## PROCUREMENT AND RISK SHARING

## Full Paper

# NON-PRICE CRITERIA FOR SELECTING INNOVATIVE CONTRACTORS

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## ABSTRACT

Public clients increasingly use other criteria than lowest price when awarding construction contracts. The primary purpose of this paper is to explore whether these non-price criteria provide incentives for contractors who develop innovative processes or technologies. Theories of innovation and entrepreneurship are applied, focusing on the role of public sector clients, their response to innovative ideas, and innovation management among contractors. Empirically, use is made of data from an ongoing Swedish study of public procurement practices, related to current EC directives. A comparison is also made with Australian prequalification practice. Results indicate that non-price criteria not necessarily stimulate innovative efforts among contractors. It appears that the type of criteria and their weights play an important role. Moreover, the effect of specifying award criteria in advance is found to be ambiguous. However, the effects on process and product innovation differ. It appears that contractors when deciding upon areas of improvement need to be alert to multiple criteria procedures used by public clients. In addition, policy-makers should be careful when choosing the degree of transparency and precision in public procurement.

**Keywords:** construction, entrepreneurship, innovation, public procurement, technology

# 1. INTRODUCTION

It has been well recognized that government agencies in several countries increasingly use multiple criteria instead of lowest price when awarding construction contracts. Recent examples include China, where the introduction of competitive tendering practices (Shen and Song, 1998) has resulted in construction contracts being awarded on a multi-criteria basis (Lai et al., 2004; Shen et al., 2004), and Turkey, where multiple criteria are used in contractor prequalification (Topcu, 2004). This movement can be explained partly by increased knowledge about negative consequences of lowest price selection (Hatush and Skitmore, 1998). Another contributing factor is reforms in legislation and regulation on public procurement which have opened up for multiple criteria practices. Whereas the traditional lowest price regime results in a certain type of price competition between contractors, it could be asked whether this multiple criteria movement has led to another type of competition—more focused on innovation and technological change. This is not necessarily the case.

This paper deals with non-price criteria in municipal construction procurement. The purpose is to investigate the relation between multi-criteria contractor selection and innovation. It is generally acknowledged that innovation and technological change are important sources of productivity growth and material welfare in countries (Edquist, 1997). There are also studies that have investigated whether governments can adopt a pro-active approach and stimulate innovative activities through its procurement practices. Lichtenberg (1988), for example, studied procurement by design and technical competition in the U.S. and found that this kind of competitive procurement stimulated considerable private R&D investment. Dalpé *et al.* (1992) studied the public sector as first user of innovations and concluded that public procurement practices may indeed affect the pace and direction of innovative activity in industry. In construction, procurement has been recognized as an instrument (Manseau and Seaden, 2001: 17), but not a major one. The literature on multi-criteria contractor selection and its relation to innovation seems scant and underdeveloped.

The remainder of this paper is organized as follows. First, an analytical framework based on theories of innovation and entrepreneurship is presented. Second, the use of non-price criteria in construction procurement is discussed and empirical data from a recent survey of Swedish municipal construction procurement is described and analysed. Some alternative routes of action for government agencies are also covered. Third, a brief comparison between Swedish and Australian practices is made. Finally, the conclusions of this paper and their implications for practitioners and future research are presented.

# 2. INNOVATION AND ENTREPRENEURSHIP

In this section the analytical framework is presented.

## 2.1 PRICE COMPETITION VS TECHNOLOGICAL COMPETITION

Schumpeter held technological competition (competition through innovation) to be the driving force of economic development and growth (Schumpeter, 1942). He criticized the strong focus on price competition and argued that what counts is technological competition, "[…] competition which commands a decisive cost or quality advantage and which strikes not at the margins of the profits and the outputs of the existing firms but at their foundations and their very lives" (Schumpeter, 1942:84). Thus, following his view, a nation striving for sustainable economic growth is heavily dependent on technological competition and innovation.

In construction procurement it could be argued that the traditional lowest price regime results in price competition between contractors. Thus, if we adopt the distinction between product and process innovation (Abernathy and Utterback, 1988), price competition leads to process innovation rather than product innovation. However, do multiple criteria open up for technological competition that in turn open up for product innovation? This could be the case if the non-price criteria refer to features of technological competition.

