Logistical stock management methods - organizational performance evaluation means

Gheorghe CHIRU[1]

Abstract: Numerous approaches have been proposed in recent years, which lead to the improvement of the organizational performance. Three stock management methods, Just in Time, Lean Management and Six Sigma were considered in this study and they represent alternative approaches for the improvement of business efficacy and efficiency. Even if they were differently presented without any links, conclusions show that they can be used at the same time in an integrated system. The study shows that there are correlations between the three working methods, as they influence the performance of the business, both from the operational and strategic perspective.

Keywords: stock management, performance, supply chain

JEL Classification: M10; M11; M40

1. Introduction

Stock management is important for any company that manufactures, deposits, sends and sells products and goods. A major influence on the global performance of the company and the efficiency of its daily activity is provided by the efficient fulfilment of this function.

Stock management supposes the correlation between the inflows and outflows, thus considering the maintenance of optimal stocks, the needed supply volume and the moment when a new provisioning has to be done.

To satisfy the product demand in a certain period of time, it is needed to realize a sufficient stock, so that a loss regarding the immobility of the invested cash or a depreciation of the stocked products won't appear. Loses also appear in case when the demand is not satisfied due to insufficient stocks, which can lead to losses due to commends unfulfillment.

The sphere of stock management significantly overpasses the traditional stock accountability, evaluation and evidence traditional practices. Modern concepts compete with many traditional control approaches and methods. High class Japanese concerns have showed hot to efficiently produce with minimal level of stocks by adopting some different concepts and techniques. As a result, specialists had to reevaluate and rethink the traditional approaches. Efficient management art firstly supposes the understanding of available techniques, followed by the planned use of those systems and procedures that will prove to be the most suitable for each enterprise.

Strategic and trade objectives of a company regarding the stock management are many and different, but the common objectives consider the profitableness, current assets and the sales volume and clients' satisfaction. In the case of manufacturing enterprises, the objective of investing in stocks also includes the efficacy of using fixed assets, work and energy.

A significant role in reaching the above mentioned objectives belongs to managers and specialists, who use efficient stock management techniques, but more important than the use of these techniques is the choice of the suitable direction regarding:

- Stability regarding the maintenance of the objectives and performance;

[1] Danubius University of Galati, Department of Finance and Business Administration, gheorghechiru@univ-danubius.ro.

- Equally considering the three common objectives: profitableness, current assets and the clients service level;
- A permanent pressure to remove over-normative stocks, with the two large components: with low speed and without moving. (Popa Ion Lala, Miculeac Melania, 2009)

The issue of stock management regards the stock analysis depending on their role in the exploitation process and the analysis of the current assets usage efficiency. Data sources needed for the analysis are: financial accountability, the annual financial statements, statistics regarding the sales and stocks, board tables, supply and production budgets, external sources. (Sîrbu Carmen, 2008)

2. Resources – Stages

2.1 Arguments regarding the significance of stocks ownership and optimization

Stocks exist in the supply chain due to the differences between the demand and the offer. Irrespective of the fact that the company's field of activity is the production or trading, it must own stocks to satisfy the demand. Two significant roles of stocks is to grow the demand that can be satisfied through the fact that the product is available when the client desires it and to lower the costs by exploiting the scale economies that can emerge during the production or distribution process (Felea, 2008).

The renown theoretician in the field of supply management and distribution, John Gattorna, assumed that despite of all the existing accountability conventions, not all stocks represent assets. The real value of stocks is given by their ability to serve several specific functions, such as the protection against the uncertainty regarding the demand against the ability of supply chain operation to deliver at the level of the demand and also the protection against the offer uncertainty, either between the different production stages, either form external offer sources. Stocks allow the decoupling of the demand from the immediate dependence on the offer sources.

The ideas supported by John Gattorna have now become reality, as all efficient companies consider logistics as a function of efficient management, producing the price-quality-time triad, whose finale result is the general optimization of one company's activities, so that to face a strong and complex competitive environment.

Nowadays, numerous companies consider the coordination of the logistics and marketing activities, regarding the efficient management of the offer, in order to satisfy the client needs at a superior level at reasonable costs.

