

Reviewing postponement in the South African automobile industry: a literature review perspective

By:

Mr Polycarpe Feussi

Email: polycapef@gmail.com

PhD Candidate, The University of Johannesburg, South Africa

INTRODUCTION

The 21st century also known as a customer friendly environment in which customers have a plethora of options to choose purchase any product is characterised by fierce competition. This competition demands industries not only to provide more customised products with competitive prices but also deliver them on time. Unfortunately, manufacturing customised products requests for additional cost and investment from manufacturers. Today's global market is characterised by the facts that customer needs and wants are more uncertain, with product lifecycle becoming shorter, demand for a service level of delivery and lead time of product much improved. To better serve the market and these increasing customer needs, companies segment the market much more detailed, competition among companies is switched toward customer-based competition.

The strategy of postponement is a vital element in any agile strategy and a powerful strategy to reduce and control demand variability (Christopher, 2000); it enhances the ability of the company to compete on time while remaining cost competitive. "Postponement increases the company's flexibility responding to changes in the mix of demands from different market segments. The company can improve its responsiveness to orders or reduce its investment in inventory (Lee and Bollington, 1993)." Companies have improved their performances by applying postponement strategy. Mass customisation and highly configured products are increasingly becoming the new normal in manufacturing. While meeting customer demands for highly configured products is essential to remain competitive, the operational demands can stretch resources and severely impact profitability. Manufacturers in the automobile industry must adapt processes to retain efficiency and quality control, while also producing products that meet customer specifications for style, colour, accessories, special features, and add-on components. Even the warehouse and logistical challenges of maintaining multiple

stock keeping units (SKUs) and product variations can pose a major challenge. For many manufacturers, a postponement manufacturing strategy may be the best way to address some of the most pressing business challenges associated with customisation, especially in the South African automobile industry.

RESEARCH METHODOLOGY

An extensive search of ISI web of knowledge, and Google Scholar databases was conducted for peer-reviewed publications regarding postponement strategies with the focus on the automobile industry in general. Different wordings and phrases related to postponement strategies and supply chain management have also been used to capture more articles, and subsequent refining steps were conducted when necessary. The phrases 'postponement strategies', 'supply chain strategy', 'product manufacturing', 'pricing postponement', 'consumer needs and segmentation' and 'purchasing postponement' along with other similar words and phrases were used to retrieve articles from the databases. With the focus on the automobile industry, phrases like 'South African automobile industry', 'the South African automobile competitiveness', 'South African automobile challenges', were also used to retrieve articles from the databases. The citations of the retrieved papers enriched the search with additional relevant articles. The numerous papers retrieved (approximately 11) have been screened appraised and summarised under the theme findings. The first point detailed in the findings is the role of the postponement strategy, followed by the delaying the customisation production, Combining with the General Design of Components, Using Information Exchange Mechanism to Reduce the System Complexity. In the findings, there are also subjects dealing with the supply chain strategy and segmentation.

FINDINGS

The role of the postponement strategy

Supply Chain Risk is potential threat to supply chain. Charles Perrow (1999) believes that the accident is ordinary, inevitably, in a tightly coupled, complex system. Nowadays, the entire supply chain is a complicated system. In the supply chain system with secure connectivity

conditions, enterprises use the means of reducing the system complexity in the supply chain risk management. The postponement strategy is a powerful weapon to reduce the complexity. This process makes postponement manufacturing both proactive and reactive. Manufacturers proactively make products up to the point of differentiation, and then reactively complete a customised version to satisfy a unique or small-lot requirement. The comprehensive nature of postponement manufacturing means it impacts multiple operations, including product design; resource procurement; need forecasting; parts and component readiness; inventory of partially-assembled product inventory; multiple-stage quality checks; and final assembly based on customer orders. For manufacturing executives, postponement manufacturing represents a fundamental shift in how they run their operations. It's important that they understand what it takes to make the change and what they can expect to gain from the effort. (INFOR, 2015: 4) According to Yang Xiaox and Li Jiajun, (2016: 58), the postponement strategy is to decrease the complexity through the following mechanism:

Delaying the Customization Production

The postponement strategy means that in the upstream of the supply chain of COPD (Customer Order Postponement Decoupling Point) is standardized, general production. But in the downstream of the supply chain of COPD is customised production. By making the product customisation stage try to delay, postponement strategy can effectively reduce the complexity. Feitzinger and Lee (1997) illustrated HP as an example to explain the critical point of mass customisation, which delays the differential operation to the latest point in the supply chain. Meanwhile, enterprises must integrate the processes of product design, manufacturing, distribution into the entire supply chain. To consider the conception of network design, they brought up three types of design theory for postponement, including product modularisation, process modularisation, and network design. (Yang Xiaox and Li Jiajun, 2016: 58)

