JUST IN TIME AS A MODERN PRINCIPLE OF INVENTORY MANAGEMENT

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Abstract: Modern inventory management implies various techniques, policies, as well as procedures that are needed to achieve an economical level of inventory, and these are primarily those inventories that reduce the total cost of production and business to a minimum. Inventories make up a large part of the total business assets in a large number of companies, which is why they require relatively large investments. In order for these investments not to be unnecessary and unjustifiably high, inventories must be managed efficiently. Material stock strategy and tactics aim to keep the costs produced by material stocks to the lowest possible level. In order to achieve all this, we should strive to keep material stocks as low as possible.

This is achieved by shredding orders, which increases the number of orders in the time period when the arrival of materials coincides with the consumption of materials from the previous order, how to monitor or control efficient inventory management. Inventories allow for business flexibility and should be increased while the savings from holding inventories are greater than the costs of keeping them. It would be ideal if the company did not have stocks until the moment of their consumption (materials and semi-finished products), ie until the moment of sale (goods and finished products), but that ideal is difficult to achieve.

That is why the strategy and tactics of stocks come down to keeping stocks at the lowest level, but that this level does not jeopardize the continuity of the production process (stocks of materials and semi-finished products) and sales (stocks of goods and finished products). It is this level of inventories that enables good financial stability and thus solvency, with the costs of financing the holding of inventories being reduced to the lowest level, which is reflected in an increase in gross profit. Inventory-free production is based on the delivery of goods and materials exactly when and where required. Flow through the distribution channel or supply chain should be easy and without waiting.

Keywords: "JUST IN TIME" Inventory management, inventory implementation, benefits and inventory production, financial result.

1. INTRODUCTION

„Just in Time“ (*JIT*) as a composition of production differs significantly from the traditional method of production with the aim of reducing any form of surplus material created in production, with changes in approach as well as in the handling of stocks. The main factor of such a system is reliability, starting with the supplier of raw materials, intermediate goods and the like. Until the end of the supply chain, ie the production itself. The system as a whole includes the production of raw materials and semi-finished products with the supplier, then the execution of orders in a particular system as well as the entire production plan in it. The delay is unacceptable because in such a situation there would be a delay in production, according to which only reliable suppliers are considered. This process is usually performed by monitoring the original change or adjustment, which is analyzed and reviewed by a team of trained engineers, and draws conclusions that are the basis for improvement. Usually, after a certain number of repetitions, procedures that used to last for hours are shortened to minutes.[23]

Modern Inventory Self-Time Management (JIT), also known as Equal Production, and sometimes referred to as the “Toyota Production System” (TPS), is an inventory strategy used by manufacturers to increase efficiency. The process involves ordering and collecting inventory for the production and sale of customers only as necessary for the production of goods, and not before. Ordering inventory on a required basis means that the company does not own security stocks and operates with continuously low inventory levels. This strategy helps companies lower inventory transfer costs, increase efficiency and reduce waste.

JIT requires manufacturers to be very accurate in forecasting the demand for their products. Inventory management at the right time is a positive inventory management strategy to reduce costs, although it can also lead to inventory. JIT’s goal is to improve the company’s return on investment by reducing non-essential costs. There are some

[23] Țic, S .: Optimization of inventory management of supply chains, doctoral dissertation, University of Rijeka, Faculty of Engineering, 2014.

competitive inventory management systems, including short cycle production (SCM), continuous flow production (CFM), and demand flow production (DFM). The JIT inventory system represents a transition from the older "just in case" strategy, in which producers had much larger stocks of stocks and raw materials, in case they had a need to produce more units due to higher demand. JIT stocks can lead to supply chain disruptions.

Companies that use JIT no longer have to maintain a huge amount of storage space to store inventory. Toyota began using JIT inventory control in the 1970s and it took more than 15 years to perfect the process. Toyota sends orders to purchase production parts only when it receives new orders from customers. Production of Toyota and JIT will succeed as long as the company maintains a stable production rate, with high quality workmanship and no machine failures in the plant that could stop production. In addition, reliable suppliers are needed who can quickly deliver parts and the ability to efficiently assemble the machines that assemble their vehicles..[24]

2. MANAGEMENT INVENTORY MANAGEMENT ASSISTANCE "JUST IN TIME" METHOD

Inventories represent a significant investment as well as a potential source of waste that needs to be carefully controlled. If it happens that managers keep too much stock, they will spend money on their storage, and they will lose it if there is damage to stocks or theft. On the other hand, if there are not enough stocks, managers will have to stop production until the necessary material is procured, and in that way they will lose time and work. For the inventory management process to be successful, the inventory manager must think carefully about some questions and give a precise answer to them. These questions can be formulated as follows:

1) The nature of the work process of the organization determines the procedure for determining the type and quantity of stocks. For the sales organization, this will depend exclusively on the possibility of procurement as well as the requirements of the market itself.

