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JIT PRACTICES IN INDIAN INDUSTRIES: A SURVEY

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ABSTRACT

This paper examines the implementation of Just-in-Time (JIT) based managerial philosophies in the Indian industries. Specifically, JIT benefits and reasons for slow implementation of JIT in Indian industries are investigated through a on-line survey using www.questionpro.com. The results of this survey support the notion that JIT has potential to increase the organizational performance of Indian industries. However, to achieve this potential, Indian industry must be willing to modify their procedures and operations. In this research paper, the critical elements of the JIT in the context of Indian manufacturing industries were identified using a online survey approach. The online questionnaire was sent to the 78 industries and 33 industries responded. On the basis of the responses, critical elements were identified. Attempts have been made to examine the degree of importance and degree of difficulties in adoption of JIT; solutions were also suggested to overcome some of these problems.

Keywords: Critical elements, Just-in-time, JIT purchasing, JIT manufacturing companies,

INTRODUCTION

Increasing international competition has forced the small companies to seek new ways to develop a competitive edge. Indian industries have also been adopting new

manufacturing approaches, managerial philosophies and information technology to survive in the emerging competitive market. However, Indian industries have not yet tested the full effect of popular JIT approach on performance of production system due to its limited implementation. Considering its potential in enhancing performance of organizing, investigation on the important JIT issues is essential. Survey has shown that JIT philosophy has the potential for increasing organization efficiency and productivity. However, JIT benefits do not just happen. Before an organization enjoys with the benefits of JIT, it must accept JIT as an organizational philosophy. This may require the organization to change its operational procedures, production system and in most cases work culture also. In this context, in many cases the plants layouts have to be changes, relations with suppliers and Kanban have to be implemented. Many researchers have reported that JIT has potential of reducing inventory- carrying costs. It is also instrumental in reducing lead time, decreasing set ups time, improving production quality, increasing productivity and enhancing customer responsiveness. Motivated by potential benefits of successful implementation of the JIT to the organizations and lack of research addressing the implementation problems in Indian context, survey of 33 industries was conducted. This survey has thrown some light on the degree of difficulty in implementation of JIT based managerial philosophy in Indian industries. The expected JIT benefit is really recognized that implementation is also examined in the study. Although it is really recognized that implementation of JIT in Indian industries is not an easy job yet number of attempts are being made in several Indian industries to implement the JIT in phased manner with belief that it would be helpful in facing the global competition.

PAST STUDIES IN INDIAN CONTEXT

A few papers are available on JIT practices which highlight the positive impact of JIT on Indian industries. Sharma and Singhvi (2009) conducted a case study on two Indian

agricultural equipment manufacturing companies, which have implemented JIT. In one case the profits of the company were found to have increased by 10%. While in the second case the company was successful in reducing the level of inventory by over 20% and reduction of waste up to 5%. The lead-time was also reduced to over 20%.

Yasin and Small (2006) conducted on the basis of investigation of 86 organization of US public sector, that JIT is a form of “managerialism”, has the potential to increase the operational efficiency, service quality and organizational effectiveness of public sector organizations.

Garg *et al.* (1998) have conducted a survey of 31 Indian industries to analyze the importance of the attributes pertaining to JIT purchasing and supplier evaluation criteria. The surveyed companies has given great importance to some attributes such as high quality, mutual trust, cooperated relationship, on time deliveries, supplier evaluation, stable production schedule, reliable network of suppliers, reduced delivery time, long-term contract and continuous improvement. The study has also indicated the scope of JIT as 70 on scale (0-100), which is predicted better compared to earlier studies.

Chandra and Kodali (1997) have developed a multi-attribute decision model using analytical hierarchy process (AHP) for justification of JIT manufacturing system in Indian industries. The selection of important JIT attributes and sub-attributes were then used in AHP to achieve the related benefits. The results of the study have quantified the JIT benefits in descending order: increased profit margin, improved competitive position, quality improvement and reduction in inventory.

Deshmukh (1996) has attempted review on the state of the art of JIT and its possible ramifications in the purchasing and manufacturing systems. It has been pointed out that JIT from a system perspective requires that suppliers and manufacturing functions must be in relation with design, planning and control. JIT must be viewed as a binding force coupling all the activities from incoming raw material to the finished goods.