To emphasize the significance of stocks ownership, the objectives of a company are:

- Ensuring a continuous material flow in order to maintain the continuity of the production activity;
- Ensuring the products' quality at an efficient price in order to grow the competitiveness level;
- Ensuring a good level of collaboration both with the clients and with the suppliers;
- Reducing the supply expenditures;
- Maintaining the optimal stock;
- Maximizing the profitableness through minimal investment;
- Maximum efficiency regarding the suitable products, at the right place, at the right moment, with the suitable quality and quantity, and for the right price;
- The use of an operational and efficient informational system which is to emphasize the status of the stocking process in useful time;
- The use of efficient monitoring and control methods for the removal of over-normative stocks and maintaining them in certain volumes.

As for the significance of stocks optimization, we can consider a strategy that considers:

- The adequate frequency of supplying;
- The product quantity.

Solving the problems that consider the stocks maintenance and optimization is made using a suitable stocks supplying system, which has evolved in time from simple administrative procedures to complex computer assisted systems.

The decision makers need information regarding the optimal size of the raw materials volumes and materials owned by the company and their correlation with the needs of production. The minimal reduction of the value and the volume of the raw materials and materials stocks results in the reduction of the depositing and keeping costs (diversity generates high costs) and creates the premises of discovering eventual frauds. (Briciu Sorin, 2006)

2.2 Adequate stock management methods

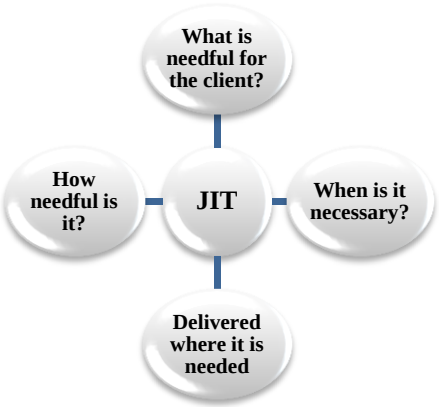
A series of stock management methods leading to the permanent insurance of the optimum stocks need is known: Just in Time method, Lean Management Method and Six Sigma method. We will analyze these methods, as we desire to emphasize the advantages that are based on the removal of all loss forms (large stocks, over-production, transportation, waiting times, defects) and inefficient work.

"Just in Time" (JIT) Method

This method originates in Japan and it was issued by Toyota, as a result of the lack of space and natural resources. The efficiency of this method consists of a series of operation that leads to the reduction of the inventory, the reduction of the depositing need and of the involved personnel.

The method is based on the drastic stock reduction principle, at the same time with the global cost reduction and the growth of the products' quality. JIT approaches a manufacturing ideology, so that the production is according to the clients' demand.

Figure 1. Priorities of JIT method



The rising question is: How can one maintain the quality of products if the costs are reduced? The answer is simple, through the fact that this system is based on the three principles: quality, immediate delivery and low or zero stocks.

JIT operates according to the plan: COMMAND – PRODUCTION PROCESS – DELIVERY and leads to the maintenance of the optimal stock, so that after the products are directed towards delivery, the production process is started to replace them. This is the only way to maintain quality, as the stocks do not make the subject of negative, degradation, expiration, depositing effects any more.

The success of JIT implementation in a company depends of the coordination between the own production plan and the suppliers' deliveries, as well as the quality of the services offered by them, both from the perspective of the product quality and the supply viability.

This requires a correlation between the own production plan and the one of the suppliers (Vijay R. Kannan; Keah Choon Tan, 2005)

JIT emerged as a reply to the traditional methods that are based on tampon stocks, numerous suppliers, high costs, low quality, limited-skills human resources.

A comparative approach on the traditional methods and JIT considers certain criteria regarding discipline and standards, the flexibility of working methods, creativity, the quality of the working environment, personnel development.