Combining with the General Design of Components

Lee (1994) believes that the general components are the premise of successful implementation of postponement manufacturing. The general components can affect the various departments of enterprises. Enterprises need to design a universal, standardised, modular product and process to ease the supply risk so that it can try to delay the time of differential activity. In the modular product design, components are exchangeable, loosely

coupled, scalable, and it will significantly reduce the dependence between the components. The use of general components allows manufacturers to transfer the procurement source when the supply disruption. From product development department, general components lead to reduce development time, cost, risk; from the perspective of the production department, it is convenient for production planning and control, and lead to economies of scale, and reduce procurement and production complexity. (Yang Xiaox and Li Jiajun, 2016: 58)

Using Information Exchange Mechanism to Reduce the System Complexity

The postponement strategy reflects the customer-driven mechanism. Based on an accurate understanding of customer information, enterprises can produce and deliver products. The use of accurate information on the upstream and downstream in the supply chain can effectively alleviate the complexity of the system. (Yang Xiaox and Li Jiajun, 2016: 58)

Supply chain strategy and segmentation

According to Jooste, Van Eeden and Van Dyk (2015:314), a supply chain strategy is formulated to specify how the supply chain activities should be coordinated to achieve financial success. The motivation to select the correct strategy is driven by the competitive advantages and capabilities that can be achieved (Ambe, 2012). The differentiation in supply chain capability is defined by customer-facing metrics as well as internal metrics. Customers experience service and product based on the reliability (predictability), speed and agility that is presented to them. This experience of the customer is however enabled by a variety of internal capabilities that should be managed. The management of assets, as well as the costs involved in creating the perceived value of the product and service, should, therefore, be measured.

The scope of a supply chain strategy should entail all the supply chain activities. Frazelle (2002) defines supply chain logistics as the flow of material, information and money from the suppliers' suppliers to the end consumer. The actual supply chain is the network of facilities, vehicles and logistic information systems. Some of the main activities that form part of supply chain management are listed below, Jooste, van Eeden and van Dyk (2015: 315)

- Warehousing and distribution centre operations

- Transportation
- Supply
- Inventory management
- Customer response

The goals and aims defined by the supply chain strategy should be translated into operational terms to make decisions and execute the strategy. This starts with an investigation process where the current activities are profiled, measured and benchmarked (Frazelle, 2002). Segmentation uses the characteristics that differentiate one supply chain from another to determine the appropriate supply chain strategy. When benchmarking, segmentation is required so that organisations can compare themselves to similar processes of other organisations. There are several methods for segmenting. Some authors and frameworks have segmented according to the following characteristics, Jooste, van Eeden and van Dyk (2015: 3017):

- Product types/requirements
- Customer types/requirements
- Uncertainty of supply
- Uncertainty of demand
- Customer buying behaviour
- Relevance of assets in total cost
- Market mediation costs

A generic supply chain strategy and configuration is usually then described for each of the segments. The most common strategies include efficient, responsive, agile or lean supply chains (Ambe, 2012). It is essential to identify the various supply chains within an organisation, since none of the strategies applies to all products (Hilletoft, 2009). Managing several supply chains within an organisation is advised rather than selecting a strategy with multiple objectives (Perez, 2013). Using a supply chain framework such as SCOR assists benchmarking since it creates a common language for processes and relates it to metrics.

Postponement manufacturing

The concept of the postponement was first proposed by Alderson (1950) from a marketing management perspective. Only in recent years has the amount of research addressing

postponement significantly increased. Mass customisation and agility are often cited to be such strategies. Bucklin (1965) was concerned with where the channel inventory should be positioned (up-stream waiting for customer orders or down-stream in anticipation of future customer orders) and which player (supplier or customer) should carry the inventory. As customer demands more highly configured products, manufacturers must turn to postponement strategies and late-stage assembly to profitably meet these demands. By embracing postponement strategies, manufacturers can better meet customer expectations and maintain employee satisfaction. The technology is available today to help manufacturers put

Postponement strategies to work.

