

# **PROCUREMENT IN MANUFACTURING ORGANISATION: PORTFOLIO AND THE USE OF THE INTERNET**

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## **ABSTRACT**

Procurement function in manufacturing organisations has played significantly more critical roles nowadays than in the past. The contribution of procurement function is much determined by how well the procurement management system is designed. A critical aspect of managing procurement function in order to optimise its contribution to the organisation is procurement portfolio, i.e., categorisation of items and then differentiation of procurement focus for different categories. This paper will discuss procurement portfolio as a basis for procurement manager to optimise the contribution of his/her function in supporting the organisation's objectives. The role of electronic procurement in each category of the portfolio will also be discussed.

**Keywords** : procurement portfolio, manufacturing, electronic procurement.

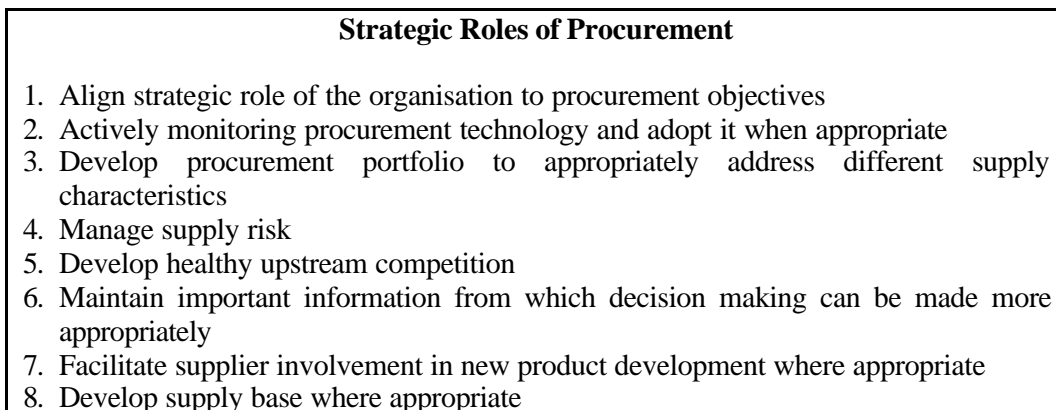
## **1. INTRODUCTION**

Traditionally, procurement has often been associated with clerical activities. People working in a procurement function spent most of their time administering purchase requisition from the units or departments needing a product or service, creating purchase orders, delivering purchase orders to the suppliers, administering delivery schedule from the suppliers, etc. When the items or service are purchased through a tendering or bidding process, clerical activities such as drafting Request for Proposal (RFP) or Request for Quotation (RFQ), administering submitted proposal or quotation, inviting prospective candidates, and conducting bidding process are among activities that are heavily associated with procurement function. Those activities were often considered to be less strategic, short-term cost oriented, and hence, less effort was spent in digging more strategic issues of procurement activities.

With the continuous pressure in the market competition, people are starting to widen their perspective on what needs to be improved in the supply chain. The fact that all manufacturing companies need heavy involvement of procurement function and that the money spent by the procurement function by large is dominant in the organisation has given manufacturing people critical understanding on how important and how strategic procurement function is. When wider viewpoint is taken into account, procurement function is not only critical to achieve cost advantage by obtaining low cost supply, but also contributes substantially to the other dimensions of the organisation's competitive advantage. In addition to its role to obtain cost advantage, procurement also supports the organisation in improving responsiveness, achieving better flexibility, and reducing risks or improving reliability of the organisation. As suggested by Ellram and Liu (2002), "the financial impact of purchasing and supply management goes well beyond cost reduction. It extends to such critical performance areas as business growth, profitability, cash flow, and asset utilization".

With the above things in mind, it is obvious that procurement people are held responsible for much wider responsibility nowadays. Understanding the strategic objective of the company and deploying this strategic objective into more specific objectives, procedures, and standards in the procurement function requires a visionary manager. He or she should be able to bring his or her staffs to support the organisation strategic objective. In other words, procurement manager should be able to align the organisation strategic objectives and the procurement objectives, procedures, and standards. Figure 1 outlines several strategic roles in which the procurement function is held accountable nowadays.

