VALUE-DRIVEN vs. MARKET-DRIVEN PURCHASING OF KITCHEN CABINETS

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ABSTRACT

In economic and management literature, the relationship between supplier and buyer can be more or less intimate. It can vary from market-driven with a constant change of suppliers to a value-driven relationship with one sole supplier. Purchasing strategies of construction companies have often been described as short-sighted, where price is the most considered aspect. Recent lean management literature promote value-driven purchasing, since it provides benefits such as just-in-time delivery, zero defects and customized products through close technical collaboration.

This article hypothesises that value-driven purchasing of customized kitchen cabinets is more profitable than market-driven purchasing in industrialized housing construction. The hypothesis is examined through a case study of kitchen carpentry at one of Sweden's largest producers of industrialized prefabricated multi-storey housing. By comparing characteristics of market-driven vs. value-driven purchasing, this article aims to further clarify the benefits and drawbacks of these two strategies.

At the case company, kitchens are ordered cabinet-by-cabinet and then installed inside the factory. The company is considering the possibility of a long-term relationship with a smaller local supplier that can deliver a new kind of innovative kitchen cabinet solution that is prefabricated. If the local supplier can meet the expectations of just-in-time delivery, zero defects and a product "tailor-made" for the housing company, there is much to gain.

KEY WORDS

Lean purchasing, Prefabrication, Purchasing strategies, Supply chain management

INTRODUCTION

The purchasing strategies of construction companies have often been described as short-sighted, where price is the most considered aspect (Dubois and Gadde, 2000). In the manufacturing industry, long-term relationships with local suppliers have occasionally proven to be more profitable from a value perspective than short-sighted relationships, especially regarding high-end products (Frazier, 1988; Krajlic, 1983; MacDuffle and Helper, 1997 and Tan et al., 1999). In this paper, value means the mutual gains obtained through a close relationship between buyer and seller, which is central in the "marriage-relations" of lean purchasing (MacDuffle and Helper, 1997). To see the benefits of long-term construction industry relationships, the use of a total cost and quality perspective is vital in order to persuade construction companies of the additional benefits of lean purchasing.

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As the construction process transforms into Lean, the supplier relations should follow (Hines et al., 2004). Little research has been done within lean purchasing in the construction industry. In the literature, the relationship between a supplier and a buyer in industrial markets can be pin-pointed on a scale from purely market-driven to JIT (Frazier, 1988). Frazier et al. (1988) define market-driven purchasing as when a company primarily buys on price, uses multiple sources of supply, and tends to switch suppliers frequently over time. In today's competitive environment, housing builders operate on tight margins and price is the principal consideration. Trust is difficult to gain and relationships are characterized by market- driven purchasing (Dubois and Gadde, 2000; Wood et al., 2005; Cox and Thompsson, 1997).

A practical issue from market-driven purchasing is that a lower price often comes with buying large quantities, which leads to large stock levels that in turn take up space and lead to capital costs (Wu, 2003). The possibilities of buying customized products in market-driven purchasing are low, since low-cost products are produced in large batches. This leads to product adaptations and problem solving, and thus an uncertainty in the final costs and delivery time (Levy, 1997; Wu, 2003).

According to Frazier et al. (1988), JIT purchasing implies that the company and supplier develop a long-term relationship and a relational exchange that is based on a greater recognition of mutual commitment between trading partners than that found in a market-driven exchange. The benefits from applying value-driven purchasing are to obtain high quality products and increased output (Hines, 1996). Lean purchasing focuses on the value creating process between buyer and seller during the exchange of goods and services (Jones et al., 1997). This value creates a win-win relationship with steady sales for the supplier (MacDuffle and Helper, 1997) and added value for the buyer in terms of collaboration in product-, production- and logistics development (Frazier, 1988). Through this collaboration the goal of lean purchasing is to aim for JIT-delivery, stockless production and zero defects (Hines, 1996).

In this article, the purchasing decision of kitchen cabinets within industrialised housing construction is analyzed. The current relationship of the supplier and buyer in this case study is close to the market-driven end-point, since the cabinets are ordered one-by-one on a short-term contract and installed using manual labour inside the factories. The hypothesis of this article is that *lean purchasing of customized kitchen cabinets is more profitable from a value perspective than a short-term relationship with a low-priced bulk supplier in industrialized housing.* The hypothesis is examined through a case study at one of Sweden's largest producers of prefabricated multi-storey housing in industrial practice.

