

## GLOBAL JOURNAL OF ENGINEERING SCIENCE AND RESEARCHES REVIEW OF JIT ELEMENTS IN TECHNICAL EDUCATIONAL INDUSTRY

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### ABSTRACT

The system Just in Time (JIT) is used to improve the efficiency with a minimum number of human and resources. JIT provides motivation to solve problems when they comes and also improves quality. JIT tool is designed and use to eliminate waste in an organization. Waste in an organization is anything that does not contribute to the value of the product or service of that organization. JIT does not provide advanced technology or complicated principles, but it try to eliminate the burdens and complexity. The main aim of the JIT is making the complex system simple not only in a manufacturing organization also in other departments of an organization. JIT means doing the job correctly at the first time and solving the problems permanently, when they come. The main theme of JIT is that no matter what type of work being done in an organization, it can be done in a better way by adopting the strategies of JIT. In this dissertation, a survey of forty nine polytechnic institutions followed by a case study has been carried out. The aim of work is to study the feasibility of JIT in technical education institutions. In the philosophy of JIT there is a wide range of techniques which reduces the waste at all stages. In this work, the important JIT elements which are easy to implement in Indian context has been identified. In the survey the most important element is Administrative Efficiency (ERP). It is proposed that Preventive Maintenance & students Projects, Administrative efficiency and Students Faculty ratio are less difficult to implement and are most important for a technical institute.

### I. INTRODUCTION

Recently Technical education institutions are increased enormously. The effective management of Institutions and Universities is of prime importance to the general welfare and prosperity of the society. With the growing of global competition (domestic and international) some institute attempt to improve the management techniques to increase productivity of service sector. It is, therefore, necessary for Indian Institutions to adopt modern management thinking and strategies if they wish to compete effectively in the market place by providing high quality service at a competitive cost. Japanese Just in Time (JIT) system is one of such management strategies. JIT is a system designed to make an organization operate efficiently and with a minimum number of human and resources. JIT also improves quality, reduces inventory levels and provides maximum motivation to solve problems as soon as they occur. JIT can be defined as a system designed to eliminate waste in an organization. Waste is anything that does not add directly to the value of the product. JIT is a revolutionary concept that challenges by its very simplicity. It introduces no advanced technology or complicated principles but instead strives to eliminate the unnecessary burdens of complexity. Making the complex system simple is one of the main goals of JIT not only in manufacturing but in other departments of an organization. JIT means doing the job right the first time and permanently solving problems as soon as they appear. It also means efficient use of resources and fixing deficiencies in the system. The central theme is that no matter what is being done in business, it can be done better by adopting strategies of JIT and continuous improvement.

### II. SURVEY AND REVIEW

Billesbach (1991) conducted a survey of 68 companies of United States who were implementing JIT. It was stated that formal declaration of corporate JIT objectives and intent minimizes misunderstanding and ambiguity, thereby

allowing more focused efforts and a better prioritization of resources to achieve those objectives. 83% respondents feel that changing product flow and layouts to a cellular manufacturing is extremely important for success. 73% feel group technology is important and 71% feels material handling simplification is important. However only 16% respondents indicates that reducing product variety is important to successful JIT implementation [8].

Ebrahimpour and Withers (1993) identified two manufacturing philosophies namely Static optimization which means that the emphasis is on management of the workforce, functional autonomy, cost minimization and maintaining stability. Second philosophy is Dynamic evolution which means the philosophy of continual improvement. They conducted a survey of 221, US based firms with the help of questionnaire based on five point Likert scale. They analyze the data using ANOVA and tested at the 0.05 significance. Responses from non- JIT firms were indicative static optimization philosophy. Whereas JIT firms responses indicates that they are using dynamic evolution philosophy [14].

### **III. PROCEDURE**

JIT is just not a technique or set of techniques of manufacturing, but is an advanced approach or philosophy which embraces both new and old techniques and provides a wide range of benefits by renovation of existing manufacturing systems. A simple definition of JIT is to produce and deliver finished goods just in time to be sold, subassemblies just in time to be assembled into finished goods, fabricate parts just in time to go into subassemblies, and purchase parts just in time to be transferred in to fabricated parts. In a nutshell, JIT is a system that produces the required items at the time and in the quantities needed. It is an approach that combines apparently conflicting objectives of low cost, high quality, manufacturing flexibility and delivery dependability. JIT is viewed as a level of perfection achieved by continuous elimination of the wasteful use of resources. The long term objectives of eliminating wastes in a manufacturing process that is so streamlined, cost efficient, quality oriented and responsive to the customer needs that JIT becomes a strategic weapon for productivity improvement [31].

