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# Important Attributes in JIT Purchasing

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**ABSTRACT**

**The product quality and delivery is very important for survival of a company. The ideal goal of JIT philosophy is to operate entire production system without interruption and without non-value added activities. This approach put stress on long-term benefits resulting from waste elimination, and continuous improvement in system, people, products, and programmes. New technologies have far reaching implications for the comparative advantage of countries in the globalization. Developing countries cannot remain just silent spectators while this new industrial revolution sweeps the industrialized world. The most fortunate thing about the industrial revolution is that "skilled people and not the heavy machinery largely dominate it". Modern Technology is more focused towards system configuration than the development of hard and robust machines. Just-in-time is a system to achieve global competitiveness. Among various JIT elements, JIT purchasing has large potential. This paper describes attributes in JIT purchasing. Based upon work in this area, the future research directions have been stated at the end.**

**Keywords: JIT, Just-in-Time, Purchasing, Attributes.**

## I. INTRODUCTION

Just-In-time (JIT) is defined in the APICS (American Production and Inventory Control Society) dictionary as "a philosophy of manufacturing based on planned elimination of all waste and on continuous improvement of productivity". It also has been described as an approach with the objective of producing the right part in the right place at the right time (in other words, "just in time"). Waste results from any activity that adds cost without adding value, such as the unnecessary moving of materials, the total of excess inventory, or the use of faulty production methods that create products requiring subsequent rework.

The traditional approach to purchasing is at the root of many problems that business faces today. High inventory levels, soaring costs, adverse relationships with supplier and quality issues which either stop production or results in poor products are just a few of the problems with the current way of purchasing [3].

## II. LITERATURE REVIEW

The basic idea of JIT was originally developed and formalized into a sophisticated management system by the Toyota Motor Company in Japan. Since then many views on the content of JIT [1, 5, 9, 14] have been put forward as JIT is being globally accepted. JIT can be summarized as an approach to eliminate waste and achieve manufacturing excellence. Pardeep extended his own work by considering three components of a procurement system, i.e. ordering, transportation and receiving and handling sub-systems.

An inventory model is developed in which uncertainty in lead-time is also considered. In his earlier work, he developed basic economic order quantity model in JIT purchasing context. Fandel and Reese [7] have studied a headlight manufacturing industry, which was making JIT deliveries to a German car manufacturer with logistic constraints. The practical case shows how acceleration of the distribution process in the supply can become an efficient solution. Freeland [8] administered a questionnaire in different industries to supply JIT purchasing practices in the USA.

Of the sixty usable responses received, it was found that 45% had `formal` JIT purchasing programmes and 22% were planning to implement. The longer JIT purchasing had been in place, the greater the perceived benefits. Weber et al. [34] received 74 articles on vendor selection to find the importance of 23 vendor selection criteria attributes. Among the attributes; quality, delivery, net price, availability of production facilities and capabilities and technical capability were found to be simply a change in policy that they must negotiate with supplier. In order to cut cost Turnbull [12] emphasized the adoption of the Japanese model involving very high intro and inter-organizational independence. The literature on JIT purchasing has been reviewed and based on this, 34 relevant attributes were identified. Few person

discussed the feasibility of transforming purchasing and quality control operations from conventional to JIT practices. The study is confirmed to the dock-to–store area of an aircraft engine manufacturing plant. Findings on saving in terms of inventory related costs and inventory through implementation of JIT practices were reported.

Nassimberi analyzed the intensity and nature of the relationship between principal operational JIT practices, i.e. to create the link between buyer and supplier's operation chains. Waters-Fuller classified the JIT sourcing literature into three groups-the advocate schools, pragmatist school and sceptical school. Literature on these three schools have attributed, e.g. long term contracts, total quantity suppliers, dependable deliveries, small lot sizes, exchange of data, reduced supplier costs and stable schedules. Garg et al. [10] have analyzed two inventory models under JIT manufacturing agreement and carried out their parametric analysis. They have also proposed a logistic-based inventory model [12] for JIT procurement considering investments in vendor development and order processing, transportation, receiving and handling, quality assurance subsystems. Garg et al. [11] analyzed some vital issues in JIT purchasing in Indian context on the basis of a questionnaire (n=28) sent to different Indian industries. The issues included the importance of JIT attributes, problems in implementing JIT, and expected benefits from JIT purchasing implementation.