The postponement means to delay activities in the supply chain until customer orders are received with the intention of customising products, as opposed to performing those activities in anticipation of future orders (Van Hoek 2001). The postponement is defined as the delaying of value-adding activities until demand pattern becomes visible (Boone et al., 2007; Yeung et al., 2007). The logic behind postponement is that the delay leads to the availability of more information and thus the risk and uncertainty of those activities can be reduced or even eliminated (Yang. et al., 2004). The concept of postponement is developed to include purchasing postponement, logistics postponement, production postponement, product development postponement, and pricing postponement. Although much has been written about the postponement strategy, there is still limited literature on its implications on the supply chain risk. Choi Kanghwa et al. (2012) study postponement strategy via a system dynamics simulation model, taking the experiences of a Korean automobile as an example.

The basic principles and potential business benefits of postponement manufacturing have been known for decades. Stan Davis called the fundamental concept "mass customisation" in his breakthrough business book, *Future Perfect*, published in 1987. Davis understood that the information technology available then made it possible for companies to move beyond using economies of scale to mass produce goods at low costs. Davis asserted it was possible to use technology to produce goods that are individually and cost-effectively managed. Postponement manufacturing became the operational side of his mass customisation assertion.

Manufacturers have made great strides in their ability to design and bring complex products to market at affordable prices. Despite these advances, market forces challenge manufacturers

to do more, while driving the need for innovation and product customisation. These market forces include INFOR (2015: 3):

Customer expectations

The evolution of customer expectations is one of the most striking results of manufacturing progress, raising the bar for manufacturers to produce unique items quickly. Once it became possible for consumers to buy highly customised products, they were no longer willing to settle for mass-produced, generic items. Today, customers demand more individualised products at the same speed and value as mass-produced items. According to a recent report by IDC, the trend is expected to continue unabated. In the future, fulfilling customers' needs through a 'make-to-individual' approach meeting clients with a single, precisely tailored customised product, made on demand will be the norm. (INFOR, 2015: 3) Customers also demand speed, on two levels. They are impatient and don't want to endure long product delivery times. And when the product demand shifts, they don't want to wait long for manufacturers to shift their production to meet the new demand. (INFOR, 2015: 4) This consumer purchasing style is not only having an impact on brand-oriented industries; it is impacting the whole manufacturing value chain, to the point that B2B (business-to-business) trading is now often defined as B2B2C (business-to-business-to-consumer), indicating how increasingly important it is to take care of the customer of the customer.

Inventory control

High inventory costs are a significant driving factor behind postponement strategy adoption. Maintaining an inventory of multiple product variations is often cost prohibitive. When companies offer hundreds of styles, colours, and features, the inventory implications become staggering. (INFOR, 2015: 3) Short-lived product lifespan also makes it risky to maintain an inventory of a particular product version. No brand manager wants to be stuck with yesterday's bestseller when the customer is looking to purchase the next hot thing.

Quality control

According to INFOR (2015:3), although customers expect highly specialized products, they still expect reliable quality and brand continuity. It is up to the manufacturer to ensure a level of consistency among the many variations produced and shipped under their name, even when various subcontractors and third-party logistics partners may be involved in completing the product, packing, and shipping.

Enhanced product configuration

Product specialization typically starts with the ability to manage multiple product configurations. Modern technology solutions make this possible through an online portal where customers pick and choose product variables. A design engineer can use tools to update product specifications, and sales teams can cut their time quoting complex configurations. (INFOR, 2015: 3)

Improved visibility

Modern analytics and business intelligence (BI) solutions offer enhanced capabilities to consume data at a more granular level. As a result, manufacturers can now get better visibility into their operations for efficient postponement manufacturing. They know exactly how many parts are in inventory to meet precise production requirements and can better predict future requirements. (INFOR, 2015: 3)

Improved communications

INFOR (2015:3) asserts that postponement manufacturing requires better communications among customers, suppliers, and partners. Manufacturers often turn to partners to complete the product or perform specialised finishing tasks, such as adding a name or picking and packing orders. According to the institution, this collaboration requires real-time visibility among multiple locations and systems. (INFOR, 2015: 3) The advanced enterprise solutions of today mobile and social tools strengthen communications within the company and among partners. Collaborative tools that capture business-related conversations also play an essential role in coordinating multiple resources.

More detailed product management

INFOR (2015:3) pointed out that advanced enterprise solutions have new capabilities to manage sourcing, production, and inventory at the component and serial number level. These new capabilities make it easier for manufacturers to efficiently manage the individualized production and assembly requirements of postponement manufacturing. Combined with tools

for improved visibility, the manufacturer can allocate components from one product to another as needed.

