A NEW APPROACH IN LOGISTICS MANAGEMENT: JUST IN TIME-LOGISTICS (JIT-L)

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Abstract

Companies which have to operate in a continuously changing and increasing competitive environment, have started to pay special attention to their supply chain management in order to have a sustainable competitiveness. Therefore, recently logistics management has become an important tool to increase competitiveness of companies. Logistics management can be defined as a part of the supply chain which plans, implements and controls the efficient, effective forward and reverse flow and storage of goods, services and related information between the point of origin and the point of consumption in order to meet customer requirements. Just In Time (JIT) management which was first applied by Toyota Corporation, involves delivery of necessary goods to the production line just in time without any raw materials storage. As a current concept, Just In Time Logistics (JIT-L) can be also defined as the application of JIT management philosophy to four main components of the logistics including i) customer services, ii) order processing, iii) inventory management and iv) transportation management. The aim of this study is to present importance of Just In Time Logistics for the companies and discuss why JIT-L should be considered as a logistics strategy by companies. To achieve this aim, papers and reports on JIT-L have been examined, and hence a review paper on JIT-L has been prepared to enhance the current understanding on JIT-L.

According to the study, waste elimination and improvement of service quality objectives of the JIT also relate with business logistics. Application of JIT philosophy to the logistics area results in several benefits such as determination of waste sources, increasing delivery speed of goods to customers, improvement of processes by organizing business requirements and man power plans for logistics, and increasing harmony among suppliers and customers. Accordingly, the information, presented in this study, is expected to be beneficial for logistics companies, logistics

departments in large companies and academicians who work in the area of logistics. Consequently, this study plays an important role to present both conceptual and applied information on Just In Time Logistics which is a subject, has not been investigated and discussed deeply in Turkey, yet.

Keywords: *Logistics Management, Just In Time Logistics, Supply, Delivery*

Jel Classification: M1 (Business Administration)

1. INTRODUCTION

The globalization is forcing firms to be more careful about customer satisfaction and profit maximization. Therefore, firms must use different tools to develop loyal customers who are less sensitive to the product price increases and help the firms to make profit maximization. Logistics is one of the key tools that builds cost and service advantages to the firms. On the other hand, Just-in-Time (JIT) management approach, which is effective in the manufacturing sector in particular might be applied to the firms as a chance to achieve cost and service advantages through logistics. When the firms focus on the JIT for business processes but not products, the management principles of the JIT can be applied to logistics (Kee-Hung and Cheng 2009:1). Since the intensity of competition is getting bigger and bigger everyday, Turkish firms also should consider how to establish competition advantages against both local and foreign firms. Since one of the biggest part of a firm's expenses is materials transportation (Özcan, 2008), firms can reduce these expenses by managing logistics activities carefully. Logistics management in the firms is being more important everyday. In this study, logistics management and Just-in-Time logistics are reviewed and how Just-In-Time Logistics can be used by Turkish firms as an alternative competition tool is discussed.

2. THE CONCEPT OF JUST IN TIME

Just-in-time (JIT) is a materials management system which aims to work with zero inventory and to ensure materials when they are required. JIT has been written about since the early 1970s. If one search would be made on the researches, dissertations, papers and manuscripts that were written about JIT, it is clear that a significant amount of study will be noticed over the past three decades. JIT takes advantages of minimum resources and responses in minimum time to the customers with having minimum waste and using all the factors of production (Url 1.). JIT management approach has been proven effective in the manufacturing sector in increasing productivty, quality and efficency, decreasing costs and waste and improving communication (Kee-Hung and Cheng 2009:1). JIT also started to grow in the service sector around the mid-1990s (Yasin, Small and Wafa, 2003).