MARKET- AND VALUE-DRIVEN PURCHASING WRITINGS

The first academic writer to analyse the economic system was Francois Quesnay (1694-1774), the medical doctor of the French king Ludwig XV. In 1758, Quesney presented his famous economic system of exchange between the supplier and buyer of goods and money, where price was the central factor. Quesney believed that the economic system "works itself" and should not be controlled, but rather "laissez-faire", e.g. market-driven purchasing.

Similar to Quesney (1766), Hayek (1935) also believed in market-driven purchasing and proposed that the economic system is coordinated by the price mechanism and a society, e.g. the market is not an organization but an organism. According to Hayek (1935), individuals are able to act through foresight and by choosing between alternatives based on price signals initiated by the price-mechanism. Sir Arthur Salter (1921), a member of British parliament and another

champion of "laissez-faire", saw the economic system, e.g. market, as one big company where companies can stay or leave a business relationship just like employees. The reason to stay or leave is price.

A new era of purchasing literature came with Coase (1937), who argued that there is more to a business relationship than just the price; this statement can be seen as one of the first indicators of lean purchasing. The development of supply chain relationships towards lean purchasing has advanced in the manufacturing industry, though the construction industry is lagging behind. In manufacturing, collaboration between major supply chain components is very important (Tan et al. 1999).

MARKET-DRIVEN PURCHASING

In market-driven purchasing, the buyer and seller have little commitment to their relationship (Kotler, 1984). Coase (1937) and Williamson (1975) both refer to the cost of running a relationship as a transaction cost. According to Coase (1937), this cost is low in market-driven purchasing. Information exchange in market-driven purchasing is often formal and mostly limited to issues concerning the purchasing agreement (Frazier, 1988). In such relationss, both parties tend to approach each other in a self-serving manner with little interest in mutual gain (Stern and El-Ansary, 1988).

The relationship between buyer and seller in construction is generally of the arms-length type rather than partnerships (Dubois and Gadde, 2000; Cox and Thompsson, 1997; Wood et al, 2005). According to Gann (1996), a market-driven, short-term relationship between buyer and seller often characterizes the management of supply chains in traditional craft housing production. Moreover, the findings of Dubois and Gadde (2000) showed that the supply of building materials is primarily characterized by an exchange of standardized products, which according to Krajlic (1983) is a type of product that does not require a close collaborative relationship. So why change? An implication of standardized bulk products is the necessity of numerous and costly man-hours for the erection of a building (Dubois and Gadde, 2000).

VALUE-DRIVEN PURCHASING

Because lean has its main focus on value, lean purchasing is here called value-driven purchasing. Value-driven purchasing can be characterized by zero defects, close technical cooperation with suppliers and just-in-time delivery (Hines, 1996, Levy, 1997). Wu (2003) claims that the proximity to a supplier is also a success factor for value-driven purchasing. As a lean enterprise, a company uses the qualitative aspects of the supplier that contribute to high quality products. With zero defects, a supplier shields the housing factory for the financial risk of defective products (Ballard and Howell, 1998), adding an internal value to the housing factory. Björnfot and Sardén (2006) define internal value as the value created by and between supplier and buyer to obtain an economically efficient production unit.

Ellrams (1997) model of Total Cost of Ownership model (TCO-model) is closely related to the lean supply chain through the mapping of all activities and their cost to increase value and eliminate waste in the supplier relation. Close technological and strategic relationships are other characteristics of value-driven purchasing. A lack of collaboration can result in extra time and resources to solve problems caused by not sharing information (Dubois and Gadde, 2000). A close technological relationship facilitates strategic technological development. In construction, process innovations are uncommon; instead, typical innovations in construction are product innovations by suppliers (Koskela & Vrijhoef, 2001).