Improved demand forecasting

More detailed supply chain management capabilities, which work with advanced analytics and BI, can help manufacturers' better forecast demand, predict specific requirements, and manage supply chain production. (INFOR, 2015: 3)

Improved management of complex bills of materials (BOMs)

Postponement manufacturing makes BOM requirements more important than ever in the manufacturing process; they have to do more than establish what manufacturers need to build a product. Postponement strategies use BOMs as a tool to manage the complex progression of materials and components as they evolve throughout the entire product manufacturing process. Modern software solutions can help efficiently manage the increased reliance on BOMs and the vast increase in product components that have to be tracked (INFOR, 2015: 3).

Postponement strategies analysis based on the type of supply chain risk

Numerous research papers discuss the postponement strategy in supply chain management. Shao and Ji (2008) analysed and compared two different postponement strategies applied in a mass customisation system with service time guarantees. Saghiri and Soroosh (2011) pointed out a structural approach to assessing postponement strategies: construct development and validation. Schwartz Frank and Voss Stefan (2014) studied the postponement strategies in supply chain management. Ni Yanting and Wang Yi (2015) brought a double decoupling postponement approach for integrated mixed flow production systems. Zhou Wenhui et al. (2015) developed a two-stage queueing network on form postponement supply chain with correlated demands. Supply chain risk is divided into supply risk, production risk and demand risk in this thesis from the perspective of the manufacturer. This thesis will assess the postponement strategies to reduce each kind of supply chain risk.

Purchasing Postponement Strategy to Reduce Supply Risk

Supply risk is the probability of purchasing and supplies related accidents in the supply market. Typical postponement strategy to reduce supply risk is purchasing postponement strategy. In the case of purchasing postponement, the purchasing of raw materials is postponed until the information on downstream demand becomes available. Purchasing postponement strategy is preferred when the demand is highly uncertain, raw material has high obsolescence cost and is of high value regarding total product cost or ties up a huge amount of working capital. Purchasing postponement especially holds true under the situation where companies can separate demands patterns into "base" and "surge" elements (Gattorna and Walters, 1996). Basic demands can be produced in advance based on long-term forecasts while decisions on product quantities for surge demands (with a higher level of uncertainty) have to be delayed until further information on market demand is available.

Postponement Strategies to Reduce Production Risk

Product Development Postponement

Product development postponement refers to all the activities of the value chain, including product design activities, are delayed until receiving customer orders. Product development postponement is considered an extreme form of customisation. Moreover, in this case, the customers are also involved during the design stage. In product development postponement, information drives all the development process. This leads to a significant reduction in lead times with fewer costly redesigns, especially those resulting from substantial changes later in the development processes. Toyota deals with the high levels of uncertainty by letting their suppliers come up with novel ideas and designs without limiting them with strict specification constraints. During that time, people at Toyota continue gathering market data on consumer demands and technological trends, till some convergence is achieved (Yang. et al., 2004). Finally , Gualandris Jury and Kalchschmidt Matteo (2015) studied the role of manufacturing postponement enablers.

Production Postponement

Production risk refers to the risk occurring in the production process, such as machine failure, product quality problems, the strike and so on. Production postponement means delay production activities and makes the inventory to maintain universal state, until the receipt of

customer orders. Production delays can be divided into manufacturing postponement, assembling postponement, packaging postponement, labelling postponement etc. Production postponement strategy works where there are multiple product derivatives. High product variation makes it difficult to forecast and hold inventory at the finished stage. Production postponement results in higher production costs because of the loss of scale economies. The inventory costs, on the other hand, are reduced. Pagh and Cooper (1998) cite HP's example to exemplify assembly postponement strategy. The multinational HP postpones the final assembling step to the last stage at the local distribution centres, and once demand becomes visible, final manufacturing/assembly activities such as power supply, packaging and labelling are carried out.

Postponement Strategies to Reduce Demand Risk

Demand risk refers to the risk of uncertainty from the market trend and customer preference. Typical strategies to decrease demand risk include logistics postponement and pricing postponement.

Logistics Postponement

Logistics postponement refers to the postponement of the flow of final product. Logistics postponement is like just-in-time delivery reducing obsolete inventories and improving customer responsiveness by avoiding the wrong time and place utility of products. Instead of placing the goods at the final point in the supply chain, they are kept at a central location, with the aim of following the demand pattern for the final shipments (Yang et al., 2004). In the case of logistics postponement strategy, distribution costs are higher due to smaller shipments and faster modes; inventory costs are reduced by holding inventories at a central location while the production scale economies are preserved. Dinesh and Arpit (2015) studied the application and evaluation of packaging postponement strategy.