Firms are forced to implement a wide variety of innovative managerial tools and philosophies to react to external and internal pressures. Over the past three decades just in time has been one of the most popular business revitalization for the firms. The early development of JIT was initiated by Taiichi Ohno in Toyota's manufacturing plants in an attempt to meet customer demands precisely with minimum delays (Kee-Hung and Cheng 2009:9). A recent research has shown that the successful implementation of JIT philosophy can produce significant benefits for manufacturing firms; such as, improving quality that consistently and continually meets customers requirements; minimizing levels of inventory and improving relationship with suppliers (Aghazadeh, 2003),

reducing the labor turn over rate; reducing manufacturing lead times; reducing set-up time; (Wafa and Yasin, 1998), reducing operations and materials handling costs; and maximizing the use of space (Petersen, 2002). Moreover JIT can also ensure the on-time receipt of material from suppliers (Yasin and Wafa, 2001); improving purchasing function, improving preventive maintenance, increasing worker participation, improving the quality and timing of received material; full utalization of people, equipment, materials and parts; and improving competition while reducing paper work (Salaheldin, 2005).

The main purpose of Just in Time manufacturing systems is to remove the unnecessary stuff that is above the minimum employee and material requirements to reduce the cost (Sezen and Gök, 2004). JIT is a system that gets rid of some suppllying, storing and securing activities that were needed for manufacturing to save time and reduce the cost. It should be seen as a total materials management theory. JIT covers suppliers, customers and manufacturers (Özalp, 2005:646). JIT is a philosophy which encompasses almost all business processes and functions within the supply chain (Das and Handfield, 1997). The benefits of JIT show that implementation of the JIT can greatly improve the operations performance of many firms and it is appropriate for all businesses that desire to improve its productivity and profitability.

3. THE CONCEPT OF LOGISTICS MANAGEMENT

In the 1980s and 1990s, companies began to view logistics as more than simply a source of cost savings and recognize it as a source of enhancing product or service offerings as a part of the broader supply chain process to create competitive advantage (Mentzer, Min, Bobbitt, 2004). The Council of Logistics Management defines logistics as the process of planning, implementing and storage of raw materials, in-process inventory, finished goods and related information from point of origin to point of consuption for the purpose of conforming to customer requirements (Kasilingam, 1998:1). The general description of logistics in the literature is "**7R**'s" that is the abilitiy to deliver the Right products to the Right customer at the Right place, in the Right condition and Right quantity at the Right time, at the Right (lowest possible) costs (Gülenç and Karagöz, 2008). Therefore, logistics represents a collection of activities that ensures the availability of the right products in the right quantity to the right customers at the right time. Logistics activities serve as a link between production and consumption and provide a bridge between production and market locations or suppliers separated by a distance and time. The main purpose of logistics is to coordinate a bunch of related activities which work together to create a supply chain and provide time and location benefits for customers. The operations which are coordinated by logistics can be listed as follows (Çancı and Erdal, 2003:35); i) Planing and marketing strategy, ii) Market strategy and product design, iii)Production planning, iv)Materials management, v)Inventory management, vi)Warehousing and materials handling, vii)Distribution, viii)Warehouse and silos, ix)Transportation, x)Insurance, xi)Customs clearance services, xii)Purchasing, xiii)Customer relationships, xiv)Technical support.

On the other hand, logistics management is a part of Supply Chain Management that plans, implements, and controls the efficient, effective forward and reverse flow and storage of goods, services, and related information between the point of origin and the point of consumption in order to meet customer requirements (Mentzer, Min, Bobbitt, 2004). Logistics management is sometimes used instead of physical distribution. However, these two functions are very different from each other. Logistics management includes many activities from supplying the materials to

customer satisfaction. On the other hand, physical distribution is interested in only distributing final products to the customers. Yet, logistics management is composition of a physical life cycle and physical distribution. As can be seen logistics management covers almost all management functions like planning, controlling, coordinating, organizing. Through logistics management includes many different kind of processes, it should be handled more carefull and professional.