Through collaboration, lean suppliers can develop the buyer's production in ways that the buyer would never master alone. At the same time, the buyer can drive the development of the supplier's business into a much larger company through the supplier's increased sales volume (MacDuffie and Helper, 1997). With just-in-time (JIT) delivery, value-driven purchasing minimizes storage and capital costs. Therefore, collaboration between buyer and supplier also exists at a logistic level to not only resolve logistic issues, but to evolve new systems (Levy, 1997). A drawback of a sole supplier relationship is the lack of competition among suppliers, i.e. there is no market to which a buyer can turn to in case of unexpected volume or price changes. The absence of alternative supply sources makes contract specifications important (Walker and Weber, 1987).

MARKET- VS VALUE-DRIVEN PURCHASING

Kraljic (1983) combines market and value strategies through categorizing different kinds of products to different strategies. Regarding highly customized products, Kraljic (1983) argues that value-driven purchasing is beneficial, though when it comes to bulk products, a market-driven approach is more appropriate. Frazier (1988) has divided different purchasing strategies into market driven, relational (a hybrid between market-driven and JIT) and JIT-exchange. JIT in Frazier's (1988) article coincides greatly with value-driven when a few extra parameters are added and Table 1 has therefore been modified, with value-driven purchasing in the last column instead of JIT (see Table 1). As with Frazier (1988), Table 1 includes time horizon, focus and nature of relation, and transaction costs. In Table 1, supplier proximity, product complexity, level of trust, size of supplier, inventory level and production complexity are added.

According to Frazier (1988), market-driven purchasing is short-term and price-driven with many alternative suppliers on the market. As little information as possible is exchanged in market-driven purchasing (Frazier, 1988) because of the low level of trust with a low transaction cost (Coase, 1934). Due to the minimal information exchange in market-driven exchange, the complexity/customization of the product is often low (standardized). Geographically, a market-driven supplier can be located anywhere, near or far. In market-driven relationships, suppliers are often large because low prices originate from economies of scale (Levy, 1997, Wu, 2003). Therefore, inventories are also large due to quantity discounts (Wu, 2003). Since the products are often non-customized bulk products, they can occasionally render the production line of the buying company quite complex (Stehn and Höök, 2004).

Table 1: Analysis Framework of purchasing decisions (modified from Frazier, 1988).

Purchasing characteristic	Market-driven purchasing	Value-driven purchasing
Time Horizon of exchange	Short-term	Long-term
Focus of exchange	Price	Joint emphasis of core product and value-adding services
Nature of information exchanged	Limited to transaction	Close exchange of information concerning product design and production planning as well as JIT-delivery.
Number of suppliers on the market	Many	Sole-sourcing
Product complexity/ customization	Low	High
Supplier Proximity	Far or near	Near (Preferably)
Transaction costs	Low	High
Level of trust	Low	High
Size of supplier compared to buyer	Large	Small
Inventory level	Large	Small/None (JIT)
Production complexity	High	Low

However, a value-driven relationship is characterized by long-term relationships that are driven by product, production and logistic development with one sole supplier on the market. The exchange of information concerns everything in the joint development of product, production and logistics (Frazier, 1988), providing high complexity and highly customized products that of course lead to high transaction costs (Coase, 1934; Williamsson, 1973). This kind of close information sharing implies a high level of trust. A small supplier is an advantage in the technical collaboration because a smaller company tends to be more flexible (Macduffle and Helper, 1997). A value-driven supplier is preferably situated close by to facilitate communications (Wu, 2003). Inventories in value-driven purchasing are close to zero due to JIT (Macduffle and Helper, 1997). The production line is simplified due to the purchasing of customized products (Stehn and Höök, 2004).

CASE STUDY: KITCHEN CARPENTRY IN INDUSTRIAL HOUSING

This is a case study of a Swedish timber volume element manufacturer with a turnover of approximately 50 M€. The company produces multi-storey buildings of two to six floors and aims to be the Scandinavian market leader in industrialized timber housing. To succeed, lean principles are part of everything they do, including supplier relations. The housing factory produces six timber volume elements each day.

Type of kitchen depending on the type of project, e.g. student housing has a kitchen in each volume element whereas retirement homes only have one kitchen of perhaps six volume elements. Normally half of the volumes produced for residential buildings contain kitchens. The case study was carried out through personal interviews with the management and factory workers, as well as observations in the factory. The purchasing, sale and drawing managers were asked to describe their workflow from first contact with the client to delivery. The factory workers were

observed for four months, when small questions were asked to clarify how and why they did what they did.