### 2.2 THE NOTION OF ENTREPRENEURIAL OPPORTUNITIES

In research on entrepreneurship the notion of entrepreneurial opportunities is at the centre. Shane and Venkataraman (2000) have defined the field of entrepreneurship as involving "[…] the study of sources of opportunities, the process of discovery, evaluation, and exploitation of opportunities; and the set of individuals who discover, evaluate, and exploit them." One source of entrepreneurial opportunities is technological inventions where entrepreneurs with particular prior knowledge (Shane, 2000) can discover how an invention can be used and introduced in the market. Technological development and change thus created entrepreneurial opportunities. Another source of entrepreneurial opportunities is the division of knowledge (Hayek, 1945) in the market. Krueger (2003) has noted that entrepreneurs are likely to recognize patterns in the myriad of cues and signals that we receive; patterns that may indicate entrepreneurial opportunities. If contractors discover entrepreneurial opportunities this may be an incentive to invest in R&D. Here, the important question that we should ask is whether non-price criteria create entrepreneurial opportunities or not.

In a seminal article Kline and Rosenberg (1986) argued that in successful innovation both technical and market needs must be fulfilled. Kline and Rosenberg questioned the conventional "linear model" of innovation (where R&D leads to production and marketing of a new product) and pointed out that innovation is both complex and uncertain. If we are to link innovation and entrepreneurship we can note that invention and innovation might result in new entrepreneurial opportunities (Shane, 2000). Conversely, if individuals or companies discover entrepreneurial opportunities this may result in R&D investments that later on result in new products or processes. Both demand and supply matter.

## 3. THE USE OF NON-PRICE CRITERIA

Procurement of construction projects can be performed either as a single-stage procedure or as a two-stage procedure. In the single-stage procedure

all contractors are allowed to submit tenders on a construction contract. In the two-stage procedure the buyer usually distinguishes between prequalification and final selection of contractors. All contractors are allowed to enter the prequalification stage, but only those that qualify are allowed to enter the final selection stage. Multi-criteria contractor selection can thus refer to both single-stage and two-stage procedures.

## 3.1 NON-PRICE CRITERIA IN SWEDISH MUNICIPAL PROCUREMENT

In order to gain an understanding of various non-price criteria an empirical survey was conducted in the spring of 2004. The sample consists of 386 tendering documents, representing construction projects procured by 171 (out of 290) Swedish municipalities in 2003. Lowest price selection was used in 42 tendering documents (11%), but these are not referred to further in this paper. In Sweden it is common that government agencies use a standardised system (AF AMA) for tendering documents. The AF AMA system facilitates the review and codification process as information is presented under particular headings in the documents (e.g. AFB.52 for information on award criteria). The tendering documents were derived from a commercial database which contains records of tender invitations from government agencies in Sweden. Construction procurement was defined according to the Common Procurement Vocabulary codes (CPV) employed in the European Union. There is probably a slight bias in the sample towards municipalities that use more sophisticated approaches, since this might be correlated with a propensity to provide electronic tender documents. In line with the scope of this paper we focus on three factors that have been extracted from the empirical data. These factors are (*a*) the type of award criteria, (*b*) the weightings of non-price criteria, and (*c*) the degree of transparency and precision.

### 3.1.1 The type of award criteria

A great diversity of multiple criteria practices is represented in the sample. However, based on an analysis of the tendering documents ten main categories of award criteria could be identified. These were (1) tender price/unit price, (2) operation and maintenance cost, (3) contractor capability, (4) project duration, (5) environmental issues, (6) quality issues, (7) function, (8) references, (9) service quality and attitude, and (10) financial capacity. Thus, one category refers to price criteria and nine categories refer to non-price criteria. Given these criteria categories we can ask whether using them stimulates innovation. Criteria that are most strongly related to technological competition are ‘operation and maintenance cost’, ‘quality issues’ and ‘function’. These criteria refer to general features, while most of the other criteria refer to prescriptive specifications. ‘Contractor capability’, for example, is more related to how efficiently the construction project can be carried out, than the introduction of new products.

### 3.1.2 The weights of non-price criteria

In using multiple criteria government agencies also have to rank and assign weights to these criteria. Thus, they have to make a trade-off between price and various non-price criteria. The empirical data shows that some municipal agencies assign very low weights to non-price criteria compared to the tender

price criterion. The lowest weight that was identified for a non-price criterion was 0.5% (mean 11.3%). Obviously, by assigning low weights to non-price criteria, municipal agencies lower the incentives for contractors to improve their non-price performance. In fact, very low weights for alternative criteria result in a selection of contractors that resembles lowest price selection.

### 3.1.3 The degree of transparency and precision

When private companies procure construction projects they may decide to keep their initial preferences secret. They can review tenders and make the trade-off between price and non-price criteria *ex post*, instead of *ex ante*. In public procurement, on the other hand, there is need of transparency and precision in contractor selection. Otherwise there is always a risk of government personnel being accused of favoritism or sweetheart deals (Wilson, 1989). Based on the empirical data a Transparency and Precision Index was created (see Table 1). The index indicates how transparent and precise the municipal agencies were in their award criteria. The tendering documents in the sample achieved a score of 3.17 on average (standard deviation 1.30).