Table 1. Comparative criteria traditional methods – modern methods

Criteria	Traditional methods	JIT
Priorities	Extended market with many options	Limited market with few options: low costs, high quality
Standardized systems	Non-standardized products	Standardized products
Production capacity	Maximum	Average
Production system structure	Technological principle based system	Continous flow principle based system, production cells
Rational placement	Wide spaces Mechanic materials transfer	Narrow spaces Manual material transfer
Personnel	Specialized with low abilities and competitive atitude	Specialized with wide abilities, teamwork and flexibility
Preparing and processing	Long time	Little time, prompt changes
Stocks	Tampon stocks Wide depositing spaces	Reduced tampon stocks Stock removal
Suppliers	Numerous Receiving base delivery	Low Assembly line delivery
Planning and control	Planning-oriented, registers the statistics, orders,production capacity etc.	Control-oriented sets and stimulates the production process from the beginning to the end
Quality	Corrective quality inspection preventing the error emergence	Preventive quality inspection that prevents th error emergence
Production capacities maintenance	Reactive maintenance-interventions made after the manifestation of defects/wear	Proactive maintenance–interventions made without expecting the manifestation of defects/wear

This method, which is based on the principle that stocks must be on the way to the clients and not in the deposits, ensures a cost reduction, but, if at a certain moment, a higher demand on the market arises, it is possible that the company won't be able to satisfy it as a result of the fact that the material suppliers won't be able to fulfill the order exactly in the needing moment. The disadvantage of using the method originates in the fact that the demand varies, and the system cannot function in an efficient manner.

The "Lean Management" Method

JIT is not the only method used in stock management, and the fluent production (Lean Management) concept emerged from the environmental changes.

Lean Management uses the JIT concept and comes along to its principles with the concept of added value of the manufactured products, the one that the client desires in fact.

The added value concept, from the client's perspective, can be defined as an element (functional feature, quality, delivery period etc.) the client pays for, as he/she finds an advantage (additional functionality, better viability or lower price) compared to another product (Badea Florica, 2009).

There are cases when numerous activities within a company bring no added value to the product, and one of the main objectives must be their removal, so that the company will improve its performance with minimum expenditures.

There are several differences between the two JIT and Lean concepts, regarding the products' life cycle, production losses and product range.

Table 2. The transition process from JIT to Lean Management

	JIT (Just in Time Production)	Lean (Fluent production)
Product life cycle	Monitored from the input to the output	Monitored from the subcontracting until after their selling and recycling
Loses	Only from the production process	From all production processes
Manufactured products	Low product range	Wide product range manufactured according to the market demands

Seen as a production evolution perfectly correlated to the actual development conditions of companies, the Lean Management model significantly considers the dimensioning of the product life cycles, the dimensioning of the processes and the dimensioning of the manufactured products range.

The Lean model was not thought just as a technological process, it is also based on an evolutionary process regarding the change and adaptation of usages and mentalities. The starting point is the strategy the company applies regarding the short and medium term objectives setting, that can be fulfilled by all implied individuals.

The basic component of Lean Management is the motivational management based on the team spirit, the improvement of the working conditions for all the employees, the personnel training and the recognition of their efforts, as well as the introduction of working discipline.

The "Six Sigma"

Six Sigma is an integrated method through which one pursues the achievement of an excellence level for the quality of the products and/or of the services a company provides. The excellence degree can be quantified through different indexes that evaluate the fulfillment degree of the pursued optimum. That is why the main issue of the Six Sigma approach is the managerial one, in which the operational issue in integrated, based on the theory and practice provided by mathematical statistics.

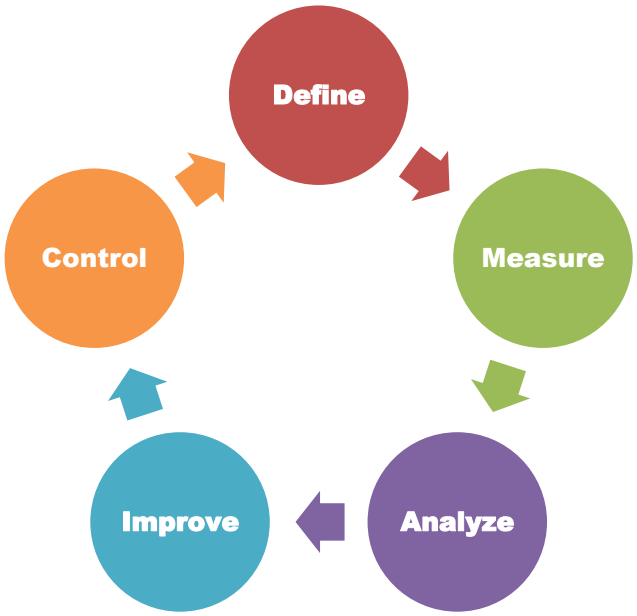
Six Sigma is approached from two points of view, namely:

