VENDOR MANAGED INVENTORY AND RELISH OF BOTH PARTNERS

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ABSTRACT: *The article deals with new approach of Vendor Management Inventory for better inventory management and flexible planning of production without difference to scope of business branch, than the companies use the traditional replenishment programs. Inventory management is important element of all business subjects and play very important role in the logistic supply chains. Approach Vendor Management Inventory is suitable tool to decrease administrative costs and improve the production process. The article deals with theme in application practice, which is based on the experiences of the companies that build up this approach and focused to implementation this system in Czech Republic. Further the article contains the design of new model Vendor Management Inventory in the form of Vendor Management Inventory – Outsourcing of support activities.*

KEY WORDS: *vendor managed inventory; vendor; supplier; customers; costs; case studies; advantages; outsourcing; and model with support outsourcing.*

JEL CLASSIFICATION: *L60; M10.*

1. INTRODUCTION

In the last decade on the basis of increased density of transport, requirements of customers in the form of higher quality speed and quantity expressed in the rising importance of supply chain management like an important instrument to achieve the competitive advantage. Firms increased the interests for improvement of activities in the form of new modifications of supply chains with smaller partial or complex interventions. The concept supply chain management and particularly coordinate supply chain management managers used to emphasize the role of coordination of different parts of supply chain. Managers try to focus not only on the fragments but on the whole chains.

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The idea of complex supply chain, which is applicable by coordination way in order to achieve the higher level of service with low costs, is an inherent goal of all firms around the world. The results of integration have positive depends not only on the loyalty of customers, but also ensure the alive of all logistic partners in the whole supply chain in the high competitiveness environment. In addition, the key task in supply chain management is the encouragement of all parts in supply chain for cooperation and coordination in order to optimize system. But on the other hand, the participants in supply chain are likely to prefer their own business and own interests than the profit of complex system.

The way of forestalling the integration problems in supply chain lies in the relative new approach of Vendor Managed Inventory (VMI). Vendor managed inventory is the approach that manages, controls and replenishes the stock by supplier in desired amounts on the basis of demand.

The aim of this article is to assess and compare the approach Vendor Managed Inventory as an instrument that coordinates replenishment of relationships between firms in supply chain management with traditional replenishment process by using of outlines from the world practice and undertaking the literature review of the Vendor Managed Inventory - Supply Chain management related body of knowledge. Secondly, the situation in the field of VMI in firms of Czech business environment from results of research project, which was realized in year 2010, is also described. Finally, in the chapter Guidelines for further developing, I suggest directions for the future research, for example in the form of common outsourcing in the main and support activities.

2. VENDOR MANAGED INVENTORY APPROACH

In 1985 the approach Vendor Managed Inventory by companies Wal-Mart and Procter and Gamble, which improved the supply chain and also fixed the position of leader on the American retail market of this company, was introduced in the USA. The Vendor Management Inventory was presented as a new tool for supply of all stores against the traditional replenishment process, which became more administratively and time-consuming and was not able to cover all requirements of customers in time, and thus Wall-Mart lost the potential customers and revenues.

The Vendor Management Inventory is one of the systematic approaches for managing supply chain like complex activity. (Småros, et al., 2003), define Vendor Managed Inventory like an automatic replenishment program where the supplier is given the access to the customer’s inventory levels and demand. However, the responsibility of a supplier in this approach is very important. It is place of interference of many authors, who are interested in the problematic of supply chain management because the uniform view of position of owner of the stock does not exist. Customer built up or rent the stock a use him every day and has an overview of daily operations, which is one of the main guiding principles.

On the other hand, vendor has summary information about inventories in the stock and its customers and about prediction of demand. Currently these principles prevail because vendor is responsible for managing the warehouse and customers only provided the necessary information.

The main condition of implementation Vendor Management Inventory in company's activities is the trust relationship between a supplier and costumer and transparent changing of relevant information. (Christopher, 2004), acknowledgements; that information influenced the effectiveness and it is the major power in supply chain management. The supplier is responsible for level on inventory by each customer and works as a central decision maker and these decisions are linked up with problem of inventories. The vendor has an advantage in the form of assigning of needed time for dispatching, the amount of replenishment inventory, and has the access to customer's data. Vendor could control long time plans and also the flow of goods and materials day by day. In addition (Van Weele, 2002) claimed, that VMI is focused on the whole supply chain, not only on some fragments or parts of replenishment.

