the help of expert and by own experience of the authors. The expert of the field

were contacted to indicate the importance of listed critical factors and sub-factors on this scale, ranging 1 to 5 correspond to ‘Very easy’ to ‘Highly difficult’, respectively.

3.0 Identification of Distribution Factors in JSCM

Through the literature review and interactions with practicing managers and academicians, some factors and their sub factors are recognized which facilitate the adoption and implementation of JIT in distribution of any supply chain, have been identified and presented in Table I. Taking inspiration of these authors, attributes have been categorized into the following six categories in the present study:

- 1) Order processing
- 2) Quick and reliable transportation
- 3) Quick delivery
- 4) Use of technology
- 5) Ware Housing
- 6) Human Factors

Table 1: Recognition of Factors and Sub Factors of Distribution System

Sr No.	Factors	Sub-factors	References
1.	Order processing	1. quick order 2. Accurate forecasting	Takahashi et al. (2004)Soni, and Kodali,(2012)
2.	Quick and reliable transportation	1. Short delivery time to customer 2. Quick response to changing supplier needs 3. Short promised lead time	Mason .& Lalwani, (2006)Korepla, and Lehmsvaara, (1999), Roger & Roy (2005)Yima et al. (2011)
3.	Quick delivery	1. Reliable delivery 2. High Delivery speed 3. Pull distribution	Zimmer (2002)Mason & Lalwani, (2006)Wang (2004)
4.	Use of technology	1. Material tracking devices 2. Information sharing 3. Electronic Data interchange 4. GPS	Chan and Zhang, (2011)Expert opinionMistry (2005)
5.	Ware housing	1. centrally located 2. Follow of 5S 3. Connectivity 4. Quality packaging 5. Cross docking 6. Small shipment size	Korepla and Lehmsvaara (1999), Bowersox et al. (2007)Chan and Zhang, (2011),Zimmer (2002)Sourabpour et al (2012)Kumar and Singh, (2012)
6.	Human factors	1. involvement of top management 2. JIT as a culture 3. Multi-functional worker	Bushnev and Alfred (2012), Zhuang, (1994),Kannan, and Tan, (2010)

4.0 Data Collection Analysis

In total, questionnaires were sent to 119 Indian companies situated in different parts of India. Out of the 43 questionnaires completed questionnaires were received. Seven questionnaires were incomplete and were discarded. Therefore, only 36 questionnaires were considered. Among the respondent we included senior executives of the leading firms who held upper

level positions such as president, vicepresident, CEO, managing director, general manager, manager, engineers, etc and 40 respondents selected from academics and consultants. The responses were used to evaluate the one tailed T-test in order to understand the severity of the factors. The test is performed using the software spss-17. The test value is taken as 2. We now set up a hypothesis null and alternate i.e. H₀ and H_a respectively. H₀ hypothesis is true if the test value is equal to 2 or more than two i.e. difficulties faced in adopting the JIT in DP in the SC is difficult where as If the value of t-test is less 2 it means H_a is true and the factors are not difficult to implement. Factor of significant is taken as 95%.

Follow of 5s	5.292	35	.000	.66667	.4109	.9224
Well connectivity	5.916	35	.000	.50000	.3284	.6716
Quality packing	-1.435	35	.160	-.16667	-.4025	.0691
Cross docking	10.583	35	.000	1.33333	1.0776	1.5891
Small shipment size	5.493	35	.000	.83333	.5253	1.1413
Involvement of top management	-1.435	35	.160	-.16667	-.4025	.0691
JIT as culture	10.583	35	.000	1.33333	1.0776	1.5891
Multi functional workers	8.367	35	.000	.66667	.5049	.8284

	N	Mean	Std. Deviation	Std. Error Mean
Quick ordering	36	2.3333	.95618	.15936
Accurate forecasting	36	2.3333	.95618	.15936
Short delivery time to customer	36	2.1667	.81064	.13511
Quick response to changing customer needs	36	3.0833	.96732	.16122
Short promised lead time	36	1.9167	.64918	.10820
Reliable delivery	36	2.9167	.96732	.16122
High delivery speed	36	2.5833	1.05221	.17537
Pull distribution	36	2.5833	.87423	.14571
Material tracking devices	36	2.5000	1.13309	.18898
Information sharing	36	1.9167	.76997	.12833
Electronic data sharing	36	2.0000	.82808	.13801
GPS	36	3.1667	1.08233	.18039
Centrally location of warehouses	36	2.0000	.58554	.09759
followof5s	36	2.6667	.75593	.12599
Well connectivity	36	2.5000	.50709	.08452
Quality packing	36	1.8333	.69693	.11616
Cross docking	36	3.3333	.75593	.12599
Small shipment size	36	2.8333	.91026	.15171
Involvement of top management	36	1.8333	.69693	.11616
JIT as culture	36	3.3333	.75593	.12599
Multi functional workers	36	2.6667	.47809	.07968

Test Value = 2						
Sub-factors	t	df	Sig.	Mean	95% Confidence Interval of the Difference	
					(2-tailed)	Difference
Quick ordering	2.092	35	.044	3.3333	.0098	.6569
Accurate forecasting	2.092	35	.044	3.3333	.0098	.6569
Short delivery time to customer	1.234	35	.226	1.6667	-.1076	.4409
Quick response to changing customer needs	6.720	35	.000	1.08333	.7560	1.4106
Short promised lead time	-.770	35	.446	-.08333	-.3030	.1363
Reliable delivery	5.686	35	.000	.91667	.5894	1.2440
High delivery speed	3.326	35	.002	.58333	.2273	.9393
Pull distribution	4.004	35	.000	.58333	.2875	.8791
Material tracking devices	2.646	35	.012	.50000	.1163	.8837
Information sharing	-.649	35	.520	-.08333	-.3439	.1772
Electronic data sharing	.000	35	1.000	.00000	-.2802	.2802
GPS	6.468	35	.000	1.16667	.8005	1.5329
Centrally location of warehouses	.000	35	1.000	.00000	-.1981	.1981