Garg *et al.* (1996) have conducted a case study in JIT implementation of an Indian tractor assembly industry. Records of company have indicated that significant benefits are achieved by improvement in quality and productivity and reduction in inventory, material movement, space, manpower, work-in-process and lead-time. The key elements in JIT implementation were extensive training of employee on pull concepts; identification of key performance parameters; new layout based on U-shaped cells, visual control and multi-skill training.

Garg *et al.* (1994) has explored the specific cultural required in JIT implementation and also reported their presence in Indian industries. They have stated that trust, locality, responsibility, development, motivation, authority, long-term relationship, and respect for human beings mark work culture required in JIT environment. It is critical for industries to make conscious efforts to change the work culture for successful implementation of JIT. These changes require top management commitment and worker participation in decision making and massive education and training to the people concerned.

Vrat *et al.* (1993) have conducted a Delphi study to assess the applicability of implementing JIT elements in Indian context. The results have shown that quality circles and good communication are not very difficult to implement having a rating 30 and above on a 40 point scale. Top management attitude, multifunctional workers, long-term relationship with supplier and support from worker have high rating, which indicates that JIT implementation in India is not an impossible task. The study has also stressed on focusing more on error prevention, reduced set up time, Kanban system and quality of incoming material.

SURVEY OF JIT PRACTICES

JIT imposes a different set of requirements on the typical work culture. Work culture reflects the way of life of people, their norms and values regarding work in an organizational setting where technology and social cultural forces jointly, determine

managerial style and practices. In other words, work culture plays a significant role in successful implementation of JIT. Peoples and managers of different countries think differently, according to their social and cultural principles. Therefore the implementation of JIT in India may be different from its implementation in western countries. Such dissimilarity cause different types of implementation problems that would not be found in other society. This research paper, therefore attempts to analyze some important JIT issues in Indian context by conducting a on-line survey of 33 industries. The main objectives of this survey were:

1. To identify those elements, which are highly difficult to implement in Indian industries.
2. To search out most accountable reasons for its slow implementation in India.
3. To highlight the most expected JIT benefits.

RESEARCH METHODOLOGY

This study includes four phases: (a) On-line Questionnaire, (b) Data Collection, (c) Data Analysis and (d) Conclusions. First phase of this study was to review the literature related to JIT from several books, journals, reviews and relevant websites. Based on this reviews, various dimensions and related elements of this concept was identified. At last, using on-line survey, a questionnaire was prepared. The questions were on the company's profile, JIT benefits, JIT implementation and related problems. This on-line survey questionnaire was emailed to 78 industries located globally. Initially responses were poor. To get more responses various social networking websites were used and emails were sent to concern specific persons. In all 33 industries responses were completed and found suitable for study, making responses rate 80 per cent. The general profile of selected companies is given in table 1.

Table 1: General Profile of Companies

Types of Company	Automobile:7, Heavy Machines:9, Electronics:6, Others:12
Awareness about JIT	Yes: 20, No: 11, May be: 2
JIT purchasing	Agree: 67%, Strongly Agree: 23%, Disagree: 10%
Training to employees	Yes: 35%, No: 65%

Among 33 companies surveyed, seven were automobiles, nine heavy machines, six electronics and eleven others. Most of the respondents were aware about JIT.

ANALYSIS

The t-test is conducted at 5 per cent level of significance to analyze JIT issues such as difficulty in implementing the JIT elements, expected benefits of JIT implementation and reasons for the slow implementation of JIT in Indian industries. The following hypothesis was formulated for t-test:

1. H_0 : No element of JIT listed in Table 2, is difficult to implement in Indian industry (The null hypothesis (H_0) will rejected if JIT element subjected under test is not difficult to implement).
2. H_0: All JIT benefits listed in Table 3 could not be achieved through JIT implementation (The H_0 will be rejected if surveyed companies have achieved any expected JIT benefits).
3. H_0: All causes listed in Table 4, are not responsible for slow implementation of JIT in Indian industries (The H_0 will be rejected if surveyed companies face similar problem).

