Abstract. We frequently hear that supply professionals want to be seen as vital contributors to the strategic success of the firm, and that few supply management professionals really feel that they have the attention of executive management. Supplier price and cost analysis can contribute to success in attaining executive attention to supply management activities, but only if it is accomplished within a strategic context. Today’s supply manager must move away from simple conceptualizations of analysis as the handmaiden of mere cost containment and toward a focus on the creation of value for the firm, the supplying firms, and for our customers. This presentation provides a strategic context for considering price and cost analysis, an understanding of what is involved, and a view of the practical applications of such analyses. The presentation includes determination of appropriate methods for given market conditions and supplier relationships, an overview of the methods that are available, guidance for leveraging benefit from cost models, and advice for utilizing your results in management decision-making that may enhance your reputation as a supply management professional.

Introduction. This proceedings paper is intended to provide a brief overview of our presentation, based upon our chapter on price and cost analysis in the forthcoming 7th Edition of the Supply Management Handbook to be published by McGraw-Hill. Greater depth on the topic is available both in the presentation and the chapter.

Supplier price and cost analysis has received considerable attention as organizations seek cost savings, a subject central to the esteem of supply management activities in many organizations. This concern has been so pivotal to the reputation of supply managers that most introductory supply management texts contain an early example showing how cost savings from effective supply management add considerably more to the organizational bottom line than do considerably larger increases in revenue driven by increased sales. The simple fact is that the reader can easily make the argument that a dollar saved through his or her efforts at cost containment translates into a dollar on the bottom line, a result that may require many dollars in increased sales revenues. It is that simple! The intent of this chapter is to provide you with a strategic context for considering price and cost analysis, an understanding of what is involved, and a view of the practical applications of such analyses.
Let us begin with a look at some of the recent changes in the supply management profession and how those changes have impacted the role of supplier price and cost analysis. Undoubtedly, most readers are aware of past practice in the profession, when purchasing personnel sought to pit supplier against supplier in a competitive contest that was aimed at obtaining the lowest possible purchase price for necessary supplies and services. Some organizations may still operate where at least part of the purchases are still administered in this way; indeed, one could argue that certain widely available commodities, that do not represent strategically critical categories for the organization doing the purchasing, should be purchased in a manner similar to that described (Buddress and Raedels, 1998). However, readers should also be aware of the importance of concerns beyond just the immediate purchase price.

For example, as the supply management profession has advanced, a central message to supply management professionals has been that they should attend to the total cost of ownership: the cost of obtaining something, getting it to the point of use, conversion and customer support, etc, that is, purchase price plus all other costs of a given product throughout its lifetime (A good reference in this regard is provided by Ellram, 1994). In many cases, the lowest total cost has been found to be for materials or services where the actual purchase price is somewhat higher than that of products priced lower because of better quality and other factors of product performance. This example illustrates the importance of strategic guidance for the use of supplier price and cost analysis, a fact compounded by the increasingly strategic nature of supply management in general.

A Strategic Perspective. Supply has undergone a substantial transformation in recent times, away from purchasing as a tactical activity conducted by employees often treated as low-level functionaries and toward supply management as a broad label applied to myriad activities and concepts addressed by employees more likely to be viewed as highly trained professionals often reporting to the highest levels of the organization. These changes in perception are associated with the increasingly strategic role of supply management in organizations.

With such sweeping changes to the profession, we frequently hear that supply professionals want to be seen as vital contributors to the strategic success of the firm, and that few supply management professionals really feel that they have the attention of executive management. Supplier price and cost analysis can contribute to success in attaining executive attention to supply management activities, but only if it is accomplished within a strategic context. Today’s supply manager must move away from simple conceptualizations of analysis as the handmaiden of mere cost containment and toward a focus on the creation of value for the firm, the supplying firms (we must move toward ensuring value creation across the entirety of the supply chain in order to leverage the strategic nature of the inter-firm relationship), and, most importantly, for our customers. Indeed, without creating value that our customers will pay for, the organization is not sustainable. The critical concern with respect to customer value is to create a product (by which we mean either goods or services) with sufficient performance to entice customers to pay enough for the product to cover both our costs and a profit margin. Some might argue that the price does not have to yield a profit in certain cases, but on the whole, profit is essential. Others might argue that performance is not very important when a firm is attempting to compete based upon price, but we should note that there are products that customers avoid, even when they are essentially given away.
**Price Analysis.** Since price represents what we pay, or what we expect to pay in the proactive stance, price analysis can be seen as concerned with this amount. To the extent that price is determined by cost elements, discussion will largely be reserved for the cost analysis section later in this chapter. Price analysis represents a macro concern, whereas cost analysis delves into the cost elements that affect the total cost. In their sum, the elements of cost drive the price. Thus, this section deals with the big picture, and in cost analysis the discussion will turn to justification for the individual cost elements.