2) For an organization that assembles components into a final product, all components that are part of the final product must be in stock and their quantity is directly related to the plan for the production of the final product.

3) The production organization has a need for those stocks that are its basis for the production of the final product, and the quantity is determined by the quantity needed to produce one product.

4) Maintenance activities require spare parts and materials, and the range and quantities are dictated by the means that are the subject of maintenance, planned maintenance interventions, as well as emergency maintenance interventions that are assumed to have to be carried out in the coming period.

5) Inventory supplies are determined by the organization's policy and the level of their spending in the previous period.

Based on the above, it is obvious that different types of stocks require different approaches in the management of these stocks. The main goal of inventory management is to determine the optimal amount of inventory. In order to determine the optimal quantities of stocks, it is necessary to determine the amount of minimum and maximum stocks. Minimum stocks are those quantities of stocks that meet the needs of the reproduction process until new quantities are procured. Maximum stocks - the amount of stocks whose level should not be exceeded. Optimal stocks, which range between minimum and maximum stocks, do not jeopardize the reproduction process at all and are fully in line with the volume and duration of the process of production and trade. Determining the optimal quantity and efficient inventory management is based on information on the state and types of inventories, inventory costs, inventory renewal.[25]

Cost benefit analysis analyzes the costs and benefits of owning inventory and determines the optimal amount of inventory. The costs of acquiring stocks, among other things, include the costs of receipt, control, accommodation, missed quantity discounts. The costs of keeping stocks include: storage costs, handling and insurance costs, property tax. The optimal size of an inventory order is present when the minimum total inventory costs are m inimal. It is calculated as follows:

$$Qopt\ (z) = \sqrt{\frac{T(pj)\ *\ Ug(p)}{N(cj)\ *\ \%\ T(d)}}$$

Qopt (z) - the optimal size of the stock order

T (pj) - costs of one stock order

Ug (p) - total annual order quantity

[24] https://en.unitinal.com/just-in-time-jit- inventory management /

[25] Vunjak, N., Financial Management, Faculty of Economics, Subotica, 2005, p. 168

3. IMPLEMENTATION „JUST IN TIME SISTEMS

The implementation of "JUST IN TIME" requires a great and long-term effort from the organization. The key success factors are: [26]

1) Support of managers at all levels of organization management;
2) Adequate allocation of resources;
3) Building long-term relationships of trust with suppliers;
4) Changing the corporate culture of the organization;
5) Change in process flows and principles of production organization;
6) Optimization of loading and operation of equipment;
7) 7) Optimization of equipment maintenance to reduce the number of failures;
8) 8) Implementation of quality improvement programs;
9) 9) Shortening the delivery time and increasing their number. Implementation of frequent delivery systems in small batches;
10) 10) Implementation of search, analysis and loss reduction systems.

The JIT implementation process is time consuming. In order for the system to work, it is necessary to apply various methods, tools, as well as quality techniques. But the most important thing is to change the consciousness of employees and corporate culture. The original slogan of the JIT concept was the elimination of potential stocks of materials, components and semi-finished products in the production process of assembling cars and their main units Customers must rely entirely on their suppliers, so they must establish long-term partnerships with a small number of reliable suppliers and carriers. It is necessary to look for ways to reduce the volume of production batches, to achieve short production cycles so that excess production would not accumulate in stocks of finished products. Delivery time needs to be reduced to reduce uncertainties that can change over a long delivery time. Reliability. All operations must be performed continuously without interruption, ie. there should be no equipment failures, breakdowns, absences, etc. Workers. A spirit of cooperation is needed, both between workers and between managers and workers, the well-being of all depends on the general success in work, all employees should be treated equally and fairly. Any creative initiative of any employee regarding possible improvements in work is encouraged.[4]

4. ADVANTAGES AND CONCEPTS OF JUST IN TIME PRODUCTION METHOD

<u>The main advantages of JIT production are:</u>[27]

1) higher product quality,
2) reduced waste,
3) reduced cycle time,
4) shorter setting time,
5) safer production flow,
6) less inventory, raw materials, works in progress and completed works,
7) reduced production costs,
8) higher productivity,
9) higher participation of employees,
10) and improved relations with suppliers.

<u>Possible problems in production are the following:</u>

1) the reduction of inventories did not result in the expected financial gain,
2) increase in missed business sales contracts,
3) increase in production line shutdown due to lack of necessary components,
4) increase of transport costs per unit of consignment,
5) increase in the number of alarming deliveries,
6) increase in costs for logistics management,
7) increase the cost of software installation for supplies.