A survey was conducted on Indian industries [13, 14] to find the extent of relevance of JIT purchasing attributes. The study had predicted a better scope of JIT implementation in India compared to earlier studies. This indicated that the scope of JIT implementation in India is increasing. Indian industries will have to become competitive in order to bear and sustain competitiveness. This has established [15] that industries can achieve competitiveness by adopting JIT system.

In JIT operation everyone knows the effect of his order and own unique contribution towards organization's quality product. The manager motivates the workers to think quality first and production rate second. Some developing countries [26] like India, Brazil, and China etc. are restructuring their economy to become competitive with global market. Smaller lot size means fewer inventories to expose problems. Cutting safety stock within production process strengthens this approach.

The eight basic principles of JIT purchasing are:

1. Better Inventory control
2. Optimization of process
3. Elimination of unnecessary
4. Elimination of waste
5. Elimination unnecessary transportation.
6. Employees involvement in decision making
7. Supplier participation
8. Total quality control

These principles must be applied to three basic functions of manufacturing i.e. Purchasing, Production and Marketing. In general, in JIT purchasing environment, purchase is carried out in small lots in small standard container used to hold exact quantity and to the required specifications from a nearby-located single supplier with a long-term contract. No percentage of rejects from supplier is acceptable. The supplier is encouraged to be more innovative. He is given "loose specifications".

The company relies more on performance specifications than on product design. Delivery schedule is left to the supplier. Counting and receiving inspection of incoming parts is eliminated. Formal paper work is reduced to minimum delivery schedule or quantity can be changed by simple telephone calls/fax/telex message. Supplier is evaluated by consistence in quality, delivery performance and price under the varying conditions, which is the most important aspects, while price is merely an important factor. In JIT purchasing, supplier selection is based on quality, technical expertise and effective buyer–supplier communication. The outcome of JIT purchasing wills be–frequent and reliable deliveries, high quality of incoming parts in exact quantity, small shipment size. As a result JIT purchasing helps to reduce inventory and increase productivity benefiting both the buyer and supplier .

## III. JITPURCHASINGATTRIBUTES

The investigator on JIT purchasing and supply/ sourcing attributes identified 34 attributes of JIT purchasing. A frame work was developed to classify these attributes like buyer actions, supplier actions and joint buyer-supplier actions, which has been shown by input & output attributes.

Here 25 are input attributes, out of which 13 attributes belong to the buyer, 6 to the supplier and 6 to the joint buyer-supplier action category. The remaining 9 are outcome attributes.

The inputs of buyer action, supplier actions and joint buyer supplier action create the JIT purchasing environment to improve quality of parts. The outcome attributes consist of frequent and reliable deliveries, high quality parts, small shipment size etc.

JIT purchasing attributes identified by researchers in the past were 34 and in research work has identified 10 more JIT Purchasing attributes. Now these attributes have been increased to 44, grouped as:

Input Attributes: These attributes include

- Buyer action – The twelve attributes are of buyer action
- Supplier action – The ten attributes are of supplier action
- Joint buyer-supplier action – The sixteen attributes are of joint buyer - supplier actions.
- Output Attribute - The eleven attributes are of output attributes.

These attributes are described in Table 1 to Table 4.

Buyer Action Attributes: These attributes are the action to be taken by buyer for successful implementation of JIT purchasing. These are given in Table 1.

Supplier action attributes: These are the actions to be taken by the supplier. These are highlighted in Table 2.