4. JUST-IN-TIME LOGISTICS (JIT-L) MANAGEMENT

As a new concept, Just In Time Logistics (JIT-L) can be defined as the application of JIT management philosophy to four main components of the logistics including i) customer services, ii) order processing, iii) inventory management and iv) transportation management. The role of each component in logistics can be summarized as follows;

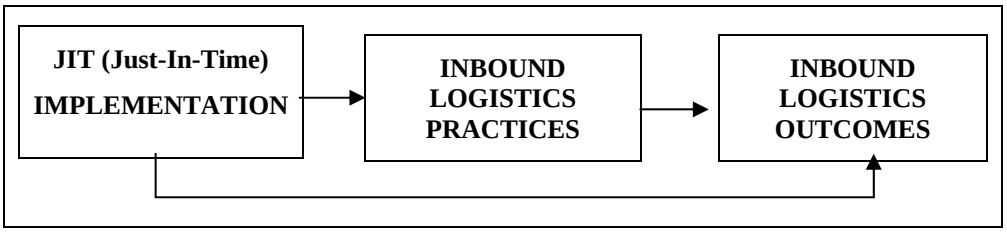
- ***Customer service*** is about the creation of time and place utility in the seven rights (7Rs) (Kee-Hung and Cheng 2009:4). If the flow of goods and services is well managed, the quality of customer service will increase. Customer service is related to the output of logistics systems and it plays very important role in creating, developing and maintaining customer loyalty and satisfaction.
- ***Order processing*** includes all the order activities which are collecting, checking, entering and transmitting order information (Kee-Hung and Cheng 2009:4). It reflects a relationship between suppliers and firms. The order cycle time that is the time a customer transmits an order to the time the customer receives that order is very crucial for customer satisfaction. The firms can compress the order cycle time with implementing JIT-L successfully.
- ***Inventory management*** involves managing appropriate inventory levels which is necessary to serve the demand in a supply chain (Kee-Hung and Cheng 2009:4). It means keeping stock levels as low as possible but at the same time providing the desired level of stock available to serve customers' demand. That will lead firms to significant reduction in logistics costs. Inventory management adds "time" value to a product.
- ***Transportation*** **transfers** materials, components and finished products between raw materials suppliers, distributors, retailers and end customers in a supply chain (Kee-Hung and Cheng 2009:4). Improved transportation management may cause to increase in sales, increase in market share and ultimately to increase profit contribution and growth. Transportation adds "place" value to a product (Kee-Hung and Cheng 2009:39).

There are three logistics activities in a firm's logistics supply chain. These three stages of logistics activities are inbound logistics (materials management), intra-plant logistics and outbound logistics (physical distribution). As mentioned above there are four main components of the logistics and each component takes a place in a different logistics stage. While transportation management is placed in inbound logistics, order processing and inventory management are placed in intra-plant logistics and finally customer service is placed in outbound logistics. To reach the full benefits of JIT, it should be implemented at all three logistics activities.

There is a very tight relationship between inbound logistics and JIT implementations. Tracey and his coworkers' study showed that JIT: i) improves supplier operations, ii) enhances transportation operations with respect to inbound carriers, iii) reduces the level and improves the management of inventories, iv) does not cause overall inbound logistics costs to increase and v) increases the

quality and performance of inbound logistics (Tracey, Tan, Vonderembse and Bardi, 1995). Inbound logistics is getting more important for the organizations that are adopting the JIT implementations. JIT affects both the entire organization and the logistics function in particular. With implementation of JIT, a number of managerial, operational and organizational changes occur in inbound logistics such as purchasing. For example, criteria for supplier selection are anticipated to change, inbound shipment size is expected to decline, and paper work is expected to be reduced. In addition, it is suggested that these changes will result in specific logistical related outcomes like the timely delivery of material to production, an overall decrease in logistics costs (Vonderembse, Tracey, Tan and Bardi, 1995). Some of the changes could be decreasing of inventory levels or requirement of suppliers to use bar coding and smaller-size inbound shipments (Tracey, Tan, Vonderembse and Bardi, 1995). The firms that adopt JIT may stop inspecting and counting received materials. Moreover, JIT-L has an impact on purchasing sytems, too. In addition, it can result in reduced inventory costs, shorter lead times and improved productivty for buying organizations. Changes in inbound logistics with implementation of JIT will of course affect the outbound logistics outcomes such as cost and per cent of on-time delivery. It may also have a direct impact on the inefficiencies associated with suppliers shipping smaller lot-sizes that increases inbound logistics cost. Another benefit could be increasing levels of preventive maintenance that may reduce raw material and work-in-process inventory levels, and in addition improved information flows may promote the on-time delivery of parts. The relationship between JIT and inbound logistics outcomes is shown in Figure 1.

