Applicability of Just In Time (JIT) Production Approach in State Forest Enterprises

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Abstract:

Just in Time (JIT) Production System, also called as Non-Stock Production System or Toyota Production System, is based on minimization of stocks of raw materials, supplies, intermediate goods and final products. The basis of JIT system is to produce, receive/deliver supplies, intermediate and final products just in time when needed. Main benefit of this is decreasing stock level and lead time. Changing cost structures of enterprises due to high level of automation, it becomes impossible for them to produce and sell with “I would sell whatever I produce at whatever cost” approach. In recent years, many enterprises in developed countries use advanced cost management systems for an efficient cost management. JIT approach is one of these cost management approaches. High level of diversification in customer demands and various product desires after 1980s lead enterprises to change their production systems. Enterprises search for new methods for cost reduction in order to maintain and increase their market shares. These improvements in private sector are slower in public sector. In Turkey, State Forest Enterprises (SFEs), which supply most of the wood raw material (Kaplan 2007), are typical examples of this situation. Hence, SFEs are not managed efficient and economical, as cost and managerial accounting usage is not at desired level and current accounting system works inefficiently because of bureaucratic obstacles (Öztürk and Türker 2000; Türker 2008).

In this study, JIT approach is discussed theoretically in the context of role of cost management in enterprises’ success. Also JIT approach is examined within the scope of production management in State Forest Enterprises in terms of planning where, when, how much and how will production operation be realized and applied and this process’s effect on costs.

Key terms: jit, cost management, state forest enterprises, competitiveness

Introduction:

In recent years, conventional production and cost systems are started to be discussed and it is seen that for enterprises, conventional cost methods do not contribute enough to decisions of managers in competitive markets. Enterprises, affected by this alteration, started to adopt different production methods (Aracıoğlu 2010).

One of these modern cost systems is Just in Time Production (JIT) system. The system is based on minimization of stocks of raw materials, supplies, intermediate goods, final products and resources used for these goods (Ardiç et al. 2009).

Public sector adopts to these modern cost management developments in market slower than private sector (Ardiç et al. 2009). In Turkey, General Directorate of Forestry (GDF) and State Forest Enterprises (SFEs) which supply approximately 57% of wood raw material (Kaplan 2007), are typical examples of this situation. Hence, SFEs are not managed efficient and economical, as cost and managerial accounting usage is not at desired level and current accounting system works inefficiently because of bureaucratic obstacles (Öztürk and Türker 2000; Türker 2008).

In this study, JIT approach is discussed theoretically and a conceptual framework about this approach’s contribution to cost management, production planning and stock management is formed. Then this approach’s applicability in SFEs is examined. Thus, it is aimed to try to determine where SFEs stand in cost management process.

Just in Time Production System:

Just in time production is defined as “efforts to work with minimal stock, minimize transportation distance, minimize defective production and have a continuous, just-in-time workflow from supplying to production and from production to distribution (Şahin and Eren 1994).
JIT is not just a stock reduction program or a basic supplier program. JIT is a system offering raw materials, supplies, intermediate goods and final products when required and as needed (Acar et al. 2006). JIT is against any loss and unproductivity in production process (Kırlıoğlu and Şahözkan 2003).

With JIT system, it is possible to evaluate many cost items as direct costs which are accepted as indirect costs in conventional cost accounting. Just in time production method also affects allocation keys which are used for non-value creating activities. For instance, storage costs are considered as indirect costs in conventional cost accounting. In distribution of these costs, storage area is used as allocation key. As there is no storage area in JIT production system, storage area cannot used as allocation key. Thus, JIT leads to changes in production costs and calculation and audit of these costs. For this reason, enterprises using JIT system in their production processes, give up conventional cost and managerial accounting methods and start to adopt new methods (Yükçü 1999).

The most important feature of JIT system is preventing loss occurring as a result of overproduction, unneeded transportation, unproductive processing and defective production (Karcıoğlu and Dursun 2001). JIT defines all factors which do not enhance the product value, as waste. Preventing any kind of loss is main purpose of the JIT program (Acar 1992).

Japanese researcher Shigeo Shingo considers stock as “the main source of problems in the production process” (URL 1). It is crucial for JIT system to produce with minimized carrying cost and satisfy the customer needs outrightly by acting as a cost leadership (Erden 1999; Dursun 2001).

