

POSTPONEMENT: A SUPPLY CHAIN MANAGEMENT STRATEGY

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ABSTRACT

Nowadays the importance of a global production – distribution system capable to fulfill different customer needs and to maintain just in time supply capacity with minimum cost influence is being increasing. Postponement is the supply strategy, dealing with these concerns. This study presents the various postponement strategies, and their advantages, in production supply chain management which are applied at large in enterprises, in order to gain competitive advantage against their competitors.

Keywords: *postponement, supply chain, production, management, strategy, JIT.*

1. Introduction

Globalization, mass customization and e-business facilitated manufacturing companies are following a global production – distribution network in order to gain competitive advantage. As a result, the importance of a global production – distribution system capable to fulfill different customer needs and to maintain just in time supply capacity with minimum cost influence is being increasing. Worldwide, supply chain production as well as postponement choices, consist a major issue in modern global operation management (Choi et al., 2012).

Postponement is the strategy to handle these difficulties. Until customer preferences are identified, postponement is the process to delay product differentiation. Postponement allows companies to modify their production while at the same time companies take advantage of mass production of the non - postponed activities (see e.g. Van Hoek R.I., 2001). Nevertheless, the strategy of postponement feasibility depends on customers' willingness to wait for the customized product as well as to the extent of the selling season (the product life cycle) for short-lived products (Reimann, 2012). As a matter of fact, is a broad recognizable method for improving the trade-off between cost and customer service, the need for quick response to consumers' needs and the reduction in the life cycle of the products, is facilitating forecasting and planning procedures (Choi et al. 2012).

This study presents the various postponement strategies, and their advantages, in production supply chain management applied at large, in enterprises nowadays, in order to gain competitive advantage against their competitors.

These strategies start by postponing the purchase of raw materials as close as possible to the starting point of the production process. After an order has been received for the product and have know the exact requirements for raw materials, with the obvious aim of savings for the company, both due to not putting unnecessary orders and non-obsolescence orders which will not be absorbed. This leads to a product differentiation at later stages of the production process (Bhoon et al., 2006). This has as a result, a series of benefits depending on the scale of its adoption, the industry that the company operates and the products it distributes.

Regardless of the categorization of postponement strategy, everything lies in moving as close as possible to the point or time of sale of the product, in other words, the postponement towards to the end of the production process of perfecting the goods, in order to achieve greater flexibility for the company, as we get closer to the point of sale.

In the remaining part of the study, we are addressing the need of adopting a postponement strategy (Section 2) we represent the basic forms of the strategy (Section 3), while in the last section of the study we are discussing the advantages of adopting the postponement strategy.

2. The need to adopt the postponement strategy

In order to develop a postponement strategy we should take into consideration two major tasks: (1) finding out how many steps to postpone, and (2) which steps to postpone (Beamon, 1998). Companies that use postponement are flexible to develop different product versions in order to satisfy changing customer needs, and to segregate a product or to modify a demand function (Waller et al., 2000). Undifferentiated materials raise companies' flexibility in order to respond to changes in customer demand. Moreover, companies have also the chance to diminish supply chain cost by keeping identical inventories (Lee and Billington, 1995; Van Hoek et al., 1999). Postponement requires matching in product type, market demands as well as in the structure or constraints within the manufacturing and logistics system (Fisher, 1997; Fisher

et al., 1994; Fuller et al., 1993; Pagh and Cooper, 1998). Generally, postponement may suit in the following conditions: innovative products (Fisher, 1997; Fisher et al., 1994); products with high monetary density, high specialization and wide range; markets characterized by long delivery time, low delivery frequency and high demand uncertainty; and manufacturing or logistics systems with small economies of scales and no need for special knowledge (Pagh and Cooper, 1998).

In order to identify the factors that define the practical application of the postponement throughout the supply chains of manufacturing companies', Kisperska-Moron and Swierczek (2011) recognized five main groups of factors contributing to the application of postponement, i.e. characteristics of demand; internal time-based processes; error forecasting; significance of products' planning; and the level of product customization. Their analysis revealed that a large amount of surveyed companies worldwide apply postponement strategies according to a specific hierarchy of importance of these groups of factors. The most important factors are related with time and demand characteristics of industrial operations i.e. manufacturing and logistics systems. The forecasting process is of great importance especially when the number of product derivatives raises, and then the postponement seems to be an efficient method for handling the increased product variety. The level of product customization is the third factor concerning the choice of postponement. The above results essentially reflect what has been presented in the bibliography; however, the level of importance of particular characteristics in the surveyed companies seems to be quite different. The application of postponement does not depend on market conditions, but when different postponement strategies are applied, (full production and assembly) the impact of market and demand appears to be different. In general, the implementation of full production postponement has a great impact on manufacturing and logistics procedures.