Joint Buyer-Supplier Action Attributes: These are the actions to be jointly taken by buyer and supplier. These are given in Table 3.

Outcome Attributes: These are the resultant attributes of the earlier three action attributes. These will result in faster and flexible supply chain. These are given in Table 4.

**Table -1 Buyer Action Attributes**

| Sr. No. | Attribute | Description |
|---|---|---|
| 1. | Reliable business of supplier | Efforts have to be made to develop network of only those suppliers who can deliver desired reliable supply and also help in developing such supplier who can supply materials just on time. So that process can be optimized. |
| 2. | Healthy Long-term contract | Buyer and supplier should have long-term business contract for one or a few parts. Longer the contract, larger will be the benefits achieved by them. So supply of material will be on time and as per quality assurance. |
| 3. | Increased business volume to Supplier | The volume of the business given to selected supplier should be steadily increased depending upon his performance. |
| 4. | Emphasizing performance not specifications. | Performance of received materials is emphasized instead of precise design specifications and In case emphasizes the importance of honest communication between manager and employee. |
| 5. | Supplier certification | Supplier certification is am important component of a total quality management system that assures that a suppliers is produced packaged and shipped under a controlled process that result in consistent conformance to our requirement . Supplier may be certified whose performance is found up to expectations for reasonable period of time. |
| 6. | Supplier training and development | Education and training is the most common approach to the supplier devolopement and improvement. A purchaser may provide traning in statistical process control, quality improvement technique,JIT or any other crucial proformance area. The selected customer should be assisted in required areas such as training etc. |
| 7. | Supplier plant audit | Executives of buying company should periodically visit and audit customer's plant. |

| | | |
|---|---|---|
| 8. | Buyer responsible for inbound freight | Delivery schedule is left on buyer. Inbound freight is to be included in price of product to be paid. |
| 9. | Freight consolidation | It related economy in shipment and transportation cost. Transportation company is responsible for delivering incoming materials / parts from one or more supplier's to one more Buyers. |
| 10. | Stable production schedule | Production schedule of buyer must be stable and has to be intimated to supplier in advance. |
| 11. | Supplier evaluation | Supplier evaluation is a continue process with in purchasing department and forms part of pre-qualification process. An effective performance measurement system has to be design for supplier evaluation. |
| 12. | Minimum supplier | Buyer has to confine number of supplier for one part, ideally one for each part. Some JIT implementing companies are even selecting single supplier for several parts. |

**Table -2 SUPPLIER ACTION ATTRIBUTES**

| Sr. No. | Attribute | Description |
|---|---|---|
| 1. | Product reliability | The product reliability is an important factor for continuing further supply |
| 2. | Service ability | The service ability is also an important factor for the satisfication of customers by providing the service after the sale of product. |
| 3. | Statistical process control | It is a system to control the quality of a Process on shop floor with the help of Statistical techniques. |
| 4. | Close proximity | The supplier should be located as close as possible to buyer. |
| 5. | Quality circle | It is a team who has been assigned the task to improve quality in its expertise area. |
| 6. | Flexible suppliers | Suppliers should be able to cope up with Requirements of buyer in respect of quantity, quality, service etc. |
| 7. | Reduced setup | Efforts are required in reducing setup time in process, changeover etc. |
| 8. | Increased customer support | Supplier has to remain in touch and interact with executives of buying company whenever necessary in the interest of both. |
| 9. | Ability of Supplier | The Supplier ability must be judged before giving final order of supply. |
| 10. | Supplier Attitude | The attitude of supplier is also an important factor for continuing further supply. |