JIT system has two goals to eliminate wastes. These are (İpekgil and Gökşen 1994);

- Zero inventories (raw materials, intermediate goods, product stocks)
- Zero defective (for purchased goods and outputs)

But these goals are ideal operating goals. To achieve these goals are practically impossible. What is important for enterprises is reducing costs by increasing improvement efforts toward these goals (Acar 1992). In this system, documentation and accounting transactions become simple in parallel with simplification of production process (Gürsoy 1997).

Main purposes of the JIT system are determining in which steps of current production process, wastes occur, eliminating all wastes, increasing productivity, decreasing costs and adding value to customers.

![Figure 1. Just in Time Production Philosophy](image)

**General Approaches of Just in Time Production System**

- **Kanban System**: Kanban is a Japanese word and it means “cards”. Kanban is an information system which is used for controlling production
and material flow and it determines what will be produced, when and how much will be produced and where will products be sent.

Kanban can be defined as a new production control (scheduling) approach which is used for controlling material flows in a just in time production environment (Orbak and Bilgin 2005). In order to realize just in time production, it is necessary to establish an information system stating the time and amount of production to each processes. This function in just in time production systems and group technologies is performed by Kanban system (Orbak and Bilgin 2005).

- **Kaizen (continuous improvement):** Kaizen stands for “improvement”, or “change for the better”. It focuses on continuous improvement. Kaizen is related with JIT, because it is impossible to achieve zero inventories and zero defects goals of JIT system. So that enterprises and managers can adopt Kaizen approach and work for continuous improvement to reach their goals (Erdoğan et al. 2006).

- **Poka Yoke (mistake-proofing):** This Japanese term comes from Poka (mistakes) and Yokeru (avoid) and means “mistake-proofing”. According to Shiego Shingo, who applied this term, the aim of poka-yoke is to design the process so that mistakes can be detected and corrected immediately, eliminating defects at the source (Parıltı 2003).

- **Standardization of Production Activities:** One of the most important factors of JIT system is standardization of all production process activities. Taiichi Ohno, developer of Toyota Production System, says that “Where there is no standard, there can be no kaizen” (URL 2). There are three primary goals of standardization of production activities (Kanat and Güner 2006).
  - Increasing productivity by eliminating unnecessary acts in manual labor
  - Providing balance in terms of production timing among all product lines
  - Reducing inventory level

In order to realize these goals, standard operations should be reorganized with including components such as “cycle time”, “arrangement of Standard operations” and “standard process inventory amount”.

**Comparison of Traditional Method and Just in Time Production:** JIT is a different system from traditional practices in terms of quality and production control systems. New cost accounting methods are being developed due to JIT system. Traditional method and JIT is compared in Table 1 (Acar 1999).

<table>
<thead>
<tr>
<th>Traditional Method</th>
<th>Just in Time Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>Push system</td>
<td>Pull system</td>
</tr>
<tr>
<td>Mass production</td>
<td>Knowledge generation for competitive advantage</td>
</tr>
<tr>
<td>Simplex experienced workers</td>
<td>Broadly skilled flexible workers</td>
</tr>
<tr>
<td>Having normal and abnormal wastes</td>
<td>All wastes are considered as abnormal</td>
</tr>
<tr>
<td>Quality control after production ends</td>
<td>Continuous quality control</td>
</tr>
<tr>
<td>Acceptable quality level</td>
<td>Total quality control</td>
</tr>
<tr>
<td>Working with multiple suppliers</td>
<td>Working with a few suppliers</td>
</tr>
<tr>
<td>Difficult and complex cost accounting</td>
<td>Simplex cost accounting</td>
</tr>
</tbody>
</table>

**State Forest Enterprises and Production Planning**

**State Forest Enterprises:** Forestry is an economic activity trying to satisfy human needs and it is one of the important sectors of national economy (Türker 2008). Forestry sector considers structure of forests
and demands of public and it addresses ecological, economic, social, cultural and managerial aspects as ecosystem integrity. All forestry activities are held with cooperation among all partners and these activities are based on sustainable forest management criteria (DPT 2007).

27.2% of the total land area (21.2 million hectares) of the Turkey is covered by forests. Almost 99.9% of the forest are state owned, so forestry operations are planned and executed by General Directorate of Forestry (GDF) under the Ministry of Forestry and Water Affairs (MFWA). GDF is organized throughout the country as Regional Directorate of Forestry, Forest District Directorate and Forest Sub-District. There are 27 Regional Directorates of Forestry, 217 Forest District Directorates and 1319 Forest Sub-Districts (OGM 2009). SFEs are basic decision taking and implementing entities. The role of SFEs is to provide goods and services which public demands from forest resources within the scope of sustainable forest management. While SFEs perform these duties, they also carry out production, management, marketing, finance and so on functions (Ardıç 2010).