Vendor Managed Inventory is defined as typical storing in the point of customer use by the Server Valuestreamguru (Vendor Management Inventory, 7.5.2011), but the ownership is not finished until the item is not consumed or moved on "drawn upon"; In comparison with the traditional replenishment process, in which the storekeeper controls the level of inventories in the stock and sends the order to purchasing department of the firm in the case of low level of inventory, this department contacts the supplier and makes the order and controls the whole process of delivering. At its most basic level, the buying and selling organization shares inventory data.

In the approach Vendor Managed Inventory, vendor holds the responsibility for generating and sending all desired amounts of items (orders) to customer, who received the series of massages, which are linked up with organization. On the other side customer moved information about the actual state in the stock to vendor. On the basic level, the vendor and customer share the data. On the basis of these information vendor decided about the replenishment. Vendor Managed Inventory is a very easy system and works very good because vendor sees everything what happened in the stock and can flexible react to actual situation.

The advantage of VMI policy due to the traditional replenishment processes lies in better using of sources. VMI could better react to changes on the market and reduce the uncertainty of demand. We know this fact under the term "bullwhip effect". Supplier can reduce the level of inventories itself by support of same level of service or can increase the level of service by decrease of costs for transport, a better planning capacity of truckloads, crossover the mistakes in deliveries, set up the minimum order to optimize loading, extend the plans to reduce costs and failures in the whole supply chain, reduce administrative costs and cover all requirements in time.

3. MODELS OF PROCESSING VENDOR MANAGED INVENTORY

Although the VMI was introduced for the first time in 80´s of the twentieth century, the first research dated to the beginning of nineties. But already in the year 1985 (Silver & Peterson, 1985) provided the first formulation and discussion of simple two-echelon inventory systems. (Svoronos & Zipkin, 1991) evaluated the performance of arborescent inventory/distribution systems. This system has the independent Poisson demand at the lowest echelon and assuming stochastic transit times, one for one replenishment policy.

In the year 1996 the complex research of last eleven years appeared by (Thomas & Griffin, 1996). They focused on coordination task of three fundamentals stages of supply chain (procurement, production and distribution). In the area of operational planning they were interested in buyer-vendor coordination, production-distribution coordination and inventory-distribution coordination with strategic planning and advance in communication and information technology (Erenguc, et al., 1999) joined the integration between production and transport. (Archetti, et al., 2005), implicated approach Vendor Managed Inventory in stochastic demand.

It was noted that VMI is illustrated in most models with content relationship of one supplier and one customer or retailer. Nevertheless, in reality there exist models with many suppliers, distributors, manufacturers, wholesalers that are in many deals with retailers and customers. (Darwish & Odah, 2008) designed the model with one supplier and more customers with penalized over the level of inventories and found the corresponding cost function. Contractual relationships are incorporated in the model and then the authors propose an algorithm for this model, which reduces the complexity of the model and looking for KKT point (Karush–Kuhn–Tucker conditions are necessary for the solution in nonlinear programming to be optimal, provided that some regularity are satisfied) related to the cost function.

(Zhanga, 2008) designed integration Vendor managed inventory model for one seller and many retailers without contracting relation. (Choi, 2004) designed the analytic model that measures the level of service in Vendor Managed inventory to better service level and reduction costs. (Jokar & Seifbarghy, 2008) considered one central warehouse and arbitrary number of retailers controlled by the continuous inventory policy (R, Q). The model has Poisson distribution of demands, assumed constant transport time for all retailers and constant lead time for replenishment. Unsatisfied demands are assumed as lost by the retailers and unsatisfied retailers orders are backordered in the warehouse. The aim of model is found as the optimal reorder point for given size of items.

(Nagarajan & Rajagopalan, 2008) investigated the performance of retailers and their managed inventory and Vendor Managed Inventory system. (Nachiappan & Jawahar, 2008) presented two-echelon under the VMI. These authors designed five basic models for various relationships between the supplier and customer with incorporated of outsourcing.