In order to optimise the strategic role of procurement function in a manufacturing context, it is important to put an appropriate emphasis or focus in line with the environmental characteristics facing the supply decisions. Classification of items based on their environmental condition and then the alignment of the focus of the procurement management for each of those categories or classifications is often known as procurement portfolio. This paper will discuss procurement portfolio to provide procurement manager with a framework that can be used in optimising the contribution of his/her function in supporting the organisation's objectives.



**Figure 1. Outlines of Strategic Roles of Procurement Function**

## **2. DEVELOPING PROCUREMENT PORTFOLIO**

Most organisation normally deals with thousands of items to be purchased from suppliers. Purchasing people are facing various characteristics of the items and different consumption patterns. Characteristics of items may be associated with their physical volumes and properties, design complexity, price, etc. On the other hand, it is usual that a company manages various different demand patterns for the purchased items. Some items are required at about the same quantity each week, some items are needed in one week of each month, and many other items are only needed several units annually. Companies dealing with fashion type products will observe evolving types of items in their database. Even manufacturing companies which produce functional items like light bulbs, cereals, cigarettes, etc. are facing significantly different consumption pattern of the purchases.

Differences in the characteristics of items and in the pattern of consumption are two out of many variables that make procurement activities difficult. Other variables, such as the nature of market, i.e., whether many capable suppliers exist or the items can only be supplied exclusively by one supplier, the unit price, the availability of local suppliers, and the strategic importance of the item to the company are also important determinant in procurement decisions. Literature on procurement portfolio suggested that in order to design an optimal procurement model, an organisation should understand first the characteristics of items to purchase, the demand pattern, maturity of the technology, and the availability of supplier.

With respect to the type of relationship with the supplier, Bensaou (1999) argued that no one type of relationship, not even the strategic partnership, is inherently superior to the others. This means that each company should develop and manage appropriately a portfolio of relationship. The types of relationship may be determined based on item or product characteristics, upstream market competition, and supplier conditions. For example, highly standardised items with stable or declining demand, with mature technology, and surrounded by many capable suppliers which the result in low switching costs would be appropriately managed with market exchange style of relationship. A market exchange relationship is characterised by limited information exchange, limited time spent directly with supplier staffs, and virtually no joint efforts between the buyer and supplier. On the other hand, complex items which require high level of customisation and large capital investment and can only be supplied by limited number of suppliers may be most suitably managed with a strategic partnership style. In a strategic partnership model, both parties are willing to share data/information, extensively involve in joint improvement initiatives and in new product design.

Handfield et al. (2000) developed a commodity portfolio matrix based on volume of purchases and the degree of opportunity and risk resulting in four classes of commodities: non-critical, bottleneck, leverage, and critical strategic supplies. The authors suggested that strategic supplies are strategically important and difficult to substitute or to obtain from alternative suppliers and are usually purchased in large volume. A similar portfolio was also used in Olsen and Ellram (1997) who distinguished items based on the degree of importance and the difficulty of managing the purchase situation. According to the authors, the degree of importance is determined by three factors: competency, economic value, and image. On the other hand, the difficulty of managing the purchase situation is determined by product characteristics, supply market characteristics, and environment conditions.

Figure 2 presents a general portfolio based on the degree of criticality and the difficulty in obtaining the item. The degree of criticality is determined by whether or not the item is a core component of the final product. An item has a high degree of criticality if unavailability of the item means that the production process has to be stopped. This type of item is normally required in almost all of the final products and no substitute is available or possible. The degree of difficulty is reflected by the availability of capable suppliers, flexibility in purchasing large or small quantity, and procurement lead time, and delivery speed flexibility. An item is considered easy to obtain if many capable suppliers are available with high volume and speed flexibility. Items which require customised and complex design is likely to be uneasy to obtain because only limited number of suppliers is likely to be capable of producing them.