Nowadays, the market share of SFEs is decreasing, so they are not operating at desired profitability level. Also there is not an effective cost calculation system and as a result cost management approach can not be adopted. All these factors leads SFEs to lose competitive power (Ardıç 2010). So it becomes necessary for SFEs to reconsider their production and cost processes.

Production Planning in State Forest Enterprises:

Wood raw material production planning should be considered as a decision-making process. This means that this planning process should be regulated consciously and aimfully. Aim should be maximizing public welfare, making production in this context and managing forest resources (Geray 1992).

Forestry is the most land depended sector and its production time is too long. Also in order to present goods and services to public rationally and provide continuity principle, forest resources have to be benefited in a planned way (Korkmaz 2006).

As a result of this necessity, in Turkey forest resources are managed through forest management plans. Forest management is defined as “planning forest enterprises or sub-enterprise units based on pre-determined aims, monitoring and controlling application of plan, presenting changes in enterprises with periodic inventory takings, determining economic situation of the enterprise and providing needed information for renewing plan (Eraslan and Eler 2003). In our country, as forest management plans are grounded on wood raw material production function, forest management plans are considered as wood raw material production plan. In sum, forest management plans include time and place regulations about production (Korkmaz 2006).

Forestry activities are also economic activities. Production in forestry depends on market conditions as other sectors. Changes in market conditions affect forest enterprises directly. So predicting future changes is very important. Beside this, forest enterprises make production with limited economic resources. Because of these limited resources, enterprises require to select a system in production. Aim of selected can be cost minimization or profit maximization. In modern production management approaches, production plans should be done due to system approach and so monitoring and evaluation should be for whole process (Korkmaz 2006).

Applicability of Just in Time Production Approach in State Forest Enterprises:
JIT defines all factors which do not enhance the product value, as waste (Yasin et al. 2001; Acar 2003). Seven reasons of wastes which JIT system tries to eliminate are (Çevik and Zeydan 1998):

- Overproduction
- Waiting
- Transportation
- Inventory
- Processing
- Motion
- Defects

These wastes can occur singly or together in an enterprise and if these wastes are reduced or eliminated, it will result in cost reduction and profit increase (Emgin 1997).

JIT minimizes transportation distance and prevents stock increase. JIT leads to benefit from limited resources more and more by minimizing defected products. So JIT can be defined as efforts for having a continuous and just-in-time workflow (Aytekin 2009). Some opportunities about applicability of JIT in SFEs can be listed as follow:

- JIT system can be used more efficiently in SFEs than other sectors in the context of management of forest goods production in accordance with market demand predicts (minimization of production loss).
- In JIT approach, reducing stock costs are the most important cost gains. If SFEs can manage their stock costs in parallel with production planning and sales, they will act conveniently to JIT.
- In yearly budget practices of SFEs, some goals about “decreasing stock amounts” and “following the market and making sale all the year round” are related to JIT approach. This situation is a good opportunity to apply JIT in SFEs (Ardiç 2010).

Production time in forestry sector is longer than other sectors. This period varies from 20 years to 200 years. Also, in the forestry sector land is used most intensively. So that forestry sector depends intensely to time and place factors. In this study, it is put forward that waste elimination is more important in forestry sector when production time is taken into consideration. According to pull system under JIT approach, each activity in production process is realized depending on previous activity. If pull system is used in State Forest Enterprises, unneeded stock in forest selling storages will be reduced and production will be made depending on demand.

On the other hand, there are some constraints about applying JIT system to SFEs. One of these constraints is that production is limited with forest management plans. This constraint can hinder production amount and sales revenue of SFEs. Hence, JIT becomes a good alternative for SFEs to increase profitability and have competitive power (Ardiç et al. 2009).

As a result, it can be said that cost management approaches should be used as required. It cannot be possible to apply JIT system to all processes and systems in SFEs. For this reason, initially it has to be applied in a pilot area and after successful application; it can be used for all systems. So “realizing production depending on stated aims, at desired quality and least cost” should be accepted by SFEs as mission and necessary steps should be taken.

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