



INTERNATIONAL JOURNAL OF RESEARCH IN COMPUTER APPLICATION AND MANAGEMENT

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JIT BASED QUALITY MANAGEMENT IN INDIAN INDUSTRIES**SANDEEP MALIK****ASST. PROFESSOR****DEPARTMENT OF MECHANICAL ENGINEERING****N. C. COLLEGE OF ENGINEERING****ISRANA****NISHANT PAHWA****LECTURER****DEPARTMENT OF MECHANICAL ENGINEERING****N. C. COLLEGE OF ENGINEERING****ISRANA****DR. DINESH KHANDUJA****ASSOCIATE PROFESSOR****DEPARTMENT OF MECHANICAL ENGINEERING****NATIONAL INSTITUTE OF TECHNOLOGY****KURUKSHETRA****ABSTRACT**

This paper investigates JIT implementation practices and performance in Indian industries. The main objective has been to identify those attributes of Just in Time (JIT) based Quality Management, which are highly difficult to implement in Indian industry. Regardless of the company size, the type of product, process, or manufacturing, JIT based quality management has potential to improve product quality and productivity in Indian firms. Paper also dwells on searching out most accountable reasons for slow implementation of JIT based quality management and highlights its most expected benefits.

KEYWORDS

Attributes, Indian Industry, Just in Time, Quality Management, t-Test

INTRODUCTION

Just-in-time (JIT) is a production strategy that strives to improve a business' return on investment by reducing in-process inventory and associated carrying costs. This production method is also called the 'Toyota Production System'. To meet JIT objectives, the process relies on signals or Kanban between different points in the process, which tell production when to make the next part. Kanban are usually 'tickets' but can be simple visual signals, such as the presence or absence of a part on a shelf. Implemented correctly, JIT focuses on continuous improvement and can improve a manufacturing organization's productivity, profitability, quality, and efficiency. To achieve continuous improvement key areas of focus could be flow, employee involvement and quality. JIT based quality management 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 may play a significant role in successful implementation of any new management philosophy. People and managers of different countries think differently according to their social and cultural principles. Therefore, the implementation of various attributes of JIT Based quality Management in India may differ from its implementation in other countries. Such dissimilarities cause different types of implementation problems that would not be found in other society. In the present study, a survey attempts to analyze some important issues related to JIT based quality management in Indian context through conducting a pre designed survey on a sample of 34 industries. The primary objectives of the survey are:

- (1) To identify those attributes of JIT Based Quality Management, which are highly difficult to implement in Indian industry.
- (2) To search out most accountable reasons for slow implementation of JIT Based Quality Management in India.
- (3) To highlight the most expected benefits of JIT Based Quality Management.

LITERATURE REVIEW

For researchers, JIT management has continuously been a topic of immense interest and there have been numerous studies, theoretical as well as empirical, on various aspects of JIT based quality management. This is amply reflected in number of conceptual articles; surveys, case studies and empirical/modeling work. Ebrahimpour and Schonberger (1998) have explained the JIT/TQM system with discussions on common problems of developing countries. They have suggested that developing countries desperately need to improve the quality and productivity of their goods to survive and compete with the developed countries. At the same time, Bartezzaghi and Turco (2001) have classified quality into four dimensions; quality of design, quality of performance, reliability & maintainability and technical assistance. They have stated that JIT partially influences the quality of conformance, which is most directly related to productivity. Quality of conformance is determined by compliance with design specifications for every product. Crawford and Cox (2004) in their research recognized the need for innovative performance measurement systems in JIT environment. They have developed a series of propositions for constructing JIT performance measurement systems. The developed propositions are based on detailed examinations of the performance measurement systems of some companies, which were addressing the problem of performance evaluation. Later on Fiedler et al. (2007) developed an expert system for implementing a sequence of just-in-time techniques. This system is capable of giving more precise recommendations with respect to a given manufacturing environment. Based on some of these research findings and existing gaps in the literature, the present work dwells on identifying attributes of JIT based quality management, their implementation and expected benefits. Literature review has helped to explore the relevance and status of JIT attributes, besides helping to formulate directions for future strategies. In the literature, JIT practices have continuously drawn the attention from researchers and practitioners. This is reflected in number of conceptual article survey and case studies, and empirical/ modelling work