Figure 1. JIT and Inbound Logistics Interface



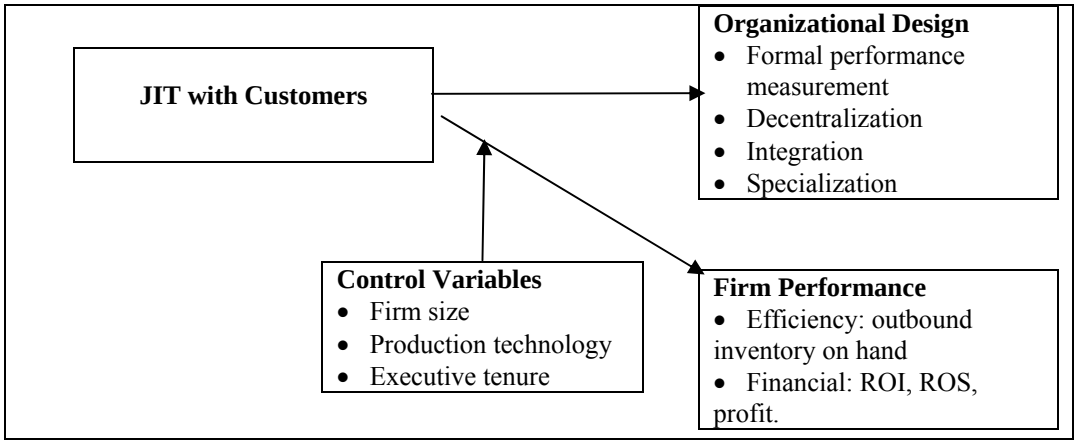
Source: Tracey, Tan, Vonderembse and Bardi, 1995:26.

There is also a close relationship between intra-bound logistics and JIT application. JIT systems can be applied to business logistics because it is about both the process and the transfer of all required materials and products on time and to the desired place. Reducing waste and improving services are the goals of JIT and these goals are relevant and applicable to business logistics, too. In business logistics, waste can be defined as anything other than the minimum amount of equipment, space and workers' time. These wastes are absolutely essential to add value to the product or service (Kee-Hung and Cheng 2009:5). The firms can apply the philosophy of JIT to discover waste sources in the processes. Moreover, JIT can improve services with planning the manpower and facilities requirements to meet the distribution needs, reducing product introduction time by responsive delivery, improving logistics service quality by forging supplier and customer partnerships and so on. In a successfull implementation of JIT into intra-bound logistics, employees are the key factor. They represent the core of firm's capabilities. To reduce wastes and improve services, firms need intellectual, skilled employees with empathy ability. Team work is also another key factor for the success. A team that consists of members from purchasing,

materials control, process/design engineering, production and suppliers can solve many quality problems from supplies and enable the firm to meet the market requirements better. Employees' support for the implementation of JIT will ease failure of the process. Therefore, training, caring for and motivating people are necessary for achieving the JIT goals (Kee-Hung and Cheng 2009:137).

Customer service that is related to final output is a critical element for outbound logistics. Final output can be a physical product (for example, a sofa), a service (for example, travel service) or a combination of both (for example, a fast food restaurant). Customer service is not only about good service levels but also the financial costs incurred from providing quality customer services because minimizing costs is key to survival and prosperity in a competitive marketplace (Kee-Hung and Cheng 2009:47). The definition of JIT with customers could be made like the use of the integrated, problem solving initiatives of a just-in-time philosophy concentrating on improving quality and facilitating timeliness in supply and distribution to external customers. As a part of JIT-L, JIT with customers' fundamental objective is very simple: to satisfy the customer by delivering the right goods or services in the right quantities at the right times while minimizing total process cost by eliminating waste of all kinds from the supply chain (Claycomb, Dröge, Germian, 1999). There are three main factors that are associated with JIT with customers: Organizational design, firm performance and control variables as shown in Figure 2.

