ALTERNATE PRICING STRATEGIES IN CONSTRUCTION

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ABSTRACT

Recent research findings on pricing strategies both in general and in construction are reviewed and explored. First, pricing strategy in general, mostly in the manufacturing industry, is reviewed. It includes the concepts of pricing strategy, predatory pricing, price wars, and price policy development. Second, pricing strategy in construction is explored. It includes various pricing models for bid price determination, such as the Friedman-Gates models, expected utility models, risk-pricing model, and the crew-day, multiple regression, and fuzzy-set pricing models. In conclusion, pricing strategies in construction are still predominantly based on a cost-based approach. More recent models try to close the gap between the models and the real life conditions of a bidder's decision-making process. It appears that there are more problems in cost-based pricing as opposed to market-based pricing. Consequently, it is highly recommended that, alternative pricing approach such as that are closer to the proposed market-based pricing model need to be explored and developed for use in the construction industry.

Keywords: Pricing strategy, cost-based pricing, market-based pricing.

INTRODUCTION

According to Rosenberg [1] price determination for a market offering is the most complex task in marketing. The organization faces many problems in making its decisions on pricing. Pricing has become management's most critical decision in marketing activities, and is the final chance for attaining the equilibrium necessary for an enterprise operating in a free economy [2]. Price rations and allocates inputs (materials, labor, and money) to their highest and noblest economic use in producing goods/services wanted in a free, competitive economy. Price also rations and allocates the output of the economy, using the mechanism of the competitive marketplace. Pricing decisions, therefore, need to be adapted to changing conditions, of which the following are important: rapid technological progress, growing number of new products, wider and more insistent demand for services, new and stronger foreign competitors, and tightened legal restrictions [3]. Throughout most history, prices were set by negotiations between buyers. Sellers would ask a higher price than they expected to receive, and buyers would offer less than they expected to pay. Through bargaining, they would arrive at a mutually acceptable price [4].

The construction industry in most countries in the world is one of extreme competitiveness, with high risks, and margins of profit generally low when compared to other areas of the economy. Consequently, pricing is one of the most important aspects of marketing in construction. But unlike in other industries, transactions and contracting in construction are conducted through the competitive bidding process, so that pricing mostly takes place in the bidding process. Up until today, there has been only one pricing approach used in construction: cost-based pricing. The typical procedure in cost-based pricing involves estimating the project cost, then applying a markup for profit. This approach is presented in Figure 1. Many researchers propose a bidding strategy based on this approach [5,6,7,8,9,10,11,12]. There are problems with this pricing logic [13].

On the other hand, market-based pricing, developed mostly in the manufacturing industry, is an alternative strategy. There are models published by researchers concerning

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bidding strategies in the construction industry [14,15,16,17,18,19,20] that, to a certain extent include market information. However, the application of these models in the industry is very limited due to the special characteristics of the construction industry. Transactions and contracting in construction are conducted through the competitive bidding process. Many still believe cost-based pricing is the best pricing strategy because most bidding strategy models require input information about competitors, such as their minimum and maximum markup, and some of them require information about customers/owners; most of the time this information is not readily available. To improve the understanding of different pricing alternatives in construction, various pricing strategies are reviewed and explored in this paper. First, pricing strategy in general, mostly as used in the manufacturing industry, is reviewed. It includes the concepts of pricing strategy, predatory pricing, price wars, and price policy development. Second, pricing strategy in construction is explored, including various pricing models for bid price determination such as the controversial Friedman and Gates models, expected utility models, and the risk-pricing, crew-day, multiple regression, and fuzzy-set pricing models. Finally, conclusions related to pricing in construction are drawn.