Table 2: Degree of Difficulty in Implementing JIT Attributes by the Respondents

S.N0	JIT elements	Degree of difficulty Low High	No Response	Mean Score	t-value Calculated	Result Let H_0=3

		1	2	3	4	5				
1.	Automation	0	5	1	19	7	1	3.75	3.795*	H_0= Rejected H_1= Accepted
2.	Frequent & reliable delivery	0	5	4	13	8	3	3.45	1.763*	H_0= Accepted
3.	JIT purchasing	0	3	0	20	7	3	3.67	2.722*	H_0= Rejected H_1= Accepted
4.	Kanban card or system	0	2	0	12	16	3	4.00	3.829*	H_0= Rejected H_1= Accepted
5.	Set up time reduction	0	4	0	21	4	4	3.39	1.509*	H_0= Accepted
6.	Small lot sizes	0	8	1	17	2	5	2.93	-0.223*	H_0= Accepted
7.	Strong buyer-supplier relationship	0	10	0	14	9	0	3.67	3.217*	H_0= Rejected H_1= Accepted
8.	U-cells / Layout improvement	2	12	7	4	3	5	2.36	-2.514*	H_0= Accepted
9.	Scheduling flexibility	0	9	7	13	1	3	2.91	-0.406*	H_0= Accepted

*Significant at 5% level.

Table 3: Expected benefits of JIT implementation as perceived by respondents

S.N0	Expected Benefits	Degree of difficulty Low High	No Response	Mean Score	t-value Calculated	Result Let H_0=3

		1	2	3	4	5				
1.	Improved Competition Position	0	3	0	16	13	1	4.091	5.554*	H_0= Rejected H_1= Accepted
2.	Increased inventory turn	0	4	0	20	7	2	3.737	3.260*	H_0= Rejected H_1= Accepted
3.	Increased productivity	0	3	2	14	8	6	3.273	0.883*	H_0= Accepted
4.	Increased profit margin	0	0	2	15	12	4	3.818	3.032*	H_0= Rejected H_1= Accepted
5.	Low scrap rate	0	7	2	17	2	5	2.969	-0.112*	H_0= Accepted
6.	Reduced Inventories	0	3	1	15	11	3	3.757	5.013*	H_0= Rejected H_1= Accepted
7.	Reduced production lead time	0	3	4	18	5	3	3.485	2.029*	H_0= Accepted
8.	Reduced purchase lot size	0	3	0	22	7	1	3.909	5.013*	H_0= Rejected H_1= Accepted
9.	Reduced raw material/parts	0	3	2	15	10	3	3.696	2.727*	H_0= Rejected H_1= Accepted
10.	Reduced work-in-process	0	2	0	19	9	3	3.787	3.212*	H_0= Rejected H_1= Accepted

*Significant at 5% level.

Table 4: Reasons for slow implementation of JIT

S.N0	Reasons	Degree of difficulty Low High	No Response	Mean Score	t-value Calculated	Result Let H_0=3

		1	2	3	4	5				
1.	High cost of implementation	0	0	1	13	17	2	4.242	5.824*	H_0= Rejected H_1= Accepted
2.	Lack of production technology	6	17	0	8	1	1	2.333	-3.148*	H_0= Accepted
3.	Lack of support from supervisors	7	14	0	11	0	1	2.394	-2.789*	H_0= Accepted
4.	Lack of support from suppliers	0	14	1	9	7	2	3.091	0.356*	H_0= Accepted
5.	Lack of support form HRD and R&D department	8	15	2	5	1	2	2.091	-4.321*	H_0= Accepted
6.	Lack of top management	10	14	3	3	1	2	1.939	-5.326*	H_0= Accepted
7.	Lack of training	0	12	2	14	3	2	3.060	0.263*	H_0= Accepted
8.	Lack of JIT understanding	0	4	0	21	7	1	3.848	4.458*	H_0= Rejected H_1= Accepted

9.	**Traditional methods of quality control**	**0**	**1**	**1**	**14**	**12**	**3**	**3.484**	**3.387***	**H_0= Rejected H_1= Accepted**

*Significant at 5% level.

The result of t-test was given in table 2 to 4. The study indicates the JIT on 0-5 scale, implying that perfect implementation of JIT is slightly difficult in Indian industries. It has been found that JIT elements such as automation, JIT purchasing, Kanban system, strong buyer-supplier relationship are difficult to implement while other elements such as frequent and reliable delivery, set up time reduction, small lot sizes, U-cell/ layout improvement and scheduling flexibility are easy to implement in Indian industries. Similarly JIT benefits such as improved competition position, increased inventory turn, increased profits margin, reduced inventories, reduced purchase lot sizes, reduced raw material/parts and reduced work in progress are expected benefits. The results of the survey indicates that high cost of implementation, lack of JIT understanding and traditional methods of quality control are the major traditional reasons for slow implementation of JIT in Indian industries. Even with these problems, Indian industries are expecting significant benefits from JIT implementation. Statistical test confirm that scope of JIT in India is good. So attention must be focused on critical elements of JIT to reap maximum benefits.