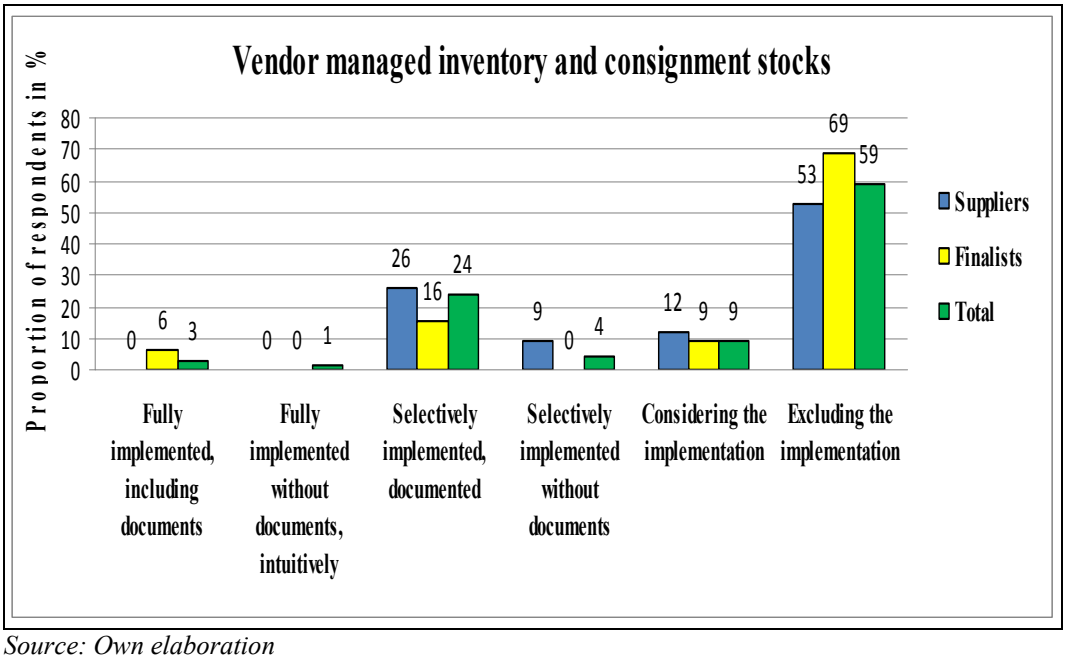
Single vendor – Single buyer (it is the ideal case, but in practice it is not so much extended), Single Vendor – Multiple buyers (big farms and their production sold by agents), Single Vendor – Multiple buyers with outsourcing (when the cumulative demand is higher than capacity of vendor, and outsourcing is the opportunity how to solve this problem), Multiple Vendors – Multiple Buyers and Multiple Vendors – Multiple Buyers with outsourcing. The authors tried to calculate the corresponding costs of these designed models and find the optimal sales quantity, acceptable contract price, optimal sales price and optimal outsourcing quantity.

4. THE IMPLEMENTATION OF VENDOR MANAGED INVENTORY IN CZECH REPUBLIC – ORIENTATION PROBE

In 2010 the research of logistics chains with focus on risks and cost and possibilities of simulations techniques utilization by Technical University Ostrava, Czech Republic was carried out (Macurová, et al., 2010). The research was realized by the Students Grant Competition. The research was undertaken in more than 300 firms, particularly from Moravia-Silesia department and Olomouc department, from all business areas.

The research was focused primarily on the risk management and cost management in logistic chains. In the field of measures to risk reduction, the authors of research were interested in the area of Vendor managed inventory and consignment stocks. The full text of question was, "Are you applied system Vendor Managed Inventory with consignment stocks?" and this question was answered by 82 respondents (100%) from more than 300 companies surveyed.

The approach Vendor Managed Inventory is on the beginning of their practical application in the terms of Czech firms. On the Fig. 1 we can take note that in 2010 9 respondents finished implementation of this approach in the forms of implementation with documents or without documents fully. 29 suppliers, 13 finalists realized Vendor Managed Inventory selectively (it means for selected items in stocks or for chosen subcontractors) with documentation or without.