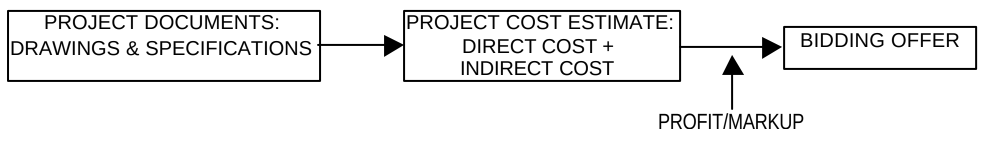

Figure 1. Cost-Based

PRICING STRATEGY IN GENERAL

All profit organizations and nonprofit organizations set prices on their products or services. Price goes by many names: rent (apartment), tuition (education), fee (professionals), fare (transportation), rate (utilities), interest (banks), toll (highway), premium (insurance), honorarium (lecturer), salary (executive), wage (workers), and finally bidding offer (contractors/consultants). Price is the only element in the marketing mix that produces revenue; the other elements (product, place/distribution, and promotion) produce costs. Price is also one of the most flexible elements of the marketing mix, in that it can be changed quickly, unlike product features and channel commitments. At the same time, pricing and price competition are the number one problems encountered by most marketing executives. Yet many companies do not handle pricing well. There are four most common mistakes made by marketing executives. First, pricing is too cost oriented. Second, price is not revised often enough to capitalize on market changes. Third, price is set independent of the rest of the marketing mix rather than as an intrinsic element of a market-positioning strategy. And fourth, price is not varied enough for different product items, market segments, and purchase occasions [4].

Best [13] claims that basically there are two extreme pricing strategies: cost-based pricing and market-based pricing. Any other pricing strategies are always in between these two extremes. *Cost-based pricing* starts by establishing the total cost of making a product. The product is then sold with additional cost-based markups, commonly a desired profit. There are two problems with this pricing logic. First, it is possible to grossly underprice a product using cost-based pricing and forgo even greater levels of profitability. The second possible consequence of cost-based pricing is overpricing. Since the price is set based on internal cost and margin requirements, the price that results could be too high or too low relative to competing products of comparable quality and reputation. What generally happens in these situations is that the product is overpriced relative to customer benefits and the price of competing products. Had the pricing started with the market (customer, competitors, and product position), a business would know what cost reductions were needed to achieve a desired level of profit. And if those cost targets could not be met at the market-based price, then perhaps an alternative positioning strategy would have to be developed. Or perhaps the project should not be pursued since the profit potential is not likely to be achieved. However, there are conditions under which cost-based pricing does make sense and needs to be used: in commodity markets where competitors face the same cost of supply; and in competitive bidding markets, where pre-qualified bidders are selected on the basis of low price [13].
Market-based pricing, sometimes called demand-based pricing, is basically the inverse of

cost-based pricing. It starts with the customer and the benefits the product creates relative to key competitors. Based upon a combination of customer benefits, price is set in the market. This can be done with the help of marketing research, marketing information systems (MIS), or decision support systems (DSS) [21]. The goal of market-based pricing is to create a price based on a superior customer value, in terms of either real economic value compared to competitors' cost or customers' perceived benefits. Consequently, it seems reasonable that different market-price strategies would be developed in response to different customer needs. While customers in different segments have different product needs, they may also have different price needs. A price-sensitive segment would be most attracted to lower price regardless of additional product or service benefits. On the other hand, a quality-sensitive segment may pay more for extra benefits (product, service, or brand) they desire. Thus, market-based pricing could take different forms in different segments within a market [13].