C r i t i c a l l y	High volume flexibility, low supply risk, critical to the organisation's success.	Items are critical, maybe expensive, not many suppliers are able to supply, risk of supply shortage, competing with other buyers.
	High volume flexibility, low supply risk, not critical to the organisation's success.	Low volume flexibility, there is a risk of supply shortage, not so critical (not expensive and not part of the core process)
D i f f i c u l t y   t o   O b t a i n		

**Figure 2. Segmentation of Purchases Based on Criticality and Difficulty to Obtain**

### 3. ACHIEVING STRATEGIC COMPETITIVENESS BASED ON AN APPROPRIATE PORTFOLIO

Creating a classification based on the above two dimensions is an important step in procurement management. However, the strategic implication of this classification will only be realised when it is further translated into differentiated focus. Logically, each cell, which represents a unique set of characteristics, will have a different focus from other cells. Figure 3 outlines the management focus that each cell should maintain.

Cell 1 is a cluster of items with low degree of importance and relatively easy to obtain in the market. These items are normally simple and standardised, thus many suppliers are capable of producing them. The technology required to produce the items is mature and in many cases, with relatively low complexity or unsophisticated. Many other buyers also normally need these items. In manufacturing companies, commodities items such as bolt, nuts, and standardised paint are examples of cell 1 items. Most MRO (maintenance, repair, and operations) items also belong to this classification. Office supplies such as A4 papers are other examples. Since items are easily obtainable and the design are normally simple and standardised, the buyer can focus on short-term purchasing interest, i.e., looking at the price, comparing them, and then select the best deal. Procuring these items does not need to be done by evaluating supplier technological capability or their financial position. In other word, the buyer can design a very loose relationship and can move from one supplier to another whenever appropriate and investment to improve supplier capability is hardly ever justifiable in this situation. As far as the procedure is concern, the buyer should strive to minimise bureaucracy of the procurement process. Efforts should be spent to simplify procurement process and the organisation should delegate purchasing decisions to lower level of authority.

C r i t i c a l i t y	Keep multiple suppliers. Look at other supply characteristics, choice need not predominantly be based on cost. The use of multi attribute e-auction is appropriate. <div style="text-align: center; margin-top: 10px;"> <span style="border: 1px solid black; border-radius: 50%; padding: 5px 15px;">1</span> </div>	Focus on maintaining effective partnerships: increase supplier reliability and buyer's bargaining power. Reduce long-term risk. Use of on-line information exchange. <div style="text-align: center; margin-top: 10px;"> <span style="border: 1px solid black; border-radius: 50%; padding: 5px 15px;">3</span> </div>
	Focus on obtaining low cost suppliers and simplifying procurement processes. The use of e-auction is appropriate. <div style="text-align: center; margin-top: 10px;"> <span style="border: 1px solid black; border-radius: 50%; padding: 5px 15px;">2</span> </div>	Focus on developing alternative suppliers. Invest in technology and knowledge to support supplier capacity and capability. Develop purchasing consortium to justify the investment. <div style="text-align: center; margin-top: 10px;"> <span style="border: 1px solid black; border-radius: 50%; padding: 5px 15px;">4</span> </div>