The installation of the cabinets was rather complex and consisted of several steps that were observed in detail. The cycle time for all of the different installation steps was measured for 10 kitchens. All observations at the company were carried out through the asking of 5 why's to get to the source of problems (Ohno, 1988). Two workshops were conducted with the purchasing manager, lean coordinator, two representatives from the local cabinet supplier and two university colleagues. The first workshop was an open discussion. The second workshop was a presentation of the cycle times and detailed descriptions of the steps involving the kitchen installation with a discussion of the results. The research is mainly based on qualitative data.

CURRENT PURCHASING DECISION

The house manufacturer currently buys kitchen cabinets from one of Europe's leading manufacturer of kitchen cabinets with a turnover of 250 million Euros. The kitchen cabinets are delivered in weekly batches to the case company. The whole planning of the purchasing begins as soon as the housing factory has received housing drawings from the client. The drawing managers at the housing factory adjust the drawings to fit the timber volume elements and when all the windows and door placements are set, planning of the kitchen can start.

Ten weeks before delivery, according to the contract, a drawing manager makes a rough sketch of the kitchen with measurements, requiring approximately two hours, and sends it to the kitchen cabinet manufacturer. The kitchen manufacturer then sends back a detailed plan of the kitchen cabinets, which will also serve as work instructions for the carpenters. This detailed plan is discussed and verified between the client and one of the salesmen at the housing factory.

Seven weeks before delivery, all kitchen design choices must be settled upon for the order to be complete, which takes approximately one week of phone calls for a salesman to coordinate. The salesman handles multiple projects in different phases simultaneously. Commonly, the salesmen have five projects each at a time. The purchasing manager then sends the order to the cabinetmaker six weeks before delivery. The delivery date is set according to the production schedule of the factory, i.e. three days before installation.

Installation of kitchen cabinets is one of the most time-consuming activities in the factory. It takes 20 hours with one craftsman at a time to complete a kitchen, including electrical installation, tiling and plumbing. This is under consideration that the kitchen is completed entirely inside the factory. The 20 hours are equivalent to three days in the factory which amounts to 50% of the total time of a volume element in the assembly line s. Consequently, the carpenters are under great pressure when there is a kitchen in each volume element.

However, half of the kitchens observed were not completed inside the factory because of incomplete, inaccurate or wrongly made drawings and last minute changes from clients. Additionally, the installation of cabinets was postponed when the cabinets did not fit (mostly due to incorrect design), which in turn prevented an entire chain of upstream activities from taking place, e.g. plumbing and electrical installations. Therefore, the majority of these activities had to be carried out at the construction site, leading to delays and extra costs.

In Table 2, the above empirical results are noted as purchasing characteristics for the current purchasing situation of cabinets. Table 2 shows that this is clearly a case of market-driven purchasing, according to all the characteristics discussed in Table 1.

Table 2: Analysis of the case company's current purchasing decision.

Purchasing characteristic	Explanation
Time Horizon of exchange	Short-term, the house manufacturer has a two-year price-contract with call-offs to each project
Focus of exchange	Mainly price
Nature of information exchanged	Limited to transaction
Number of suppliers on the market	There are many similar cabinet makers on the market.
Product complexity/ customization	Low, the current product has been the same for more than 30 years.
Supplier proximity	Far, the supplier is located 1,000 km away
Transaction costs	Low, there is no customer adaption apart from the drawings that change for every project.
Level of trust	Low, all decisions go via the client- house manufacturer- cabinet maker and vice versa
Size of supplier compared to buyer	Large, the supplier has a turnover of 250 million Euros, whereas the house manufacturer has a turnover of 50 million Euros.
Inventory level	Large, a large heated storage room is kept for storing and sorting cabinets
Production complexity	Large, it takes 20 hours to assemble a complete kitchen.

TOWARDS VALUE DRIVEN PURCHASING?

During the past three years, the housing manufacturer has had informal discussions with a small local supplier about starting a value-driven supplier relationship for the delivery of kitchen cabinet solutions. A workshop was carried out with a local supplier with a turnover of 1.3 M€, where the experienced cabinet manufacturer easily interpreted the housing manufacturer's production problems. The local supplier offered to provide a better product and service to the house manufacturer through close collaboration between the two companies. The better product and service will be in the form of a kitchen subsystem with complete plumbing, electricity and tiling installations. The system would be a complete wall with kitchen cabinets that is lowered into the timber volume element. In Table 3, the possible future relationship with the local smaller supplier is analysed.