Recently, marketers have begun to examine firms' reactions to competitors' signals regarding future actions, including pricing signals [22,23,24,25]. Often they focus on actions or signals that represent significant departures from competitive norms, for example, deep price cuts or large increases in advertising. Such actions may be termed aggressive if they are motivated by the desire to force rivals to react by taking actions that significantly impair the rivals' performance or competitive viability. When these actions lead to a reduction in competition and undermine consumer welfare, they may be considered predatory. Predatory pricing involves lowering prices to an unreasonably low (usually below-cost) or unprofitable level in a market in an effort to weaken, eliminate, or block the entry of a rival [26]. Traditional economic thought maintains that predation is only feasible if certain market conditions hold [27,28]. These conditions inure to the predator the requisite market power (power to control price) and therefore the ability to recoup lost profits that attend a predatory episode. Some conditions provide predators with the ability to drive out competitors in a price war and thus enhance market power. To the extent that a predator's only competitors are small fringe suppliers and that the predator has superior financial resources ("deep pockets") from which to draw, the likelihood of outlasting competitors is enhanced. Another set of conditions are those that keep a predator's potential losses from low prices below those of its rivals. If a predator has a lower cost structure or a lower cost of capital than a competitor, then the losses incurred at below-cost pricing are larger for the targeted rival. Similarly, a predator that enjoys a price premium normally has a larger unit profit margin and thus in a price war enjoys the advantage of lesser absolute losses per unit [26]. Price wars are an intense form of price competition that usually decrease profitability for every competitor but may not give any long-term advantage to any competitor. Yet many firms may see pricing competitively to attain higher profits or a larger market share than one's competitors as a desirable goal. Armstrong and Collopy [29] found that a substantial proportion of managers in both surveys and experiments values beating competitors more highly than making profit. Leeflang and Wittink [30] found in their study that price cuts were a common competitive response. A study by Griffith and Rust [31] found that most managers tended to be competitive to the point of irrationality, sacrificing profits for relative standing versus other firms. The price of competitiveness in competitive pricing can sometimes be low profit. Furthermore, Sivakumar and Raj [32] found in their quality tier competition study that with price reduction, high-quality brands gain more than do low-quality brands both in 'what' (brand switching) and 'whether' (time decisions). They also found that high quality brands are less vulnerable to losses when prices are increased. These confirm the asymmetric theory- that is, consumers respond to price promotions more to switch up than to switch down quality tiers [33].

One important step in setting a firm's pricing policy is to select a pricing method [4]. The most elementary pricing method is to add a *standard markup* to the product's cost. Lawyers, accountants, and other professionals typically price by adding a standard markup to their costs. Another cost-pricing approach is *target-return pricing.* The firm determines the price that would yield its target rate of return on investment (ROI). Target-return pricing tends to ignore price elasticity and competitors' prices; the firm needs to consider different prices and estimate their probable impacts on sales volume and profits. The firm should also search for ways to lower its fixed and/or variable costs, because lower costs will decrease its required break-even volume. These two methods are very close to the cost-based strategy described by Best [13].

An increasing number of companies are basing their price on the product's *perceived value*. They see the buyers' perceptions of value, not the seller's costs, as the key of pricing. They use the non-price variables in the marketing mix to build up perceived value in the buyers' minds. Price is set to capture the perceived value [34]. The key to perceived-value pricing is to accurately determine the market's perception of the offer's value. Sellers with an inflated view of their offer's value will overprice their product. Sellers with an underestimated view will charge less than they could. Market research is needed to establish the market's perception of value as a guide to effective pricing [35]. In *going-rate pricing* (also called *competition-based pricing* by Evans and Berman [36], the firm pays less attention to its own costs or demand and bases its price largely on competitors' prices. The firm might charge the same, more, or less than its major competitors. Going-rate pricing is quite popular. Where costs are difficult to measure or competitive response is uncertain, firms feel that the going price represents a good solution. The going price is thought to reflect the industry's collective wisdom as to the price that would yield a fair return and not jeopardize industrial harmony. *Competitive-oriented pricing* is common where firms submit sealed bids for jobs. The firm bases its price on expectations of how competitors will price rather than on a rigid relation to the firms' costs or demand. The firm wants to win the contract, and winning normally requires submitting a lower price than competitors. At the same time, the firm cannot set its price below cost without worsening its position. Cost optimization is performed if possible, or perhaps the project should not be pursued since the profit potential is not likely to be achievable. The three pricing methods briefly discussed in this paragraph are somewhere in between the two extreme (cost-based and market-based) described by Best [13].