**Table-3 JOINT BUYER-SUPPLIER ACTION ATTRIBUTES**

| Sr. No. | Attribute | Description |
|---|---|---|
| 1. | Joint Standard training programme | The training should be jointly carried out in order to produce the item with in standred. |
| 2. | | |
| 3. | Mutual trust and co-operative relationship | Buyer and supplier have to trust and co-operate with each other in routine as well as during crisis. |
| 4. | Increased information sharing | Excellent communication and information sharing is required in order to achieve targets. |
| 5. | Supplier involvement in design | Supplier has to be involved during early stage of design to minimize manufacturing problems. |
| 6. | Continuous improvement | Both buyer -supplier should work together to seek continuous improvement in all areas |

| | | |
|---|---|---|
| 7. | Joint value analysis program | The value analysis programme should be jointly carried out in order to strive for cost reduction. |
| 8. | Standardized packaging | Standardized packaging of deliverers avoids any damage to materials. |
| 9. | Motivation | The motivation level of both buyer and supplier must be high to tackle any eventuality during supply deal. |
| 10 | Transportation reliability | Transportation reliability must be high which will be beneficial to both for buyer and supplier. |
| 11 | Coordination of work centers | All the work centers must have full co-ordination and co-operation to get the best quality of the product, reducing all the wastages. |
| 12. | Team work spirit | Teamwork spirit must be maintained for smooth work at each level. |
| 13. | Work for flexibility | The work force must have flexible enough to adjust in each circumstance. |
| 14. | History and background | History and background of both buyer and supplier should be known to each other to avoid any misunderstanding during deals. |
| 15. | Managing skills | Managing skills must be high to manage the things as per the time requirements in any stage. |
| 16. | Reputation in market | Reputation in market must be good for proper running of their business. |

**Table 4 OUTCOME ATTRIBUTES**

| Sr. No. | Attribute | Description |
|---|---|---|
| 1. | Economic order quanitity | Just in time helps in reducing the inventory level. |
| 2. | Material Just on time | Right quantity at right time helps in optimizing process. |
| | Reduce Material handling cost | Just in time helps in reducing the material handling cost. |
| | Optimum process | Just in time helps in optimizing the process. |
| | Reduce inventory cost | Just in time helps in reducing the inventory cost . |
| 3. | Frequent deliveries | Buyer receives frequent deliveries, may be daily or several times a day. |
| 4. | Reliable deliveries | The deliveries are received by buying company when required with no Uncertainty. |
| 5. | Small shipment size | The shipment size of deliveries is small and one in ideal case. |
| 6. | Exact quantity | Exact quantity as ordered is received. No counting is needed at buyer's end |
| 7. | Reduced delivery lead time | The lead-time in purchasing activities is reduced. |
| 8. | Elimination of receiving inspection | The supplier certified the quality of delivered inspection materials and receiving inspection at buyer's end is eliminated. |
| 9. | Reduced paperwork | Paperwork at offices of buyer and supplier is reduced as it is replaced by electronic communications. |
| 10. | Fair price | Fair price giving reasonable profit to supplier is fixed. |
| 11. | High quality | Quality of incoming materials at buyer's end is increased. |

## IV. FUTURE RESEARCH DIRECTIONS

JIT purchasing has a significant potential for quality improvement and cost saving. Implementing JIT purchasing can assess cost benefit analysis. Further more research is required in investigating inventory in supply chain. Some basic elements affecting JIT purchasing implementation are to be identified to achieve more benefit of JIT.

JIT purchasing has a wide scope of research in manufacturing, services and administrative sectors. JIT purchasing attributes have a wide scope for future research work. Some important issues identified for further future research work are as follows.

1. Concentrated efforts in research are necessary to understand problems:

(i) Related with JIT purchasing implementation on part of management, workers and suppliers.
(ii) Scope of JIT in computer integrated manufacturing system.
2. Research is required in designing a comprehensive performance measurement system comprising effective JIT purchasing implementation.
3. More exhaustive study is required in Indian industries while implementing JIT purchasing and identifying bottlenecks of the system.
4. Empirical models must be developed to modify the basic inventory models in JIT context to resolve purchasing issues in EOQ.

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