Source: Own elaboration

Figure 1. Vendor Managed Inventory and Consignment stocks

In addition, 10 suppliers, 8 finalists considered about the implementation of VMI. It means that more than 47% of all suppliers in survey implemented in some form or considered about implementation of this approach, 31% of final producers implemented or considered about Vendor Managed Inventory.

On the other side it is a bit little disturbing that more than 69% of finalists does not think about implementation of this system and hold traditional or some different ways to replenish the stock itself.

5. PUBLISHED EXPERIENCES OF APPLICATION VENDOR MANAGED INVENTORY

In the next section experiences and intricacy with application of approach Vendor Management Inventory are introduced without difference to business area in the chosen companies.

5.1. Volvo powertrain

The first practical case of successful implementation of VMI is from Sweden Company Volvo (Gröning & Holma 2007). The company Volvo powertrain is one of the world's largest producers of diesel engines. The company has about 8.000 employees and the plants are in Sweden, France or United States. The production is customer-oriented which means that every engine has customer itself.

In April 2002 Volvo stated the first VMI relationship. Volvo recognized the exigency to decrease the level of inventory. First, the concept of VMI was realized in the plant Skövde and Köping. The VMI was designed by fifty suppliers; it was about 60% of total volumes. For managed of relationships with suppliers Volvo used VMI application PipeChain. System B2B supported supplier and customer in relationship of transmit information. The concept of Volvo is based on the daily report about demand, level of inventory and required the internet connections.

In February 2004 Volvo evaluated the first results from VMI relationship with suppliers. The cover of inventories dropped down from seven to three days. The inventory level decreased about 67% and also the administrative costs fell down. VMI effected the planning of production in good way, set up time and increased the level of service. Volvo evaluated VMI as the solution for the future that connected all parts of firm. The investment to software was paid back for six months.

5.2. IKEA

Ikea is one of the biggest retailers in the field of furniture and home accessories in the world. In 2000 IKEA formulated a new direction for the new millennium, improved the life of people around the world and became the number one in the world. IKEA used many sorts of distribution channels, like call off, order point distribution center, Vendor Managed Inventory (Henningson & Lindén 2005).

In the new millennium, IKEA went through different direction, they accepted the strategy that decreased costs in supply chains and improved the quality and service

level. In 1996, IKEA introduced the first Vendor Managed inventory relationship. Today IKEA AB is divided into 16 main world areas and about thirty distribution centers. The division "WOOD" is placed in Almhult, Sweden. This division is responsible for purchase of wood from Denmark, Belarus, Estonia or Latvia. These negotiations are linked up with very high level of administrative costs and cooperation of all participants. In addition, the very high competitive environment, in the form of firms from India or Poland, forces IKEA to return to different areas like the very high quality, speed and logistics costs of her products, because IKEA is not so much competitive in the field of wage costs.

In the year 1991, the IKEA purchased the firm Bräntorp, which became the member of SWEDWOOD International, which is in the ownership of IKEA. Bräntorp is the producer of kitchens and accessories from wood. This firm has only one customer - IKEA. The company used 3P-logistic company for delivering of products, which store Bräntorp's inventory of finished goods and schedules the carriers to the distribution centers (Logistic managers Bräntorp). But in 2002-2003 firms had problems with deliveries and IKEA was not able to cover the demand of her customers because only 70% of all orders were covered. In December 2003, IKEA decided to launch new Vendor Managed Inventory approach with instrument Advanced Production Planning (APP). The results were unbelievable and improved the position of Bräntorp immediately. Already in the year 2005, Bräntorp grow up with 94% of satisfied demand.

The relationship between Bräntorp and IKEA is based on the veracious share of data. Every day Bräntorp receives the file with data and these data are put into the ERP system. In addition, every week firm receives the information about the demand for next 150 days. The manual work decreased from 175 hours to 100 hours, the administrative with better prediction decreased from 240 hours to 120 hours of work and 192 hours are interested in the managed of stocks and VMI revealed false orders by better information between all participants. The investment of new approach was 700.000 Swedish Crowns and 40% of costs were remunerated by SWEDWOOD.