#### **Philosophy of JIT**

The first basic principle involved in JIT production approach is the elimination of waste. In a JIT system, waste is defined as anything associated with the production process that does not add value to the product. Thus, waste includes quality defects, inventories of all kinds, time spent to move material and time spent in setting up the machines. If the implications of managing the reduction in waste for the categories mentioned above are analyzed, it becomes obvious why JIT is involved in all aspects of the management of production Process. The second principle of JIT involves the management of people. JIT philosophy assumes that people are capable and willing to take on more responsibility. If defective parts are being produced, an individual can stop the production line. Once stopped, everyone working on the line has the responsibility to solve the problem. The production worker is also given the responsibility for the maintenance of his equipment. Frequently, a production worker goes through a check list before starting to India has become one of the fastest developing countries and the major reason for its development is rapid industrialization. The large scale industries and small scale industries of India are applying the latest technologies and by improving the quality of their products and reducing the production cost they are giving tuff competition to the western world. But little research has been carried out to improve the quality at optimum cost in the technical Institutions of India. Due to limited availability of resources, it is highly difficult for Indian Institutions to promote advance manufacturing technology in their course curriculum. These sectors need new techniques, which are characterized by low investment, high short term payoff and high quality. Institutions of India require a major effort to convert the traditional systems of working into newer systems. But, newer systems of working are difficult and uneconomical to implement in Institutions due to the following reasons:-

1. Resistance of the management due to lack of resources.
2. Change in the whole system is a difficult task.
3. Most Institutions are interested in product innovation rather than process innovation.
4. Lack of qualified and trained staff.

Table 1 JIT Definitions

| S. NO. | AUTHOR                       | DEFINITIONS/DESCRIPTION/REMARKS   |
|--------|------------------------------|---|
| 1      | Schonberger,1982 [60]        | JIT is a system to produce and deliver finished goods just in time to be sold, purchased materials just in time to be transformed into fabricated parts, and sub assemblies just in time assembled into finished goods.   |
| 2      | Hall,1983 [35]               | JIT is not confined to a set of techniques for improving production defined in the narrowest way as material conversion. It is a way to visualize the physics operations to the company from raw material to customer delivery.   |
| 3      | Ansari,1986[2]               | JIT is not just a series of techniques, rather it is a manufacturing philosophy which requires the support, commitment and participation of human resources at all levels of organization.  |
| 4      | Voss and Robinson, 1987 [72] | JIT is a production methodology which aims to improve overall productivity through the elimination of waste and which leads to improved quality.  |
| 5      | Gilbert, 1990 [28]           | JIT is a shop floor control technique that allows the scheduling of inventory movement through the shop floor with the use of a Kanban which is a material tracking device.   |
| 6      | Voss, 1990 [71]              | JIT is an approach that ensures that right quantities are purchased and made at the right time and quality and that there is no waste.  |
| 7      | Miltenberg,1990 [55]         | JIT is an approach, where waste in the systematically identified and removed to reduce cost and lead times and improve quality.   |
| 8      | Billesbach,1991 [8]          | JIT can be defined as an organizational philosophy which utilizes employees to identify and resolve problems and inefficient in the workspace.  |
| 9      | Gupta, 1991 [34]             | JIT embodies a philosophy of excellence to establish demand pulled inventory practices that produce to design specifications at a rapid but smooth delivery rate with zero idle inventories, zero unnecessary lead times and increased employee involvement in the process. |
| 10     | Helper, 1991 [36]            | JIT is described as hottest and most controversial subject facing   |

#### IV. ROLE OF INVENTORY

Traditionally, inventory has been considered as an asset. In a JIT environment, inventory is considered a liability. First, in a JIT philosophy inventory is waste. It adds to cost but does not contribute to the value

of the final product. Second, the JIT philosophy involves a never-ending cycle of problem identification and solution. Inventory permits many problems to be hidden, and thus is a hindrance to never-ending improvement. In the Figure 3.2, inventory is viewed as the water in a lake while production problems are viewed as rocks below the surface. With sufficient inventory the problems are covered up. For example, suppose a firm has significant scheduling or inventory will permit operations to continue however working around these problems with inventory often means that the problems are never solved.

## V. FUTURE SCOPE

A survey was designed to find out the most important elements of JIT which are easy to implement in polytechnic institute. The survey consists of comparison based on following common parameters. The parameters are administrative efficiency, automation (ERP), infrastructure (aesthetic value), communication & information sharing (between employers & employees), continuous improvement of student (industrial training & industrial visit), institute industry interaction programs, continuous improvement (staff), motivation (faculty) job satisfaction, motivation of students for entrepreneurship, motivate faculty and non teaching staff for higher education and training, upgrading of contents in the current scenario (expert lectures from industry, modernization of lab facilities, preventive maintenance of lab equipments, research and development (utilization of lab facilities for consultancy & student projects), schedule teamwork, technical support, transportation facility, top management support, value edition program (SDP, FDP), curriculum utilizing visual and information literacy's.

## VI. DATA COLLECTION

Data were collected following the self-administered mail survey method. Self-administered mail survey has the advantages of relatively low cost and easy access to widely dispersed samples (Fowler, 1993). These people were also assumed aware of the general characteristics of the Institutes.