With this in mind, price analysis is a comparative process that seeks to establish reasonable purchase price thresholds relative to market conditions. Such an analysis does not necessarily require knowledge of the cost structure of the supplier, but, instead, evaluates the extent to which the sum of the cost elements is justified given prevailing prices for the item or similar items. This essentially represents analysis for benchmarking of prices.

Since price analysis is aimed at determining if pricing is reasonable from a market perspective, the type of market within which your supplier is operating represents a critical input into the process. Where there is competition, prices are likely to be lower than in markets without competition.

In order for perfect competition to exist, there must be many firms, each small relative to the total size of the market. This requirement prevents any given firm from influencing price (although, collusion or the formation of a cartel could bring about such influence, reason enough for such activity to generally be prohibited in the U.S.). Another requirement for perfect competition is that the product must be standardized. This prevents competitive advantage through differentiation. In such cases, prices are subject to easy comparison, price should be determined by the market, and price analysis is a matter of market comparisons, which are readily facilitated today utilizing internet resources.

When competition exists but is imperfect, i.e., when there are many producers of a similar product but there is some differentiation, suppliers can influence price through their differentiation strategies. In such cases, market comparisons are still available, but adjustments need to be made for special features of the specific product you are sourcing.

Although the modern global market makes long-standing oligopolies difficult to maintain, such a market is characterized by few relatively powerful producers, under such conditions, producers have pricing advantage. Since such conditions are difficult to maintain (even such traditional oligopolies as the automotive and steel industries have seen reductions in seller ability to set and maintain pricing), we should increasingly see competitive pricing and options for negotiating attractive deals.

Under a monopoly, absent government regulation, the seller is free to determine both supply and price. Under such conditions, there is little value in price analysis, since there are no comparisons with merit. This is also a case where cost analysis may not repay the expenditure of resources, since the purchasing organization has little power to influence the conduct of the seller. Similar conditions apply where your specific needs require products with proprietary content. However, in such cases, if you can manage to develop a collaborative relationship with the supplier, the application of cost analysis may bear fruit.
Cost Analysis. Cost is the value of resources required to produce a given good or service. For our purposes, the term cost will be used to refer to the sum of all the categories of cost, including direct and indirect costs. Thus, the total cost associated with a given product can be broken down into components through cost analysis.

Cost information can be obtained from the supplier either because of the relationship that your organization has with the supplier, or because of requirements as part of a request for proposal for a new purchase. When cost information is obtained through provisions requiring its presentation, we should be concerned that it may not be complete and/or accurate. Voluntary submissions may be more accurate, but generally, in order to gain voluntary provision of costing information, a long-term relationship will be required. Among the benefits of trusting relationships is access to information and commitment to working together for mutual gain. In the absence of cost information from the supplier, cost modeling provides a tool for determining and understanding the behavior of key cost drivers.

Cost analysis requires looking at those costs that directly relate to production of each unit of the product (the direct costs), and those costs that are incurred in managing and providing for the production of the product as part of the overall production mix of the organization (the indirect costs). Direct costs include labor actually attributable to production of the product and the materials utilized in the product. The relationship of these elements to the value of the product is obvious. The analyst may question the extent to which the correct methods or materials are used to be cost effective, in which case, this may become the focus of target and should costing as well as value analysis and engineering activities. Such activities are aimed at containing costs by bringing new thinking and product design to bear on meeting customer needs in cost-effective manner. Innovation in supply management techniques, currently including early supplier involvement (ESI), may be required in order to impact these cost elements. However, the values of direct costs in product pricing are generally relatively easy to establish. Such is not the case for indirect costs.

Indirect costs include many categories of overhead. While some overhead is essential to the operation of any business, how overhead applies to a given product in aggregate form or at the unit level is frequently difficult to establish. These decisions and the extent to which such costs are considered reasonable is always the province of judgment.

If a supplier produces only one product, the firm’s overhead must all be covered by the price charged for that product. Thus, allocation of overhead becomes a relatively easy matter, and each unit can be assumed to require overhead activity that is simply the total of overhead costs divided by the units produced. There are not many firms for which such simple logic applies.