PHILOSOPHY OF JIT

It states that simple: inventory is waste. JIT inventory systems expose hidden causes of inventory keeping and are therefore not a simple solution for a company to adopt. The company must follow an array of new methods to manage the consequences of the change. The ideas in this way of working come from many different disciplines including statistics, industrial engineering, production management, and behavioral science. The JIT inventory philosophy defines how

inventory is viewed and how it relates to management. Inventory is seen as incurring costs, or waste, instead of adding and storing value, contrary to traditional accounting. This does not mean to say JIT is implemented without awareness that removing inventory exposes pre-existing manufacturing issues. This way of working encourages businesses to eliminate inventory that does not compensate for manufacturing process issues, and to constantly improve those processes to require less inventory. Secondly, allowing any stock habituates management to stock keeping. Management may be tempted to keep stock to hide production problems. These problems include backups at work centers, machine reliability, process variability, lack of flexibility of employees and equipment and inadequate capacity. So the just-in-time inventory system focus is having “the right material, at the right time, at the right place.

PRESENT STUDY

(A) METHODOLOGY

The present study has been carried out over SMEs situated in Haryana and these enterprises manufacture various kinds of goods like auto parts, castings, pipes and tubes, pumps, grinders etc. The study was carried out in following steps:

- An extensive literature survey was conducted over journals, books; e-resources etc. The literature survey provided a shape to the present research problem. Based on this review, various dimensions and related attributes of the JIT concept were identified.
- Keeping the objectives and the limitations of the present study in mind, various research methodologies were examined and it was decided to use survey based data collection as the most appropriate approach.
- Then questionnaire was designed for the managements of the enterprises, keeping in mind, all the attributes of JIT strategy in Indian context. The questionnaire included questions based on company’s profile, implementation of JIT, quality management strategies, other related problems and expected benefits.
- This questionnaire was also subjected to pre-testing for modification and refinement.
- Then the questionnaire was got filled by selected industries and the responses were subjected to analysis through statistical analysis followed by validation of the results by hypothesis testing.
- Then the final conclusions were drawn for framing future guidelines.

The questionnaire was mailed to 115 manufacturing firms located around Delhi, Faridabad and Gurgaon because of logistic constraints. Initially the response was poor and to get better response, reminders were sent to managers by telephonic calls and some managers were personally contacted. In all, thirty-seven responses were received and out of thirty seven responses, three were excluded from study due to incomplete and irrelevant responses. At last, thirty-four responses were found suitable for study, making response rate twenty-nine percent.

(b) RESULTS

Table 1 shows various reasons for slow implementation of JIT based quality management over Indian industries and it also shows the level of impact (from high to low) of these attributes. The t-test is conducted at 5% level of significance to analyze the issues such as degree of difficulty in implementation of various attributes of JIT based quality management, expected benefits and reasons for its slow implementation in Indian industries. The following hypotheses were formulated for t-test.

1) Ho: No attribute is difficult to implement in Indian industry. (The null hypothesis (Ho) will be rejected if any attribute subjected under test is not difficult to implement.)

2) Ho: All expected benefits could not be achieved through implementation of JIT based quality management. (The null hypothesis, Ho, will be rejected if surveyed companies have achieved any expected JIT benefits)

The benefits such as improved equipment utilization, improved quality control, improved worker efficiency, increase in inventory turn, increased flexibility, increased productivity, increased profit margin, increased team work, low scrap rate, reduced inventories, reduced product cost, reduced production lead time, reduced purchase lot size, reduced frequency of stoppage and reduced work-in-process are highly expected benefits from implementation of JIT based quality management. All causes listed in table 1 were found to be not responsible for slow implementation of JIT based quality management in Indian industries. The null hypothesis (Ho) will be rejected if surveyed companies face problems listed as reasons for slow implementation of JIT based quality management in table 1. The values which are less than 3.00 are accepted otherwise it is rejected. On the basis of above hypothesis it is concluded that out of 12, eight are accepted and four are rejected. The t-test has been conducted at 5% significance level to analyze the issue of degree of difficulty in implementation of various attributes of JIT based quality management.