- The cover letter that informed an overview of the aim of the survey, identification of the researchers,
- A self-addressed stamped return envelope, and
- A courtesy card that respondents could receive the summary of the findings of the study. After the sending then questionnaire, a follow-up postcard was sent to the sample one week later, thanking those participants who replied and stressing the importance of cooperation to non-respondents.

| S.NO. | ELEMENTS SCORE  | RESPONSE |   |   |   |    | Mean Score (0-100) |
|-------|---|----------|---|---|---|----|--------------------|
|       |   | 4        | 3 | 2 | 1 | 0  |                    |
| 1     | Administrative Efficiency (ERP)   | 6        | 8 | 5 | 3 | 3  | 61                 |
| 2     | Communication & Information sharing (between Employers & Employees)   | 2        | 1 | 2 | 7 | 13 | 22                 |
| 3     | Continuous improvement of student (Industrial Training & Industrial Visit, Institute Industry Interaction Programs) | 1        | 2 | 4 | 3 | 15 | 21                 |

|    |   |   |   |    |    |    |    |
|----|---|---|---|----|----|----|----|
| 4  | Curriculum utilizing Visual and Information Literacy's                                      | 4 | 5 | 2  | 7  | 7  | 42 |
| 5  | Expansion of Syllabus contents with adding of modern techniques                             | 3 | 2 | 3  | 10 | 7  | 34 |
| 6  | Expert Lectures   | 5 | 5 | 2  | 1  | 12 | 40 |
| 7  | House Keeping (orderliness, cleanliness, discipline, safety)                                | 5 | 7 | 8  | 5  | 0  | 62 |
| 8  | Infrastructure (Aesthetic Value)  | 6 | 6 | 10 | 3  | 0  | 65 |
| 9  | Job satisfaction  | 7 | 5 | 6  | 3  | 4  | 58 |
| 10 | Motivation of students for Entrepreneurship   | 4 | 3 | 8  | 5  | 5  | 46 |
| 11 | Motivate faculty and non teaching staff for higher Education and training                   | 3 | 5 | 5  | 3  | 9  | 40 |
| 12 | Modernization of lab facilities in the scenario of global competition                       | 8 | 7 | 5  | 4  | 1  | 67 |
| 13 | Preventive maintenance of Lab Equipments  | 5 | 7 | 6  | 7  | 0  | 58 |
| 14 | Research and development (Utilization of lab facilities for Consultancy & Student projects) | 6 | 8 | 4  | 2  | 5  | 58 |

## VII. CONCLUSION

This chapter gives important conclusions obtained from present work. Present work has analyzed some vital issue of JIT implementation on the basis of a case study. The following conclusions are drawn: It is concluded that technical Institutions have different priorities with respect to important and difficult elements for JIT implementation. Most important elements for technical Institutions are Modernization of lab facilities in the scenario of global competition (mean=67), Student faculty ratio (mean=67), Infrastructure (Aesthetic Value) (mean=65), House Keeping (orderliness, cleanliness, discipline, safety) (mean=62), Administrative Efficiency (ERP) (mean=61) etc. It has been observed in case study that four elements were the most important and relatively less difficult to be implemented. These are Administrative efficiency (ERP), Preventive maintenance of Lab Equipments, Research and development (Utilization of lab facilities for Consultancy & Student projects), Student faculty ratio. It is recommended that Polytechnic Institutions should implement most important and less difficult elements at the initial stage.

## REFERENCES

1. Alonso, R.L. and Frasier, c.w., (1991), "JIT hits home: a case study in reducing Management delays", *Sloan Management Review*, pp.59-67.
2. Ansari, A. (1986b), "Survey identifies critical factors in successful implementation of Just in Time purchasing techniques", *Industrial Engineering*, October, pp.46-50.

3. Banerjee, A. and Kim, s. (1995), " An integrated JIT inventory model", *International Journal of operations and production Management*, 15, pp.237-244.
4. Behara, R.S., Fisher, W.W. and Lemmink, Jos G.A.M. (2002), "Modeling and evaluating service quality measurement using neural networks", *International Journal of operations and production Management*, vol.22, No.10, pp.1162-1185.
5. Benson, Randall J. (1986), "JIT: Not just for the factory", *APICS 29th, Annual International Conference proceedings*, pp. 370-374.
6. Berling, R'J' and Geppi, J.J. (1989), "Hospitals can cut materials cost by managing supply pipeline", *Journal of the Hearth Care Financial Management Association*, Vol.43, No.4, pp.19- 26.
7. Billesbach, T. and Schniderjans, M. (Third quarter, 1989), "Applicability of JIT Techniques in administration", *Production and Inventory management*, pp. 40-45.
8. Billesbach, T.J. (1991), "A study of the implementation of just in time in the United states", *Production and Inventory Management Journal*, vol. 2, No. 3, pp.1-4.
9. Chandra, S. and Kodali, R. (1998), justification of just-in-time manufacturing systems for Indian industries", *Integrated Manufacturing Systems*, Vol. 9, No. 5, pp.314-323.
10. Chase, R.B., and Gravin, D.A. (July-Aug 1989), "The service factory", *Harvard Business Review*, pp. 61-69.
11. Demmy, W.S. and Constable, G.K. (1988), "Major elements of Just-In-Time production", *IEEE*, PP. 161-164.
12. Dickson GW. An analysis of vendor selection systems and decisions. *Journal of Purchasing* 1966; 2:5–17.