A classic production line implies the existence of stocks between producers and suppliers. The supplier produces parts-assemblies which he sends to the warehouse after leaving the production assembly line. "At the right time" technology means continuous supply of the necessary parts-assemblies from the supplier to the manufacturer without any stocks. Inventories are being eliminated. This means that there is a precisely determined appearance of the technological element and the supplier forwards the assemblies from his production line directly to the production line of the manufacturer. The requirements for technological elements are precisely defined and

[26] https://johar.ru/bs/religion/logisticheskaya-koncepciya-jit-vnedrenie-sistemy-tochno-v-srok-sushchnost-sistemy/
[27] http://www.eknfak.ni.ac.rs/dl/upr_proizvodnjom/JIT,%20Kanban.pdf

production proceeds upon the occurrence of the requirements. Iẑ the philosophy of UNV production creates the Lean concept.

5. IMPACT OF INVENTORIES ON FINANCIAL RESULT PRODUCTION COMPANIES

Inventories can be said to be the link between the Balance Sheet and the Income Statement. Accounting framework according to the balance principle, which has been applied in our country since 1997. Initial and final stocks affect the amount of the financial result, because they make an adjustment of expenses or income. Decrease in the value of inventories at the end of the accounting period in relation to the beginning of the accounting period corrects expenses to more, and vice versa - increase in the value of inventories at the end of the accounting period in relation to the beginning of the accounting period corrects income to more. Information on changes in the value of inventories, financial accounting received from the Accounting for operating costs.[6]

The impact of inventories on the amount of financial results can be observed from the aspect of inventory efficiency - higher inventory efficiency means higher financial result for the following reasons:

1. with higher inventory efficiency, higher effects are achieved - higher sales revenues. Higher sales revenues have a positive effect on the financial result.
2. with higher efficiency of stocks, the amount of stocks decreases, the costs of keeping stocks become lower, the amount of total costs that burden revenues is lower, thus the financial result is higher.

Inventory efficiency is measured by inventory turnover ratios. Inventory efficiency measures are indicators of inventory management success. The inventory turnover ratio shows how many times inventories have been reversed in the period for which the ratio is being determined. By comparing the number of calendar days in the period for which the turnover is measured with the turnover coefficient, the duration of one turnover is obtained (t = number of calendar days / turnover ratio). A higher turnover ratio and a smaller number of days of one turnover means higher inventory efficiency. Turnover ratios are used to measure not only the efficiency of inventories but also the total current assets of a company. Individual coefficients by types of stocks are determined by comparing the effects of individual forms of stocks and average stocks. The efficiency of material stocks is measured by the coefficient of material turnover and the duration of one revolution. As the coefficient of efficiency represents the relationship between the effects and the average stocks, the effect of the material is the cost of the material shown in the income statement. [28]

The task of the purchasing function is to provide the necessary quantities of materials and raw materials for production, the responsibility of the purchasing function is also the purchase prices, in the sense that the lower purchase price of raw materials directly means the lower cost of finished products. The responsibility of the production function is to rationally reduce the acquired material stocks through consumption in the production process. The task of the sales function is to place the produced products on the market, to generate appropriate sales revenues and to make sure that it collects receivables from customers in a timely manner and provides funds for the further process of reproduction. The CFO reviews each of the asset investment requirements and thus prevents cash from being tied up to an unnecessary level of inventory. [6]

6. CONCLUSION

Inventories make up a large part of the total business assets in a large number of companies, which is why they require relatively large investments. In order for these investments not to be unnecessary and unjustifiably high, inventories must be managed efficiently. Modern inventory management implies various techniques, policies, as well as procedures that are needed to achieve an economical level of inventory, and these are primarily those inventories that reduce the total cost of production and business to a minimum. Modern Inventory Self-Time Management (JIT), also known as Equal Production, and sometimes referred to as the "Toyota Production System" (TPS), is an inventory strategy used by manufacturers to increase efficiency. The JIT concept seeks to eliminate all activities in production and distribution that do not help create a new product and that interfere with the continuous flow of goods in the distribution process. Production without stocks is based on deliveries of goods and materials exactly when and where required. Flow through the distribution channel or supply chain should be easy and without waiting. It would be ideal if the company did not have stocks until the moment of their consumption (materials and semi-finished products), ie until the moment of sale (goods and finished products), but that ideal is difficult to achieve. It is this level of inventories that enables good financial stability and thus solvency, with the costs of

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[28] Rodić J., Filipović M.. 2006, pg. 401

financing the holding of inventories being reduced to the lowest level, which is reflected in an increase in gross profit.

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