**D i f f i c u l t y   t o   O b t a i n**

**Figure 3. Procurement Management Portfolio: Differences in Management Focus**

Cell 2 is a cluster of items which are not very critical but difficult to obtain. They are non-core items, sometimes the price is not expensive, but only limited suppliers are available to supply with a reasonable lead time. Olsen and Ellram (1997) and Handfield et al. (2000) referred to this kind of items as bottleneck. Low supplier availability may be due to the items are economically unattractive to produce or because the suppliers are located far away so that it restrict speed flexibility. Quite often packaging items for several manufacturing companies belong to this classification. Packaging items are not core components and their price are normally not expensive, but quite often the manufacturer change or improve the packaging designs to improve product appearance in the market and thus more appealing to the customers. Facing with this situation, a possible course of action the management may need to take is to develop new suppliers. If the supplier is developed exclusively for the company, the volume of demand may not guarantee the economies of scale of its production. Thus, whereas appropriate, initiating what is called buying consortium may be a viable option. Supplier consortium is a group of buying companies who aim to obtain a better bargaining power by pooling together their demand. In this framework, the buying consortium is not primarily developed to increase their bargaining power relative to the supplier, but to increase the availability of the items or to increase both volume and speed flexibility of the items in question.

In contrast to cell 2, items classified to cell 3 are not difficult to obtain and these items are critical to the company. Companies that use standardised items as their main components or materials will often have cell 3 as dominant items in their purchases. Small to medium cake producers rarely use specialised ingredients. Most of the ingredients, including flour, sugar, and salt are standardised items that can be quite easily obtained in the market. Because these items are easy to obtain but the company normally

requires in large volume, the focus in procurement management could vary. One company may need to keep more than one suppliers and the buying criteria need not be predominantly based on cost. Other appropriate criteria may be prioritised. The price offered by one supplier maybe about the same, but one supplier is willing to provide the buyer with longer credit period. Or, the quoted price maybe the same, but one supplier is willing to deliver twice a day but other suppliers are able to deliver no more than once a day. In such a situation, the buyer should carefully choose what criteria to be used in selecting the supplier.

Cell 4 is to accommodate strategic items, i.e., items which are highly critical to the company and are not available as a commodity in the market. These items require special capability or sophisticated technology and thus, only limited number of suppliers is capable of producing/supplying those items. Limited availability of supply increases the supplier's bargaining power. Long-term risk of supply could be high if the current supplier is not financially strong or if other buyers are competing with the company to secure long-term supply availability. Due to these characteristics, the company should spend substantial efforts to secure the supply and to improve long-term supplier performance. Such a situation warrants the buyer to spend effort and money in initiating long-term partnership with the supplier. Partnership normally involves commitment to share risks and benefits and to pursue collaborative improvement. The buyer may need to provide the supplier with technical, financial, and managerial supports whenever appropriate. Supplier is often involved in the new product development process. Both parties are also willing to share critical information and conserve partner's trust by keeping all of the shared information secure from other parties. Such a relationship requires trust, commitment, and reliability from both parties. Automotive companies are among the best examples showing supplier partnership model. For example, as pointed out by Handfield et al. (2000), "BMW has sent maintenance engineers and procurement, logistics, and quality personnel to suppliers –sometimes for several weeks at a time".

#### **4. THE USE OF ELECTRONIC PROCUREMENT**

Recent development in supply chain management has been marked by a splendid application of the Internet in purchasing activities. The traditional way of procuring goods or services via manual and off line activities such as sending a Request for Quotation (RFQ) by mail, conducting off line bidding process, typing purchase order in a stand alone computer, sending it by fax or regular mail, and then pay the bills by using a separate payment system is gradually replaced by electronics systems on the Internet. Those manual processes are not only time consuming, but also costly. A purchase order had to move step by step through costly staffs, from the administrative staff filling the purchase order, to the purchasing manager checking and signing it, and then to the accounting department for budget approval. Finally the purchase order should be sent via a regular mail or a fax by a mail clerk. Presutti Jr. (2003) pointed out that the cost for processing a purchase order is in the range of US\$70 to 300. With the dramatic development of the Internet, many of the procurement activities can now be done electronically. Johnson and Whang (2002) provided a comprehensive review on the use of the Internet in business, including in procurement.