When there are multiple products and multiple product lines, allocation of overhead and capital expenses becomes convoluted at a rate that accelerates rapidly as the complexity of the firm increases. In firms with multiple product lines and multiple divisions, we have never seen a situation where there was internal agreement about how overhead was allocated, because any approach that is taken will impact how various divisions and products are viewed from the perspective of profitability. If such disagreement is common within the firm, there should be little surprise that supply managers often question overhead allocation.
Overhead and indirect costs should not be allocated to a given product except when they are reasonably necessary. For example, we would object if we were buying a mature product and found that the supplier was allocating engineering overhead across all of its products, since none of that engineering effort was presently being directed toward design of our product. As another example, if we have a long-term contract for a given product, the allocation of sales overhead to our product would not be appropriate, since the sale has already been made, and there is presumably no sales activity directed toward the account at this time.

One of the first challenges in evaluating the extent to which overhead costs are reasonable, is to determine the method used to allocate such costs. A traditional method has been to allocate overhead based upon the revenues associated with a given product. Implicit in this approach is that it must cost more to manage a product that yields more revenue. Thus, a given product is assigned overhead costs that are equivalent in ratio to the total of overhead costs in the same ratio as are the product’s revenues relative to the firm’s (or division’s, etc.) total revenues for a given period. Another approach is to allocate overhead in the same manner, but instead of using revenue as the basis for allocation, direct labor represents the comparison ratio.

Activity based costing provides numbers that are more accurately reflective of the costs associated with a product, but no approach for assigning overhead costs can assure that the associated costs are reasonable. Generally, reasonable costs are those that are minimally required to accomplish production now and into the future. This applies to both direct and indirect costs. The analyst can only assess reasonableness from the perspective of what is required. This means that the analyst must understand the work being done, and how management of this work must be accomplished. Generally, this can only be accomplished by experience. That is, the analyst must answer the question of what a given activity should cost. Such “should” costing may require the use of specialists from outside the supply management profession. By using such specialists (engineers, machinists, etc.), supply managers can leverage the experience of the specialists in determining reasonable costs. It bears noting that with increasing outsourcing, the previous internal experts may be particularly adept at producing should cost figures. Indeed, successful outsourcing demands accurate should cost figures.

In addition to classification as direct and indirect, costs can also be classified according to the extent to which they vary with levels of production. Costs which vary directly with changes in number of units being produced are termed variable costs. Such costs include direct materials and labor. These costs should remain relatively constant from a per-unit perspective.

The importance of fixed costs and those that are not proportionally variable with production is that they are the source of economies of scale. To the extent that fixed costs are constant, at least in the near term over the relevant range of production, larger production volume yields a smaller per-unit fixed cost. Such economies of scale are very attractive, but also often overstated.

While there are other ways to categorize costs, these classifications have proven useful in the supply management setting. By understanding these classifications, the supply management professional can gain understanding of how costs arise, better assess the extent to which costs are reasonable, and gauge opportunities for cost reduction.
When costing information is not readily available from our suppliers, we may need to model costs. In such cases, we are concerned with constructing quantitative models that utilize information about the product that is being purchased and the conditions under which it is supplied to predict our purchase price. This can be done either graphically or through statistical methods that include linear and non-linear regression techniques. In many cases, the simple comparison of such measures as quantity or material content can be compared to price by use of a scatter diagram, representing a simple but powerful way to investigate potential relationships. For greater detail on this method, as well as statistical methods, readers can readily find more information in the forthcoming chapter as well as texts and articles on statistics and forecasting.

**Conclusion.** Pricing information can be utilized to determine the extent to which supply managers are receiving competitive pricing. Such information only exists where there is competition, and under such conditions, pricing information should both be readily available, and provide negotiating leverage with suppliers. Since price analysis can be conducted without access to information from suppliers, it can be conducted under circumstance where the relationship is contentious. In such cases, there is relatively little reason to engage in cost analysis.

However, when competition does not exist, or is imperfect, you may need to consider cost analysis. While cost modeling may allow you to estimate cost components, by far the best situation is when you can obtain accurate cost information from suppliers. Such information generally can only be assumed to be accurate and useful when it obtained under the condition of a long-standing collaborative relationship with a supplier where trust is present. Under such condition, cost analysis should be one component of an ongoing collaborative effort at cost reduction and containment. When practiced in this manner, cost analysis becomes a tool applied toward mutual gain.

The utilization of price and cost analysis can serve as a valuable tool in cost containment, but the greatest value can be obtained when these methods are integrated into the overall supply management strategy for a firm. In particular, collaborative cost analysis practiced along with leading-edge practices such as ESI in product design can contribute to achievement of greater value for our customers and enhanced profits for the firms engaged in such relationships.

**References**