Table 3: Analysis of the potential of value-driven purchasing.

Purchasing characteristic	Explanation
Time Horizon of exchange	Long-term, once production is changed it is hard to go back.
Focus of exchange	Focus on value-adding services concerning the kitchen sub-system.
Nature of information exch.	Close information exchange of product design, production planning and logistics
No. of suppliers on the market	Sole-sourcing, the product is "tailor-made" for the house manufacturer.
Product complexity	High, there is no such system today on the Swedish market.
Supplier proximity	Near, the supplier is located in the same village.
Transaction costs	High, since it will be difficult to change back to a regular cabinet manufacturer once the production line is changed Coase (1937).
Level of trust	Must become higher, as trust is crucial for the success due to the nature of the information exchanged (Macduffle and Helper, 1997).
Size of supplier compared to buyer	Small, with a turnover of 1.3 million Euros, this means potentials of full commitment to the house manufacturer (Macduffle and Helper, 1997).
Inventory level	Low, with JIT there should be no inventory.
Production complexity	Low, the kitchen subsystem will be ready to be sunk down into the volume element.

DISCUSSION: VALUE-DRIVEN VS MARKET DRIVEN PURCHASING

The current purchasing decision implies a complex production line with many handovers. Value-driven purchasing can simplify the production line, increase capacity (Hines, 1996) and provide consistent workflow (Karlsson, 1992). A vision is that the lean industrialized construction enterprise will develop into a "supplier coordinator and system integrator", providing the design of the main system and final assembly of subsystems using a network of suppliers (Stehn and Höök, 2004). A well-developed industrialized building process can become even more efficient with value-driven purchasing; taking advantage of each other's core competences and abilities and making use of this knowledge in a close collaboration is beneficial for both parties (Macduffle and Helper, 1997). Construction companies should take advantage of their suppliers' spirit of innovation.

To initialize a lean purchase, the suitability of the supplier candidate is vital to meet the needs of the buyer, i.e. the supplier must be well-chosen (Macduffle and Helper, 1997). The fact that the supplier is near (Wu, 2003), and small (Macduffle and Helper, 1997), speaks for a successful "marriage relationship". During the workshops, the supplier was fully committed to adapt to the housing manufacturer's needs. A well-established trust between buyer and seller is compulsory for this kind of value-driven relationship (Macduffle and Helper, 1997), though a well-written supplier contract is always good to avoid future problems (Walker and Weber, 1987).

The start of a lean supplier strategy will initially imply high transaction costs, since the new kitchen sub-system must adapt to the volume element production. When established, the lean system has the potential to double the output of the housing manufacturer (Hines, 1996). Experiences from the UK construction industry show that close collaboration with suppliers lead to higher profitability, fewer delays, and better quality of the finished buildings (Khalfan and McDermott, 2006).

CONCLUSIONS

From a value perspective it seems as though a long-term relationship with a dedicated local, smaller supplier would be a preferable choice over a short-term bulk supplier, even if the short-term supplier has (much) lower prices**:**

Through value-driven purchasing, the house manufacturer can accelerate production as the production line becomes less complex when kitchens no longer need to be assembled.

In market-driven purchasing, long lead-time enforces preliminary orders and drawings that often require adjustments; adjustments that are often discovered late in the process requiring a "quick fix" at the construction site, thus leading to extra costs. Extra costs and extended time for finishing can be eliminated with value-driven purchasing of complete kitchens. Geographical proximity, close technical collaboration and JIT will proactively eliminate errors.

The kitchen cabinet manufacturer can grow with an increasing and steady sales volume due to their extreme customer adaptation and the house manufacturer's dependence on this adaptation.

In the urge to strive for the lean enterprise, a system supplier seems ideal, creating a win-win relationship between both companies. The case company now plans to proceed and evaluate the local supplier, which should be an interesting process to follow. Further empirical work of a test-delivery from the local sub-system manufacturer should provide more insights into this area of work and make it possible to thoroughly evaluate potential risks. The indicative results in this paper can be made conclusive through quantification of the proposed Lean purchasing characteristics.

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