5.0 Discussion of Findings

It is observed that Quick response to changing customer needs, Reliable delivery, GPS, Follow of 5s, Well connectivity, Cross docking, Small shipment size, Multi functional workers and JIT as culture are the critical factors which Indian firms find difficult to come over. The most alarming factor is development of JIT as a culture in side the firm. As per (Garg et.al 1994) JIT as a culture of firm will boost the overall performance of the Indian firms. The t test also reveals that finding of the multi functional workers are not easy.

5.1. Quick response to changing customer needs

Consumer demand for innovative and fashion products is highly unpredictable, but could be fulfilled through quick response manufacturing system. (Roger and Roy, 2000),

However, the extra cost is usually considered to be a barrier to such an approach and therefore it seems difficult to adopt JDP. Quick delivery, 3rd party logistics, reliable transportation and small Shipment of the material remained the most important factors in distributing the finished goods (Takahashi et al 2004). Quick response is possible only when we have the efficient transportation mode and transporting regulatory policy (Chan and zhang 2011).

Material handling in or out of the firm are very much responsible to the customers as well as to the manufacturers in terms of getting the right material at the shortest possible time (Kumar and Singh 2012). Cross docking is practiced to reduce the delivery time in which unloading materials from an incoming semi trailer, car and loading these materials directly into outbound trucks, trailers, or rail cars, with little or no storage in between.

This may be done to change type of conveyance, to sort material intended for different destinations, or to combine material from different origins into transport vehicles (or containers) with the same, or similar destination.

5.2. Reliable delivery

The goal of JIT is a significant reduction of work-in-process inventory by frequent feeding of production inputs. Mason & Lalwani, (2006) report that the demand of more frequent, small-size, and premium shipments seem to cause higher transportation cost, and trading off reduced inventory against higher transportation costs become the critical factor for total cost minimization.

As per Garg & Deshmukh (1999) the diverse terrain of India with different state rules for taxes hamper the regular supply of the finished as well as of raw materials. The outbreak of band, strikes, potholes and robbery are the main reason to remain awesome delivery.

5.3. Multi functional workers

Finding of multi skilled workers are not very difficult but retention of them is the big problem in front of the industries due to various reasons. Like handsome salary abroad, family problem, medical etc. (Garg and Garg, 1999)

5.4. Regarding JIT as culture Garget al. (1994) explains that JIT to be treaded as culture in the industries for better future. This will automatically improve the performance. But the recent literatures show the adoption and understanding of JIT as culture is very slow.

6.0 Conclusion

Study of Garg and Deshmukh (1999) regarding JIT Concepts and Relevance in Indian Context clearly shows the great potential of the business. They also show some basis problems which are involvement of top management, poor infrastructures and cross trained man power.

The smart packaging prevents the finished goods from the damage and ensures the reliable delivery to the customer (Mishra, et al. 2013). In time receipt of the demanded goods enlightens the customer and is one way to gain market value (Mistry, 2005).

The t- test shows that adoption of JIT as a culture is highly problematic area, for that an environment is to be created by making the stake holders and customers aware of the benefits of the Just in time supply chain.

The national infrastructure plays a great role in providing the basic needs of the supply net work.

The good roads, fast trains, uniform taxation and good civics can prove better solution for the JSCM in India.

References

- [1] R. Balakrishnan, T. J. Linsmeier, M. Venkatakchalam, Financial Benefits from JIT Adoption: Effects of Customer Concentration & Cost Structure, *The Accounting Review*, 71, 1996, 183-205
- [2] D.J. Bowersox, D.J. Closs, C.M. Bixby, *Supply chain logistics management*. McGraw-Hill International Edition, 2nd ed. Boston, MA: McGraw-Hill, 2007
- [3] M. A. Bushuev, L.G. Alfred, Optimal position of supply chain delivery window: Concepts and general conditions, *Int. J. Production Economics* 137, 2012, 226–234
- [4] F. T. S. Chan, T. Zhang, The impact of Collaborative Transportation Management on supply chain performance: A simulation approach, *Expert Systems with Applications*, 38, 2011, 2319–2329.
- [5] D. Garg, S. G. Deshmukh, JIT Concepts and Relevance in Indian Context, *Industrial Engineering Journal*, 28, 1999, 14-18
- [6] S. Garg, P. Vart, A. Kanda Work Culture in JIT Environment.” *Productivity Journal*, 35, 1994, 463-466
- [7] V. R. Kannan, K. C. Tan, Supply chain integration: cluster analysis of the impact of span of integration, *Supply Chain Management: An International Journal*, 15(3), 2010, 207-15
- [8] J. Korepla, A. Lehmusvaara, A customer oriented approach to warehouse network evaluation and design. *International Journal of Production Economics*, 59, 1999, 135–146
- [9] P. Kumar, R. K. Singh, A fuzzy AHP and TOPSIS methodology to evaluate 3PL in a supply chain, *Journal of Modelling in Management*, 7(3), 2012, 287 – 303
- [10] R. Mason, C. Lalwani, Transport integration tools for supply chain management, *International Journal of Logistics Research and Applications*, 9:1, 2006, 57-74