Given the growing insecurity cultivated in the current market conditions, more and more enterprises are driven to adopt flexible business models that will ensure the maintenance of resources. The risk of marginalization which is present even for large companies, forces many of them to keep on trying to satisfy as best as possible the different consumers needs. This need leads to fulfill the needs of a client who is determined to spend money on more personalized products, forcing thereby the enterprises to focus in a larger variety of products to meet their needs, regardless the difficult market environment. Consumers having before them an oversupply that has to promote something new and promising are more selective in how to allocate their money.

3. Types of postponement strategy

Zinn and Bowersox (1988) developed a major classification structure for postponement strategies. They establish labeling, packaging, assembly and manufacturing postponement which are based on the type of the postponed manufacturing activities and can be described as form postponement.

Labeling postponement refers to similar products which are released in market under different brand names while depart the production site without any labels. Thus, labeling takes place at a later stage in the supply chain. The product is ready and packed and the only thing left is to put the tag on it which specifies the name of the product and provides information on topics such as components, weight, origin, nutritional value etc. This strategy is widely adopted by enterprises that distribute their products in different parts of the world, so it is possible to use a different product name for each country or translate either the ingredients or other information depending on the area that is being targeted. In this case, enterprises use the specific data from orders of each different country, in order to move forward in the process of labeling.

Throughout *packaging postponement*, the goods are at first bulk shipped to the warehouses and then packed customer-specifically. In this case and while the product is in final form, the product is not packaged

but expect data from the specific market to determine the amount to be requested from each type of packaging (Zinn & Bowersox, 1988). This formula assumes that the product comes in different types and sizes of packaging. Moreover as, the product is released in different countries with different packaging, the company seeks to know the exact demand of each country to determine the types of packaging to use.

Assembly postponement means that a main product is produced in different versions. The different variants are only differentiated in details, e.g., the color of component. The basic product is not differentiated from the factory, it changes later within the supply chain after the installation of the the differentiated part. Transposition of assembly process takes place in different times and expected market information in order to give commands to final assembly. A prerequisite for the adoption of this strategy is that the product consists of different parts that can be combined in different ways to produce different versions of the same product (eg. mobile phones, computers).

In addition to assembly postponement, in *manufacturing postponement* more than one installation is relocated from the production site to the warehouses and the extent of production steps is quite bigger. Moreover, various product components can be received from various places and combined at the warehouses.

Pagh and Cooper (1998) provided an extension of the classification suggested by Zinn and Bowersox (1988) regarding the postponement applications in the mid- to down-stream stages of the supply chain. Combining manufacturing and logistics postponement and speculation, they developed four major classifications including: the full speculation strategy, the logistics postponement strategy, the manufacturing postponement strategy, and the full postponement strategy. Bukovinsky and Graman (2005) introduced the terms of total and partial postponement production.

The article refers to the importance of labor organizations in a demanding market. In the process of differentiation the work can be made in several versions as close as to the point where we know the demand. At this point the strategy of postponement enters in order to delay the assembly of products until the order of the consumers are obtained. In this case, no part of the product is being manufactured until a corresponding order is made. There is complete displacement of manufacturing differentiation processes until a sufficient expression of demand is being made (eg. in furniture production).

Van Hoek (1998) explains that postponement models can be subdivided into three typologies: (a) *Time postponement* concerns the delay of those activities not determining forms and function of the products until orders are received, (b) *Place postponement*, concerns the delaying of moving goods downstream in the production chain until orders placement, thus maintain goods centrally and not in specific positions and (c) *Form postponement*, concerns the delay of all the activities which are influencing the form and function of products until orders placement.

The time and form postponement strategies are both influenced by the product and process factors. Product factor refers to the volume of commonality between the different products, the cost associated with achieving increased commonality and the volume of possible demand substitution while process factors refer to characteristics of the products manufacturing process including cost and capacity levels (Reimann, 2012).

Olhager (2003) and Swaminathan and Lee (2003) in their studies short out the postponement influential factors in following three major categories. Market related factors, including delivery lead-time requirements, product characteristics like volume and range and customer preferences like order size and order frequency. Product related factors, including modularity characteristics, customization opportunities and product structure and Production related factors, including production lead time and process flexibility. The consideration of these factors is linked to certain postponement strategies and gives rise to different model foci. Demand and price postponement are strongly influenced by market related factors like the

volume of market competition and level of product demand, the lead times and length of the selling season.

Yang et al. (2004) considered that postponement models can be applied in three main areas which are the supply chain, the production and the logistics. The concept of postponement, obliges to keep the product in a neutral and non-bound state as much as possible during the production process. Concerning the logistic area, the variety of value and volume and weight can be delayed in order to save on inventory carrying and holding, stock-out and obsolescence costs.

Products after taking their final form are placed in a central warehouse or in other strategic locations from where they are sent to the final or intermediate consumer, after the expression of demand (Yang et al., 2004). When there are more accurate information available in relation to the orders, enterprises progress in a direct delivering of their products.

This strategy is often used by multinational companies (eg. automotives) who choose to place their products in a central warehouse or warehouses in various countries and supply intermediate or final consumers within 24 or 48 hours after informed about the current demand. In this case the production process stops a few steps before the final stage. The main product particles, are designed and remain to be added according to the market data basis (Bowersox and Zinn, 1988).