- *the statistical perspective* – the six sigma concept is defined as having less than 3,4 defects at a number of one million manufactured products, or a success rate of 99.9997%;

- *the commercial perspective* - quality is not a scope itself, but a mean towards gaining better profit, higher customer satisfaction, market position strengthening. (Isaic-Maniu, Alexandru; Vodă, Viorel, 2008)

The integrated Six Sigma approach involves quality management techniques (TQM), based on the business performance improvement. The Six Sigma methodology is based on the DMAIC algorithm – **Define, Measure, Analyze, Improve and Control**.

Figure 2. DMAIC Algorithm



- Define the client's desires and the process objectives;
- Measures in order to find a parallel to the client's demands;
- Analyzes and evaluates the process;
- Improves or optimizes the process and removes the nonconformities;
- Controls the performance maintenance.

The reasons for which an organization can use Six Sigma are different, as it is a strategy that lead to the improvement of the efficacy and efficiency, it is a strong mean of improving the competitiveness and profitableness, a strong instrument for the evaluation of how far the company is from reaching its objectives and for the improvement and growth of employees' satisfaction, which will feel more involved in its activity.

2.3. Comparisons between the organizational performance improvement managerial techniques

The three models approached in this paper have the same essence and use the same optimization process stages. They are flexible, they do not exclude each other mutually and include new concepts alongside the existing principles. The difference between the models is represented by the implementation details.

Table 3. Comparative analysis between the main managerial approaches that implement quality strategies

	JIT	Lean Management	Six Sigma
Objectives	Reducing to minimum or removal of stock Cost reduction	Loss removal Increasing the optimization level	Removal of variation Removal of defects
Maximum focusing	Cost	Speed and cost	Quality
Indexes	Productivity Series changing optimum time Production cycle time Income increase Salary levels of the provider Total costs reduction	Productivity Quality Equipment safety Total costs reduction	Number of sold products Net profit value University studies personnel Reported incidents and accidents Absenteeism Losses value Unsold products
Used instruments	Kaizen type events Kanban method Scoreboard Balance	Kaizen type events Mapping of value flows Balancing the working charge Waste analysis	DMAIC model to reduce variability of the client-oriented processes Processes mapping
Implementation results	Reducing the costs corresponding to the operations that do not create value Reducing the preparation-finalization times Maximum reliability of the equipment Superior quality production Creating a partnership with the suppliers Education and training of the work force	Costs reduction Reducing the reaction time on the market signals Increasing the productivity Improving the quality, the delivery terms and working conditions Employees' motivation Total client satisfaction	Increasing the clients' satisfaction Investment recovery Changing the operating management method „working smarter not harder" Costs reduction Increasing productivity Cultural changes

3. Conclusions

Any organization assumes a mission, objectives and strategies in order to reach certain results.

All the presented models involve a set of means needed to improve the organizational processes and performance. Thus, all organizations can take advantages by applying the Just in Time, Lean Management or Six Sigma methods for their current management.

Table 4. The advantages of implementing the stock management logistic methods

	JIT	Lean Management	Six Sigma
Advantages	Reducing costs by reduing stocks, reducing the rejects Reducing the working time Increasing the income by improving product quality Reducing investments, both by reducing the storing spaces and by minimizing the stocks Improving the personnel activity Increasing work productivity	Cost reduction Productivity increase Market share increase Customer loyalty Cycle time reduction Defects reduction Organizational culture changing Reduction of the launching time of a new product/service on the market	Cycle time reduction Inventory and spacing needs reduction, Improvement of the terms and production fulfillment Process quality stabilization Employees' ideas use Creation of qualification models and development possibilities

The study represents a synthesis and was made in order to take knowledge of certain features, application methods and significant results from their implementation.

Even if these models have different names, they practically overlap and use similar techniques and instruments, giving the decision makers the opportunity to analyze and decide on which instruments or techniques are the most suitable for an efficient organization.

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