PROBLEM IN IMPLEMENTATION

For identifying the various problems being faced by the companies, the managers were asked to identify the problems being faced during implementation of JIT based quality management. Poor and inadequate maintenance of machines is cited by seventeen managers, where as four managers mentioned that multifunctional workers are often not available. Some companies indicated that biggest problem is use of traditional quality control techniques. One company has indicated that negative attitude traits and beliefs of Indian workforce are highly responsible for slow implementation of JIT based quality management. Fourteen companies indicate that high cost of implementation was a major problem. The survey results indicate that informal and casual quality auditing, lack of support from suppliers, lack of training and lack of understanding about JIT concepts etc. are some other reasons for slow implementation. In addition, participating industries have also indicated that they do not have full support from top management and research and development (R&D) department

TABLE: 1: REASONS FOR SLOW IMPLEMENTATION OF JIT BASED QUALITY MANAGEMENT

SN	Reasons	Impact					NR	MS	t-Cal.	Results (ho=3.0)
		High		Low						
		5	4	3	2	1				
1	High cost of implementation	14	7	4	4	2	3	3.529	.202	Ho rejected Ha= 3.50 accepted
2	Informal/casual quality auditing	7	6	16	3	1	1	3.353	-1.053	Ho rejected Ha= 3.50 accepted
3	On QC, lack of communication	5	9	11	4	2	3	3.059	0.448	Ho accepted
4	Lack of customer awareness on QC	8	6	7	7	2	4	2.971	-0.227	Ho accepted
5	Lack of employee participation	2	6	13	12	0	1	2.853	-1.153	Ho accepted
6	Lack of production technology	3	7	7	11	5	1	2.676	-2.577	Ho accepted
7	Lack of support from workers	7	9	6	8	3	1	3.176	1.314	Ho accepted
8	Lack of support from supervisors	8	7	7	8	2	2	3.147	1.101	Ho accepted
9	Lack of support from suppliers	7	16	8	2	0	1	3.735	1.527	Ho rejected Ha= 3.50 accepted
10	Lack of support from designers	0	3	11	13	3	4	2.176	-6.479	Ho accepted
11	Lack of support from HRD	5	8	9	6	3	3	2.912	-0.687	Ho accepted
12	Lack of support from R&D	14	9	8	3	0	0	4.000	0	Ho rejected Ha= 3.50 accepted

(NR: No Response; MS: Mean Score; t-Cal: t Calculated)

CONCLUSIONS

In this survey, the degree of difficulty in implementation of JIT based quality management is found to be 3.18 on a scale of 0-5; implying that implementation in totality is reasonably difficult in Indian industries. Some attributes such as set up time reduction and kanban are also found to be difficult in implementing due to lack of investment in research and development (R&D) activities. Another significant difficulty in implementing JIT based quality management is huge investment in installation of visual control, training of employees and restructuring of production process costs. It has been observed that ISO certification has increased the quality awareness in industries. Consequently, quality control and maintenance activities are now considered as staff function. This may be a favorable sign for implementation of JIT based quality management. The concept of total preventive maintenance has not been accepted deeply, resulting in high frequency of breakdowns. Even with these problems, Indian industries are expecting significant benefits from implementation of JIT. However, expected benefits do not just happen in a minute and before an organization enjoys the benefits of JIT, it must accept the principles of JIT philosophy as an organizational philosophy. This may require the organization to modify its operating procedures, production system, and in most cases work culture. In this context, in many cases, the plant layouts have to be changed and kaizen has to be implemented. This study indicated that implementation of JIT based quality management in Indian organizations is not an easy job, yet number of attempts are being made in several Indian industries to implement this approach in a phased manner with the belief that it would help in facing the global competition.

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