5.3. ICA – not success

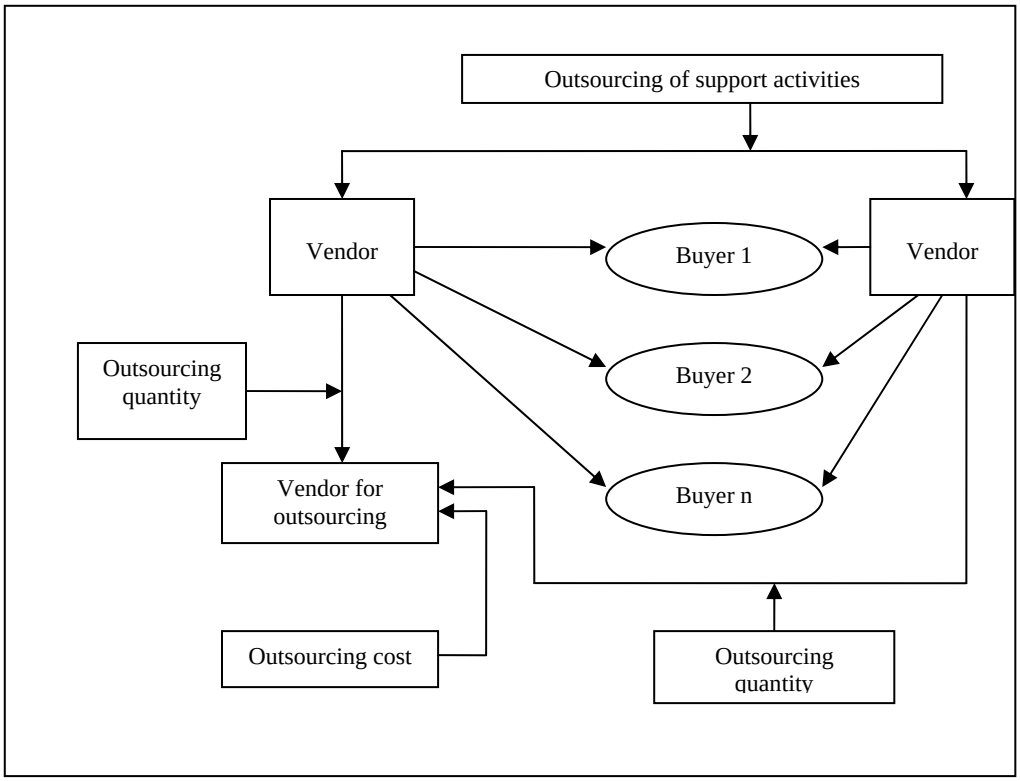
Due to (Henningson & Lindén 2005) ICA is the retailer in the area of food products. The first VMI relationship was linked up with Abba Seafood on the basis of volume of transport and in the year 1997 with Metsä Serla, 2000 SCA and 2001 with Colgate and 2002 with OLW. The goods became the ownership of firm's customers, as soon as arrived to the stock. Every day firms received daily sale by every products and for every week and next ten weeks. Before implementing of VMI, firms stated objects. For example there was stated with OLW, that work time decreased from 9.2 days to 8 days and that satisfaction of orders grew up from 93 to 98%. These goals were reached after 8 months.

The situation changed very well, the sales grew up about 23%, but it was not given by the approach VMI, but because of the situation on the market. After the first evaluation, any benefits were not pointed out between ICA and OLW. In addition, in every time, controls were launched and the whole system became very demanding in

administrative with OLW and also, after some time problems with ABBA Seafood also appeared. These facts promoted into the higher costs, failures in ERP and the whole system lost efficiency itself. The company decided to leave this approach in the year 2005, so after three years of working.

6. GUIDELINES FOR FURTHER DEVELOPING OF VENDOR MANAGEMENT INVENTORY

In the year 2008 (Nachiappan & Jawahar, 2008) presented five basic models in the condition of Vendor Managed Inventory. Multiple Vendor – Multiple Buyers – Outsourcing model is one of these models. This model works on the basis of inventory tracking and its replenishment. But sometimes, the capacity of vendors is exceeded and these vendors must use the capacity of their contractors. This contractual relationship is known under the name outsourcing. On the Fig. 2 we can observe when the vendor is not able to cover the increased demands of customers, he returns to his contractors and missing goods or materials are taken from him until he does not increase his capacity. In this case, the outsourcing is used for delivering of inventories (main activities).