Figure 2. Factors Associated with JIT with Customers(Claycomb, Dröge, Germian, 1999)



Source: Claycomb, Dröge, Germian, 1999:39.

In the literature, there are some studies about the firms that have used and had success of JIT-L. One of them was performed by Nelson Liao about Toyota automobile suppliers in Taiwan (Liao, 2008). This study shows that JIT purchasing and JIT manufacturing in the Toyota production system in Taiwan carry direct and significant benefits from suppliers' improved logistics performance as their transportation costs, material handling costs, and inventory levels decrease. Moreover it has been shown that there are findings about establishment of sound quality assurance processes, restricted numbers of suppliers with a specific process to evaluate and select, shorter puchasing lead time, and stable orders from customers for the long-term by implementation of JIT-

L. Accordingly all these benefits result in shorter manufacturing lead time, smaller manufacturing lot size, quantities of the products made according to the orders, and improved quality assurance processes (Liao, 2008). Another study was performed in Nordic and Central European paper mills about the application of Just-In-Time in paper industry logistics. In that study, multiple case studies were used with simulation for alternative business scenarios. The results show that the customer lead time distribution was reduced substantially and the average delivery time was reduced by 50%. There was also a reduction in the inventory by approximately 58% (Lehtonen and Holmström, 1998).

As the studies that were made on JIT-L mentioned above, it can be utilized as a good competition tool. According to Das and Handfield, firms using JIT practices will derive the benefits of more frequent deliveries, smaller lot sizes and lower on-hand inventory levels, as compared to non-JIT global sourcing firms. Vonderembse and his friends also report that firms which have implemented JIT could have an increase in productivity of purchasing employees. That means decentralizing of purchasing authority, decreasing inbound shipment size, reduction in the number of motor carriers used and decreasing lead times. These examples may also be very important for Turkish firms, especially the ones that are in manufacturing sectors such as automotive manufacturer suppliers and household appliance manufacturer suppliers. In particular, if the competition in the world automotive industry and Turkey's role in this sector are considered, the Turkish firms should find new ways to maintain their leading role in this area. Thus, JIT-L implementation may be one option which can be utilized to increase competitiveness of those firms. As a result, several Turkish firms should consider JIT-L implementation to become or continue a leader in the global competition in their sectors.

5. CONCLUSION

JIT logistics is a management approach for the firms that gives them an opportunity to have a competition advantage. However, there are some essential elements for JIT-L's success. For example, management support is the most important matter to make the implementation efforts sustainable. Employee involvement and cooperation are certainly another important factor for the success in JIT-L. Empowerment of employees improves the procurement lead-time performance. In the organization, creation of quality awareness is also necessary for the full benefits of JIT-L. A number of managerial, operational, and organizational changes in purchasing should also be made. Firms that would like to apply JIT-L will reduce wastes and improve services in their logistics activities. As given in the definition of JIT-L, there are four core activities of logistics that JIT management philosophy can apply: customer services, order processing, inventory management and transportation management. Creating, developing and maintaining customer loyalty and satisfaction can be carried by application of JIT-L to the customer service. At the same time the firms can compress the order cycle time with implementing JIT-L successfully. Keeping stock levels as low as possible but also providing the desired level of stock available to serve customers' demand is inventory management's goal that is achieved by JIT-L. Good inventory management adds "time" value to a firm's product. Transportation management is another important activity in logistics. Improved transportation management may cause to increased sales, increased market share and ultimately to increased profit contribution and growth. Transportation adds "place" value to a firm's product. If the implementation is successfully performed JIT-L will give a chance to firms to remain competitive by integrating and optimizing activities in their value chains and

responding better to their customers'needs. Thus, JIT-L may provide a very important opportunity to Turkish firms that are operating in manufacturing sectors. Turkish firms can benefit from JIT-L approach and use it as a management tool for becoming or remaining competitive in the global markets.

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