PRICING STRATEGY IN CONSTRUCTION

As mentioned earlier, transactions and contracting in construction are conducted through the competitive bidding process, so that pricing mostly takes place in the bidding process. The evaluation systems used by clients should indeed determine pricing activity and strategy in construction. It is believed that most pricing used in construction is cost-based. The typical procedure in cost-based pricing involves estimating the project cost, then applying a markup for profit, traditionally subjectively. This approach is presented in Figure 1. A bidder must first of all, develop a good estimate of the actual costs of construction, properly accounting for all uncertainties in the price of labor and materials, the quantities required, and the difficulties [11]. Consequently, most pricing strategy models are basically set to optimize markup; the objective is to come up with a bid price that is not too high or too low. Too high a bid price fails to get the contract and causes loss of time and money spent on preparing the proposal. Too low a bid price succeeds in getting the contract, but will force the company to undertake the job at a price far lower than necessary, leaving the money on the table. An optimum bid price will both allow for a decent profit and yet be fractionally less than any other offer [11].

The subject of competitive bidding has attracted many researchers. Two of the earliest bidding strategy models being developed by Friedman (1956) and Gates (1967), sometimes called as standard models. These models were further refined by a series of researchers such as Park (1966), Rosenshine (1972), Fuerst, (1976 and 1977), Ioannou (1988), Morin and Clough (1969), Wade and Harris (1976), and Sugrue (1980) in case of Friedman's model, and Baumgarten (1970), Rosenshine (1972), Dixie (1974), and Gates (1976) in case of Gates' model [9]. A third variant was proposed by Carr (1982 and 1983). Carr's model differs from the preceding two in that it treats cost, rather than profit, as the random variable. Overall, however, all these models have the same structure and implications [9]. Basically, they attempt to answer the question of how the bid price decision should be made to maximize the expected monetary value of the job. Friedman and Gates differ in the ways they determine the probability of winning the bid. They are sometimes contradictory [10]. For example, Benjamin and Meador [18] indicate that there has been a controversy in the competitive bidding literature regarding the correctness of the Friedman and Gates models in assessing the probability of winning a job with a certain bid price. Those who have used the Friedman approach point out that it is the correct application of the theory of probability for finding the relative likelihood of the occurrence of several events. On the other hand, some feel that the Gates equation more correctly models the competitive bidding situation in the construction industry. One comparative study of these two models found that Friedman's model always finds a smaller optimal markup to apply to the cost estimate than does Gates's model. The probability of winning at the optimal markup is less by Friedman than by Gates. Because markup is always less by the Friedman model, its use will always result in more jobs being won than will be won by use of the Gates model. However, this does not mean that the use of the Friedman equation will always result in greater total profits over the long run than will the use of the Gates formula. On the average, it takes about twice the volume of work to realize about the same profit by use of the Friedman model than by use of the Gates equation. There is a closer correspondence between the relative frequency of successful bids and the probability of winning when Gates's model is used than when Friedman's model is used [18]. On the other hand, Carr [16] proposed a general bidding model that is applicable to the competition for which a contractor's cost distribution and an opponent's bid distributions can be estimated. Historical data of a contractor's costs and competitors' bids on different projects produce a distribution for the ratio between them, the bid/cost ratio. Carr's [16] general model is developed using standardized distributions for contractors' costs and competitors' bids, estimated to have respective means of one and the mean bid/cost ratio to have equal variance. Applied in Friedman's and Gates's models, Gates's model is always more accurate than Friedman's [16]. On the other hand, Ioannou's [15] study in symmetry and state of information using Friedman's model (1988) proves the probabilistic validity of Friedman's model using the correct symmetry-based arguments.