Pricing Postponement

Pricing postponement refers to the postponement of the final price of the product. The final price depends on the final customer need. Pricing postponement is used by GreatModels.com, which is an online retail store which provides buyers with scale models (scale helicopter models, scale car models), accessories, and decals, etc. Indeed, it is stated on their website

that "the price might not show if the item is a future release," which suggests that the price of such products would be determined after demand information from the pre-launch orders has been assessed (Granot and Yin, 2008).

CONCLUSION

This study aimed to review the postponement strategy with the South African automobile industry from the literature perspective. This research was conducted through ISI web of knowledge and google scholar database. The finding reveals that a postponement strategy is a powerful tool that can help to manage the complexity of the market from the automotive and South African industry and yet increase competitiveness.

REFERENCES

- BABBIE, E. & MOUTON, J. 2010. The practice of social research. Cape Town: Oxford University Press.
- BABBIE, E. 2010. The practice of social research. London: Wadsworth Cengage Learning.
- BABBIE, E. 2013a. The practice of social research. London: Wadsworth Cengage Learning.
- BABBIE, E. 2013b. Social research counts. London: Wadsworth Cengage Learning.
- BABBIE, E. & MOUTON, J. 2012. The Practice of Social Research: South African Edition. Oxford University Press: Goodwood.
- Charles Perrow. 1999. Normal accident: living with high risk technologies. Princeton University Press.
- Choi Kanghwa, Narasimhan Ram, Kim Soo Wook. 2012. Postponement strategy for international transfer of products in a global supply chain: A system dynamics examination. Journal of operations management, 30(3):167-179.
- Christopher, M. (2000). The agile supply chain: Competing in volatile markets. Industrial Marketing Management, 29, 11-18.
- Corneli Jooste, Joubert van Eeden and Esbeth van Dyk. 2015. South African Wine Supply Chain Performance Measurement Framework. Published in: Innovations and Strategies for Logistics an Wolfgang Kersten, Thorsten Blecker and Christian M. Ri. August 2015, epubli GmbH
- DENSCOMBE, M. 1998. The Good Research Guide: for small-scale research projects. Buckingham: Open University Press.
- Feitzinger, E. and Lee, H. L. 1997. Mass customization at Hewlett Packard: the power of postponement. Harvard Business Review, 75(1): 116–121.
- Granot D, Yin S. 2008. Competition and Cooperation in Decentralized Push and Pull Assembly Systems. Management Science, 54(4):733-747.

INFOR. 2015. Industrial Manufacturing Industry Perspectives. Available at:

<http://www.infor.com/content/industry-perspectives/making-sense-of-postponment-strategies.pdf>.

Accessed on the 22nd October, 2017. /

Lee, H. L and Tang, C. (1997). Modeling the costs and benefits of delayed product differentiation. *Management Science*, 43(1), 40-53.

Lee, H. L., Billington, C. 1994. Designing Products and Processes for Postponement. *Management of Design: Engineering and Management Perspectives*, 105-122.

Lee, H. L., Billington, C. 1994. Designing Products and Processes for Postponement. *Management of Design: Engineering and Management Perspectives*, 105-122.

Lee, H. L., Billington, C. and Carter, B.(1993). Hewlett-Packard gains control of inventory and service through design for localization. *Interfaces*, 23(4), 1-11.

MOUTON, J. 1996. *Understanding social science research*. Pretoria: Van Schaik.

MOUTON, J. 2005. *How to succeed in your master's and doctoral studies: a South African guide and resource book*. Pretoria: Van Schaik.

Pagh, J.D., Cooper, M.C. 1998. Supply Chain Postponement and speculation strategies: How to choose the right strategy. *Journal of Business Logistics*, 19:13-33.

SALKIND, N.J. 2000. *Exploring research*. New York: Prentice Hall.

Van Hoek, RI. 2001. The rediscovery of postponement a literature review and directions for research. *Journal of Operations Management*, 19(2):161-184.

Yang Xiaox and Li Jiajun. 2016. The Role of Postponement Strategies to Reduce Supply Chain Risk. *International Journal of Liberal Arts and Social Science* Vol. 4 No. 4 May, 2016.

Yang, B., Burns, N. and Backhouse, C. 2004. Management of uncertainty through postponement. *International Journal of Production Research*, 42(6):1049-1064.

Yeh, C. and Yang, H. C. (2003). A cost model for determining dyeing postponement in garment supply Chain. *International Journal of Advanced Manufacturing Technology*, 22, 134-140.

Zhou, Wenhui, Huang, Weixiang and Zhang, Renqian. 2015. A two-stage queueing network on form postponement supply chain with correlated demands. *Applied mathematical modelling*, 38(11-12):2734-2743.