Typical enterprises applying the above type of postponement strategy are the apparel companies. These companies manufacture a variety of clothing sizes in white color. Once there are relevant information on fashion regarding the nuances trends on a particular season, colors are added and the construction of garments is completed.

Regarding the supply chain activity, postponement seems to offers major competitive advantages. For instance, thinking about the possibilities of postponement in saving inventory holding and carrying costs, it is reasonable to conclude that the longer the supply chain, the greater the potential benefits of postponement (Brun and Zorzini, 2009).

According to Yang and Burns (2003) the application of various postponement methods in a manufacturing company, taking into account the different factors of operations, can be classified as: (a) ETO (engineer-to-order) containing likewise pre-production stages, which could be considered as the full postponement, (b) MTO (make-to-order) relates to the core manufacturing activity, which could be considered as the productions postponement and (c) ATO (assemble to order) pointed only to final stages of production activity, which could be considered as an assembly postponement.

All these strategies explain the importance for a product to be completely tailored to the needs and orders of the customers and not into the logic of a possible future orders. Nevertheless, the use of Make to stock (MTS) type of activity is widely used by the producers. This concept of course is a speculation strategy based on economies of scale (Kisperska-Moron and Swierczek, 2011).

Despite their differences, all theoretical classifications actually have a shared concept. This concept has to do with the delay of operations related to manufacturing or logistics till customer orders are received. (Wong et al., 2009).

4. Advantages of production postponement strategy

Postponement's philosophy tracks the JIT principle, since both highlight the importance of having the right product in the right place at the right time (Cheng and Podolsky, 1996; Heskett, 1976). Postponement could offer substantial advantages for supply chain's improvement in terms of time, quality and cost. Inventory management is easier as long as fewer inventories are held. The quality of the product can be enhanced by small design changes. (Lee, 1996). Any changes are easier in the form of WIP inventories, instead of end products (Brown et al., 2000). Changes in demand are reduced by aggregation, therefore, forecasting is easier in the early stage than in the final (Christopher, 2000; Ernst and Kamrad, 2000). Obviously under a multi-echelon supply chain system the demand of the current stage is equal to the demands of the previous stages. Thus, it supports a number of different production alternatives, for example, engineering to order, purchasing to order, ymake to order, manufacture/assemble to order, packaging and labeling to order, shipment to order and adjust to order by shifting the customer order decoupling point (van Hoek, 1997, Olhager, 1994; Hoekstra and Romme, 1985). The characteristic of modularity reduces the cost of assembly (Chiou et al., 2002) but also increases outsource capability as well as new product development (Brown et al., 2000; Ernst and Kamrad, 2000). Needless to say, the outsourcing opportunities of a company are in strong connection with the level of modularity. To be more specific, a third Party Logistics (3PL) can be introduced by the logistic postponement in order to deal with value-added activities and product delivery (van Hoek2000). The postponement is very important in the supply chain. If a postponement is launching Strategies intending to delay any customized activity to such extend that the customer orders are given we can understand that further improvements are needed before the point of differentiation. (Brown et al., 2000) To a large extent, standardized components increase variable costs since they need to support various product characteristics (Lee, 1998; Ma et al., 2002). For example, in order to support different voltage supplies in different countries, power plugs need to be re-designed so that a switch is added. Variable costs get higher due to modification. In any case, One good way to reduce cost is by moving the assemble procedure to local facilities. This way, will always be a suitable plug for the product. In this case, other issues such as transportation cost, setup cost, training cost and local material cost should be taken into consideration

Furthermore, there is constantly a trade-off among mass production and customization in carrying out postponement as the first one advance economies of scale while the second one advances higher customer values (Zinn and Bowersox, 1988). Economies of scale are lost due to customization and this result is more obvious in logistics postponement since customized processes are executed separately in local facilities with diverse product lines. There is always the fear, that, as production changes from a centralized installation to a more local establishment, problems of quality are to be created (Ackerman, 1997).

The main benefit of firms adopting the production postponement strategy is the reduction of the uncertainty of demand, while collecting additional information and incorporating them into the production process and supply chain reduces the occurrence of fails in forecasting procedure. Besides, the evaluation of the success or not adopting the postponement strategy results from the evaluation of whether it helped to reduce uncertainty. The decrease in stock of finished goods is expected, as the sales volumes are adjusted to the most recent messages from the market.

Knowing information about customer preferences, such as wishes, time and place of expression etc., is a competitive advantage for the company that adopts this strategy. The company continuously decodes the environment and makes efforts to ensure the rapid and sufficient supply of products that will be on demand, in market. Furthermore, the delivery of a product has a major influence on customer satisfaction.

Especially nowadays, every lost sale and every unsatisfied customer, means losing part of market share/profits, the discrediting of the company from the customer and the empowerment of competitors. Finally, a major benefit of adopting the postponement strategy is the cost reduction in the various stages of the production chain, while the company may use the saved capital in development activity.

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