The assumption in the standard models that contractors focus their attention on monetary values turns out to be overly simplistic. Consequently, many researchers developed bidding models that maximize not only contractors' monetary values but also other utility measures, called expected utility models. For example de Neufville et al. [11] developed bidding models incorporating the effect of bidders' risk aversion such as the effect of the prevailing economic conditions, the size of the project being considered, as well as the contractor's own attitudes toward risk. Once an accurate measure of the utility function of a bidder for a particular project has been developed, the procedure for calculating the optimum bid is the same as the standard model. Fuerst [37] developed bidding models incorporating the conditions in contractors' environment including labor productivity, weather, performance of suppliers and subcontractors, unanticipated site conditions. Those environmental factors cause the difference between cost estimate and actual costs to fluctuate. Pin and Scott [38] proposed a bidding model that uses a simple-statistic model for competitive bidding in the building industry. It uses historical actual bids. The distribution of bids is fitted to a normal curve from which one may estimate the distribution of the lowest bids representing a given contractor's competitors. Then the estimation of various parameters such as the coefficient of variation, which is a measure of the relative spread of bids, is performed. A simple formula is obtained for the bid that has a specified chance of success. A likely consequence of the adoption of the model by the industry in general would be a tendency towards tighter bidding. The difference between the wining bid and the next lowest bid would be reduced [38].

Wade and Harris [20] developed a bidding strategy method, called LOMARK. It may be used by small to medium-sized contractors working in the local market environment. The method estimates an optimal markup by predicting chances of winning future bids by treating the local market structure as a single system. Some advantages of the LOMARK method are that it assumes implicit dependency between bids; it expands the database for beating a given set of major competitors; it varies the percentage markup based on the probable known competitors; and it assumes a business strategy. Since LOMARK is not a sequential bidding model, it cannot be used in deciding which jobs to bid in the future [20].

In their study concerning risk and need-for-work premiums in contractor bidding, de Neufville and King [9] found that both need for work and risk significantly affect contractor bid markups. Consequently, they proposed a model of bidding incorporating those two factors and made an experiment using historical data bids. They concluded that contractors systematically add a premium to their bids to account for both the risk level of a project and their lack of enthusiasm to do a job when they do not need the work. When either factor is present, contractors bid less aggressively. The size of these premiums depends on the actual bidding situation [9].

When the likelihood of the occurrence of risk events and the risk-associated consequences (monetary loss and gain) are uncertain, contractors may be faced with the problem of deciding the bidding price of a construction project. If the monetary loss resulting from risk events is not considered or is underestimated due to associated uncertainties, a construction company may suffer tremendous loss and may eventually fail. Consequently, Paek et al. [7] proposed a risk-pricing method that can assist contractors in the process of estimation under uncertainty. This model analyzes and prices construction project risk, which then may be included in the final bidding price to remove a contractor's potential loss resulting from the risk elements associated with the project. The method consists of identifying risk elements and quantifying risk-associated consequences. The uncertainty in the values of the quantified consequences are represented by using a fuzzy set approach and incorporated directly into the bidding price decision process. In this method, realistic generalizations are hard to formulate since the selection of risk elements tends to be case-specific. The final result is sensitive to the adopted risk-management strategies. The model has been implemented in the form of a prototype software system [7].

Fayek [5] proposed a competitive bidding strategy model for use in setting a markup for civil engineering and building construction projects. The goal of this model is to help a company to achieve its objective in bidding. The model provides more than 90 factors that may influence the choice of markup, and it enables the decision-maker to assess the impact of those that are relevant to his/her bid situation. The use of fuzzy set theory allows assessments to be made in qualitative and approximate terms, which suit the subjective nature of the margin size decision. The model has been implemented in the form of a prototype software system named PRESTTO. It is concluded that fuzzy set theory can be applied successfully to model the margin size decision, and the use of this model can improve the quality of the decision making process used in setting a markup and can help contractors to gain a competitive edge in bidding [5].

Carr and Sandahl [12] use multiple regression analysis to develop competitive bidding models, to give a contractor new insights that will help him/her compete more effectively. They developed two models, one for use in deciding whether or not to estimate and bid a job and one to aid the contractor's markup decision. The regression equations are determined using historical data. The use of the models requires plugging the value of actual variables (e.g., number of competitors, value of current projects at hand, value of bidding permits, etc.) into the equation. This can be performed before the final rush of bid preparation. A periodic update, perhaps every 6 months, would be advised, to keep the equations up to date [12].