Software vendors have been persistently incorporating more and more capabilities on their products so that the procurement processes can be done more easily with less time and headcounts which ultimately promote higher efficiency and responsiveness. PeopleSoft for example developed Supplier Relationship Management (SRM) software which enables the user to seamlessly integrate the source to settle processes, from determining the best supplier to receiving shipments, closing financial statements, and then continually analysing suppliers' performance. Procuri, another procurement software provider, offers a sourcing tool that enables the user to conduct on-line negotiation with different negotiation strategies such as one to one, sealed bid, and dynamic pricing events. The tool is also equipped with features to do multi-attribute and multi line bidding and to perform analyses on spending, supplier performance, and other relevant analysis. Ariba Spend Management provides capabilities to obtain enterprise-wide visibility and operational control. This application enables the user to use finer criteria in selecting suppliers. Oracle, with its Oracle Sourcing feature, allows users to integrate the procurement activities with the back end applications. Many other procurement software/tools providers, such as Epicor and Covigna, are well equipped with various sophisticated capabilities.

The role of third parties, such as independent electronic market exchanges, in boosting e-procurement practice has also been fantastic. Companies are now able to find a wide range of items easily and quickly via virtual markets. With the power of the Internet, various items can be easily bought electronically via virtual markets such as assetline.com for construction equipment and machinery, ironplanet.com for heavy equipment, steelauction.com for steel products like beams, rods, ingots, and pipes, chemicalnet.com for chemical items, theplasticsexchane.com for plastics materials, and many others. Such virtual markets are also developing progressively in countries such as China (for example Chemchine.com, echinachem.com), India (such as Chemvalue.com, Indiamarkets.com Indiachemicalportal.com), Korea (cyberdisty.com), Middle East (such as MEsteel.com), and Latin America (ActiMart.com). Those virtual markets enable the buying companies to more proactively seek potential suppliers, conduct bidding processes on-line, and obtain up to date analysis on price trends and other information on market development from experts.

Traditionally, items belong to cell 3 are appropriate to purchase via a tendering process. Unlike item in cell 1, the large volume of purchases in this category warrants the expensive and time consuming tendering process. With the advent of the Internet, tendering process has become more popular in procurement, and items in other category, especially in cell 1 are also candidates for tendering. The use of the Internet as a media for tendering has made this mode much cheaper and faster unlike the traditional tendering process which was normally very expensive and time consuming. Buyers can do a tendering process in their own on-line facilities, if there is any, but can also use third party providers such as the ones mentioned above. A popular means of selecting the cheapest offer from the competing suppliers through the Internet is recently well known as electronics reverse auction or abbreviated as e-auction (see for example, Emiliani, 2000; Emiliani and Stec, 2002; Smart and Harrison, 2003; Smeltzer and Carr, 2003). In this case, the buyer invites several potential suppliers to bid for price electronically and the one with the lowest bid will win.

E-procurement has not been extensively applied for procurement of items in categories 2 and 4. Although limited number of manufacturing companies may have

applied e-procurement for strategic items, the nature of e-procurement would be different from those in categories 1 and 3. Here, buying companies are hardly ever possible to use e-auction due to the limited availability of potential suppliers and due to specific designs are often needed for items in cell 4. Electronic procurement in this case should be able to integrate internal business processes of the two parties so that the buyer can easily monitor supplier's stock and capacity availability and the supplier can also monitor buyer's stock, demand, and production plan/schedule.

## 5. CONCLUDING REMARK

This paper discusses procurement portfolio and the role of e-procurement in supporting the strategic role of procurement. In many organisations, a large number of different types of items are usually purchased. Treating all items equally does not create an effective procurement system. A portfolio is a model that procurement manager can use to distinguish items based on their characteristics and then differentiate procurement focus for each category in order to optimise the contribution of procurement function to the company's strategic objectives. Furthermore, the use of electronics procurement system should take into account the above classification. Electronics reverse auction which is very popular recently and has been proven to provide very high rate on investment (ROI) is only suitable if many suppliers are capable of supplying the items in question. Understanding the characteristics of items, supply availability and the associated risks, the demand patterns, and the appropriateness of each e-procurement system is critical to creating an effective procurement management system.

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