Source: Own elaboration

Figure 2. Scheme of model Single vendor with outsourcing – Multiple buyers

On the other hand, the main activity is accompanied by the series of supportive activities, without which it would be not possible to operate the main activity. These include for example the management of data networks, computer networks, guarding of buildings or the use of companies for repairs of machines or vehicles (support activities). I suggested that in this case, the vendors can join together and choose one firm to ensure the necessary support activity.

The chosen company due to the expansion of its services can achieved economies of scale and higher revenues, which can reflect in the decreased cost of entire supply chain. The save of costs on the side of vendors and also on the side of support firms lead to the synergic effect. On the other side, the common outsourcing encounters obstacles in the form of different networks software, different guarding policies of firms, and willingness of employees to learn novelties and obtains new skills or the business policy.

The next interesting fact on the field of Vendor Managed Inventory is its new version in the form of Coordinated Managed Inventory (CMI). CMI is a very similar approach as the Vendor managed inventory system. Managers of given company managed the replenishment process of their company, but the biggest difference is that the order placed by the supplier is still recommendation and is not a firm order, until it is approved by the costumers. But in the VMI approach, the order is generated by the supplier who is responsible on the behalf of customer and delivers the products and bills it the costumer.

7. CONCLUSIONS

Vendor managed inventory is a relatively new approach how to manage the supply chain and achieve higher level of service for customers with lower total costs. VMI is based on the true relationship between the supplier (vendor) and customer, who shared the relevant data about the inventory and demand. VMI is the balance relationship between both sides and nobody has an advantage against the traditional approaches in this relationship.

Vendor Managed Inventory is not a universal instrument solving every problem with inventories, demand or truckloads but it could help to achieve better results in supply chain in the area of costs, time and work. It is not suitable for every supply chain because this approach works in some business environments, with given participants and particularly with given products, goods and materials, which have very big influence to VMI.

Vendor Managed Inventory is able to diminish the bullwhip effect that is linked up with incorrect forecast of demand, improve the set up time of machines, help to better planning of production, decrease administrative costs of customers, increase the service level, truckload rate and decrease risk of stock out. It is also able to reduce the time needed for managing the inventory level, set up the minimum order to optimize loading, improve plans to minimize costs or disruptions in the whole supply chain, detect deficiencies or surplus in the goal financial statements and give more trust in the relationship of both sides.

The advantages from VMI are useful for both sides. Particularly, the quickness of order process which is closer to be more effective and there exist not so much mistakes and failures as in the typical order processes, because transparent communication between both sides (vendor + customer) exists. Furthermore, we cannot forget the role of partnership between all participants in the supply chain. It is important to point out that the relationship must be solid for given success.

In addition, when the cumulative demand of all customers is higher than capacity of vendor, a vendor could turn to his partners, which could afford the missing amount of products, goods or materials. At present, the outsourcing in the extend economics became a common part of production, deliveries, but also in the field of support activities like common data management or guarding warehouses it could be very helpful to save the costs. Outsourcing is an acceptable strategy for covering the desired demand in the corresponding quality, quantity and quickness.

Vendor Managed Inventory in the combination with outsourcing could be a good instrument for reducing costs because an outsourcer could use economies of scale, better position in deals with his partners, experiences. On the other side, it could be very hard to implement the same outsourcer by vendors and multiple buyers; particularly the implement process is very time consuming when harmonizing all requirements of all participants in supply chain and everything must be subordinate to the common goal. This could be a problem because the participants of supply chain management are likely to prefer their own profit than profit of the whole supply chain, so this idea could lead to competitive problems and threat of survive itself.

The Vendor Managed Inventory is on the journey to become a common part of supply chain management, particularly in countries of middle, east-south and east Europe. It is not a universal instrument, but VMI could achieve the decrease of cost in supply chain management and thereby save the financial resources for different business activities.

The future research in the area of VMI could focus on the simulation of VMI in relationship of joint outsourcing in the main and support activities of firms, investigating the benefits and non benefits from this relationship. Second, how simulations in VMI effect the production by supplier in given type of production and demand and finally tested the differences between traditional Vendor Management Inventory with new version Coordinated Management Inventory in given supply chain situations.

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