DISADVANTAGE OF JIT IMPLEMENTATION

For more than a decade, JIT has been routed as prime way to keep costs down and assembly lines running smoothly. However, some researchers criticized that JIT methods have been considerable negative implication at various levels. Indian industries should be examined these issues prior to the implementation of JIT. These are:

1. Implementation of JIT does not automatically increase profits because benefits derived from JIT adoption may be offset by its many direct and indirect costs. In

addition the industries cannot expect favorable results just by implementation the JIT because it demands appropriate 'fit' between new manufacturing practices and industry design structure and processes. Its success also depends critically on management commitment and employee empowerment.

2. JIT demands the delivery of high quality parts/raw material in small lots. The small lot size production requires increase in efficiency and reliability of production sustem to unrealistic level because multiple sourcing becomes difficult under JIT.
3. JIT programmes not one-time efforts that can be quickly implemented. Such programmes need continuous assessment to achieve a sustained improvement in quality. They require continuous close cooperation and communication at all levels of industries.
4. The JIT information system, kanban requires longer time to transmit any new information through the system as compared to centralized information processing system.

CONCLUSIONS AND RECOMMENDATIONS

The results of this survey support the notion that JIT has the potential to increase the operational efficiency, quality and organizational effectiveness of Indian industries while its some basic elements are slightly difficult to implement in existing production system of industries. To gain the benefits of JIT, Indian industries must be willing to modify their procedure for dealing with supplier, analysis of operations to identify the areas of standardization, simplification and automation and reengineering of operational processes and procedures are some important issues, which should be examined prior to implementation of JIT. If these issues are not adequately addresses the JIT efforts is bound to encounter human and supplier related problems. The potential benefits of JIT to Indian industries are not in doubt. However, the art of designing the right strategy for

implementation the JIT in Indian industries is debatable. Therefore, issues related to these concern are worthy of future research.

REFERENCES

1. Chandra, S. and Kodali, R. (1997): “Implementation of JIT manufacturing system: An overview”, *Journal of Productivity,* Vol.38, pp.312-321.
2. Deshmukh, S.G. (1996): “Just-in-time: A survey, proc second SERC school advanced manufacturing techniques”, *Indian Institute of Technology, Bombay,* pp.140-148.
3. Garg, D., Deshmukh, S.G. and Koul, O.N. (1996): “Attributes for JIT purchasing and supplier evaluation: A survey”, *Journal of Productivity,* Vol.38, pp.322-326.
4. Garg, D., Koul, O.N. and Deshmukh, S.G. (1998): “JIT implementation a case study”, *Journal of Production and Inventory Management,* Vol.22, pp.26-31.
5. Garg, S., Vart, P. and Kanda, A. (1994): “Work culture in JIT environment”, *Journal of Productivity,* Vol.35, pp.463-466.
6. Kaujalgi, V.B. and Lingraj, B.P. (1997): “Implementation of JIT systems: A Case Study”, *Journal of Industrial Engineering,* Vol.26, pp.8-11.
7. Mahadevan, B. (1997): “Are Indian companies ready for just-in-time?”, *Management Review,* July-Sept, pp.85-92.
8. Prasad, B. (1995): “JIT quality matrices for strategic planning and implementation”, *International Journal of Operation and Production Management,* Vol.15, pp.116-142.
9. Sanjay Sharma and D.K. Singh, (2009), “The scope of JIT implementation”, *Journal of Productivity,* Vol.45, pp.628-633.
10. Singhvi, S, (1992): “Employee involvement in JIT success: Eicher experience”, *Journl of Productivity,* Vol.33, pp.369-371.

11. Voburba, R.J. and Davis, R.A. (1996): “Just-in-time: The evolution of a philosophy”. *Journal of Production and Inventory Management,* Vol.31, pp.57-69.
12. Vrat, P., Mittal, S. and Tyagi, K. (1993): “Implementation of JIT in Indian environment: A Delphi study”, *Journal of Productivity,* Vol.34, pp.251-256.
13. Yasin, M.M. and Wafa, M.A. (2006): “An empirical examination of factors influencing JIT success”, *International Journal of Operations and Production Management,* Vol.16, pp.23-24.