Table 1 The Transparency and Precision Index

| Transparency and precision index | Description |
|---|---|
| 5 | Award criteria with rankings, weights, and scales |
| 4 | Award criteria with rankings and weights |
| 3 | Award criteria with rankings |
| 2 | Award criteria without rankings |
| 1 | No information |

A high score signifies that the municipal agency revealed much information on how tenders were to be evaluated. This gives contractors a chance to analyse their competitiveness on the basis of the weights and scales assigned to each criteria. A low score signifies that the municipal agency revealed little or no information on how tenders were to be evaluated. Thus, contractors were faced by greater uncertainty regarding their competitive advantages.

At first glance one might argue that a high score in this index is more beneficial for innovation among contractors, especially in light of the new European Union Directives on public procurement which requires that weights shall be assigned to all award criteria. A high score indicates that there is close to perfect information rather than a confusing “myriad of cues and signals” where skilled entrepreneurs could discover commercial opportunities. Those opportunities that exist are decided *ex ante* by the municipal agency, and they are likely to be discovered by all contractors. In contrast, when little information is given to contractors *ex ante*, municipal agencies have greater possibilities to make the trade-off between price and non-price criteria *ex post*. There is also a chance that contractors discover opportunities that were unknown by the municipal agency *ex ante*. A lower degree of transparency and precision thus gives a municipal agency a wider range of possibilities to reward such discoveries. This analysis suggests that it would be optimal to combine a low degree of transparency and precision in tender invitations (*ex*

*ante*) with a high degree of transparency and precision in contract award notices (*ex post*).

### 3.2 A NOTE ON ALTERNATIVE ROUTES OF ACTION

Indeed, there are other routes of action available for government agencies than using non-price criteria (either as prequalification or final selection). One example is performance-based specifications that could result in a type of technological competition that fosters innovation and technological development. Another example is when government agencies allow contractors to propose alternative designs or technologies, even though traditional prescriptive specifications are used. A contractor can, thus, question decisions made by the government agency or its designers in earlier stages of the process. Is this design the most appropriate? Could space be used more efficiently? These routes of action could be combined with lowest price selection of contractors and yet stimulate innovation in industry.

## 4. A COMPARISON WITH AUSTRALIAN PRACTICE

A detailed discussion of Australian practice is beyond the scope of this paper. The Australian Procurement and Construction Ministerial Council has published a *National Prequalification Criteria Framework*, aiming to achieve national consistency in government agency prequalification of contractors (APCC, 1998). The document presents eleven prequalification criteria: (1) technical capability, (2) financial capacity, (3) quality management, (4) occupational health and safety & rehabilitation, (5) compliance with code of practice, (6) human resource management, (7) commitment to client satisfaction, (8) co-operative contracting and partnering, (9) management of environmental issues, (10) management for continuous improvement, and (11) compliance with legislative requirements.

It is interesting to note that this Australian framework bears similarities to the ten categories of criteria that were identified in the Swedish sample. However, while Australian practice appears to be characterised by an increased degree of national consistency, Swedish municipal practice is characterised by diversity. It is also interesting to note that the prequalification criteria under ‘management for continuous improvement’ include the following: “[t]he extent of a contractor’s commitment to continuous improvement can be gauged from […] a corporate policy on research and development, including the encouragement of improved design and/or construction processes or products […]”. This prequalification criterion is closely related to innovation. None of the non-price criteria in the Swedish sample had an explicit reference to contractors’ R&D track record. One reason can be that Swedish legislation stipulates that award criteria should be narrowly related to what is being procured, which makes it uncertain from a legal viewpoint whether Swedish municipalities could use a R&D track record criterion.

## 5. CONCLUSION

In the introductory section I posed the question whether multiple, non-price, criteria foster innovation in industry. As we have seen this is not necessarily

the case. Multi-criteria contractor selection can promote innovative initiatives, but that depends on the type of criteria used, and the weights that are assigned to such criteria. Furthermore, the degree of transparency and precision seems to play an important role. A high degree of transparency and precision implies a trade-off between price and non-price criteria that is frozen in the early stages of the procurement process.

What are the practical implications of these findings? Contractors need to be alert to the type of non-price criteria that government agencies use, and their weightings, when deciding upon areas of improvement. There might be limited opportunities for contractors to introduce new products in the tendering stage. However, process innovations for more efficient construction seem to be more easily implemented. For policy-makers, there seems to be need of an understanding of the potential negative effects of higher demands on transparency and precision in public procurement. This is also an area where more research is needed. The field of entrepreneurship can provide a useful framework for describing and analysing this phenomenon further.

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