Ringwald [39] developed a bid markup calculation using the crew-day method. It relates the capacity of a firm during a given time period to its particular financial goals. It incorporates both time and balance sheet impact on markup. It can be used both by contractors who utilize the Friedman/Gates approaches and those whose data quality or quantity precludes such approaches. It does not eliminate estimator judgement, rather, it compels the bidder to exercise judgement within a disciplined framework. It calculates markup per crew-day using the number of productive days (excluding holidays, rainy days and winter days from calendar days) which an estimator can multiply by the number of crew-days required to carry out the project in order to determine total bid markup. It is a better method particularly for limited season contractors, to ensure that an estimating department's activities are geared towards the company's financial goals [39].

CONCLUSION

Pricing strategies in construction are predominantly based on cost-based approaches. Basically, the models attempt to optimize cost-based markup in terms of either expected monetary values or expected utility to the bidder. Most models assume that clients select the lowest bidder. Most models make use of historical and current data about the bidder and other information about competitors and the overall industry. More recent models try to close the gap between the models and the real life conditions of a bidder's decision making process. From the review of pricing strategy in general, it is clear that the cost-based approach is only one of many pricing approaches available. It also appears that there are problems in cost-based pricing, such as overpricing or underpricing. On the other hand market-based strategy is a comprehensive approach that may minimize such problems. Figure 2 depicts a proposed market-based pricing model in construction. Contrary to traditional practices, this extreme version suggests that the cost estimating function is not necessary at all. The main information used in this model is market data collected through marketing intelligence, combined with the company's strengths and weaknesses. Planned marketing intelligence practices include establishing internal marketing information/decision support systems, conducting marketing research projects, collecting and analyzing competitors' past bids, training the company's staff in marketing/sales issues, searching market information on the Internet, searching and analyzing the owner's and competitors' information during bid preparation, reading trade publications and research journals, searching information about current and prospective clients, subcontractors and suppliers, talking to managers within the company, purchasing information from research agencies, and monitoring and analyzing rumors. A factors that affect a company's strengths and weaknesses include the type of project pursued (building or heavy), the geographic location of projects undertaken (local or global), the amount of work subcontracted on an average job, the amount of promotion/marketing expenditure compared to overall sales, the annual contract value of the projects undertaken, the orientation of the company in terms of marketing (competitive or negotiated bid), the market segment in which the company operates (public or private), equipment policy (owned or leased/rented), level of technological sophistication, level of past experience, and the company's marketing intelligence capabilities.

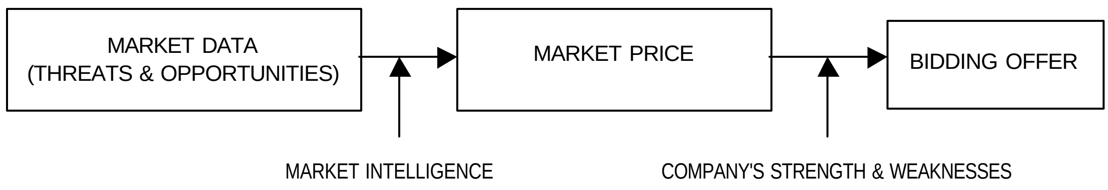

Figure 2. Market-Based Pricing

This model also suggests that the decision is always to bid the project, fully based on collected market information and the company's strengths. Cost analysis and adjustment are performed only after winning the project, before construction begins. The big assumption is the belief that the company is always able to find ways and methods to construct the project below the market price with a reasonable profit. As mentioned before, a pricing method adopted by a company lies between the two extreme strategies (cost-based or market-based). It is highly recommended that the use of an alternative pricing approach that is closer to market-based pricing, be further researched, explored, and developed in construction.

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