A PROCEDURE FOR BEST VALUE TENDERING

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BIOGRAPHY

John Kelly, Professor of Construction Innovation, Glasgow Caledonian University and Steven Male, Professor of Building Engineering and Construction Management, University of Leeds, have worked extensively with client and construction industry supply chain members. They have jointly researched, developed, benchmarked and implemented a value management methodology for the UK construction industry described in “The Value Management Benchmark” published by Thomas Telford. John and Steven follow their first UK book on value management, published in 1993 with a new book, “Value Management of Construction Projects” published by Blackwell in February 2004. This book, written in conjunction with a practitioner Drummond Graham, consolidates 10 years of research and consultancy into a practical text.

Steven and John have facilitated a number of value-for-money studies for a variety of construction clients and contracting organisations. Themes within these action research consultancy studies have included: value management and value engineering studies with a range of Blue Chip and Government clients, studies for clients with major refurbishment programmes, studies for clients wishing to develop long term partnering and supply chain arrangements, studies for construction industry consortia or clients involved in Private Finance Initiative and Prime Contracting projects.

ABSTRACT

The United States Federal Acquisition Regulations in common with other public sector organisations internationally, permit the appointment of construction consultants and contractors on a value for money or best value basis. However, there is often a concern on the part of the public sector purchasing officer that the best value criteria for the selection of consultants and contractors are vague and that a subsequent audit will fail to confirm that value for money was achieved. The lowest bid therefore remains the most attractive procurement option even in situations such as design build where it is clearly inappropriate.
This paper reports on research and proposes a value management based method for the discovery of the project value criteria which become the measurement principles against which a consultant or contractor may be chosen. The paper describes the application of notional discounting of the bid price to determine the best value for money bid. The methodology for discovery of value for money criteria and its application in competitive bidding is clear and conducive to successful audit.

**KEYWORDS**
Best value, value for money, procurement, value management

**INTRODUCTION**
The United States Federal Acquisition Regulations (FAR 2005) aims to set out a method by which best value products or services may be delivered to the customer in a manner which maintains the public’s trust. In this context best value is defined as “the expected outcome of an acquisition that in the Government’s estimation provides the greatest overall benefit in response to the requirement”.

Within the past decade there has been a move by public sector organisations internationally towards the procurement of public works on a design build basis. The design build is either procured as a capital purchase or, as a public-private partnership. In the latter the private sector partner tenders a unitary charge and remains responsible for the overhaul and maintenance of the capital product for a number of years. Additionally, public sector organisations have, concurrently, increasingly moved towards best value procurement in which the successful tender is judged on a number of factors in addition to price.

These changes bring new and unique challenges to the probity of public sector procurement. The first challenge is to define the design build procurement process so that judgment can be made on factors other than price. The second challenge is to define the design build procurement process such that the methodology employed in the selection of the contractor and consultants is transparent and capable of audit. This paper introduces such a methodology based upon a value management approach.

**BEST VALUE, FAR 2005**
A number of international public sector organisations have produced regulations for the purchase of products and services on a value for money basis and use a similar definition of “best value” (Kelly and Hunter, 2006 and Chung et al, 2006). FAR 2005 (8.405-1) gives indicative factors which should be considered in determining a “best value” offer. These factors include:
- Past performance / performance history of the supplier
- Special features of the supplier or service required for effective programme performance
- Trade-in considerations
- Probable life of the items selected as compared to that of a comparable item
- Warranty considerations
- Maintenance availability
- Environmental and energy efficiency considerations
- Delivery terms
FAR 2005 under the heading of “best value continuum” (15.101) also lays out the rules under which an agency can “obtain best value in negotiated acquisitions by using any one of a combination of source selection approaches. In different types of acquisitions, the relative importance of cost or price may vary. For example, in acquisitions where the requirement is clearly definable and the risk of unsuccessful contract performance is minimal, cost or price may play a dominant role in source selection. The less definitive the requirement, the more development work required, or the greater the performance risk” then other factors such as those listed above may become increasingly important in the selection process. However, the factors which are to be taken into consideration and the method by which the proposals are to be evaluated, including details of multi step processes, must be fully described in the solicitation documents. “Evaluations may be conducted using any rating method or combination of methods, including color or adjectival ratings, numerical weights, and ordinal rankings”.

The conclusion to this brief review of best value bidding in FAR 2005 is that there is wide scope for evaluating bids on factors other than lowest price however, the methodology for so doing has to be clear and made explicit in the bid documents.

A METHOD FOR CLASSIFYING SELECTION CRITERIA

A logical approach to managing best value and value for money is Value Management (VM). Clearly the procurement method is a valid topic for discussion at a project programming value management study and the criteria for judging a value for money tender could be determined at that time. The question of whether there are a discrete number of factors for judging value for money tenders can be answered by considering value itself.

Value is commonly cited as being a relationship between cost and function (O’Brien:1976 p16, Crum: 1971 p14, EUR 14394:1993, ICE: 1996 p3, Hayden and Parsloe: 1996 p5, RJ Park: 1999 p96). Adam (1993 p176) defines value as the lowest cost to reliably perform a function where the definition of function is that which the product process or system delivers to make it work and sell, the definition of basic function is the specific reason why the device was designed and made. Norton and McElligott (1995 p13) define value as a relationship between cost, time and function. They state that in a value management study the objective is to improve value through the balancing of cost, time and function which can be achieved in three ways:
- to provide for all the required project functions but at a reduced cost
- to provide additional desirable project functions without adding to the cost
- to provide additional desirable project functions while at same time reducing costs

Other authors introduce the relationship between value, quality and cost for example, Burt (1975) states that maximum value is obtained from a required level of quality at least cost, the highest level of quality for a given cost or from an optimum compromise between the two. Best & De Valence (1999 p14) state that value is a relationship between time, cost and quality, and illustrate the time, cost, quality triangle, a technique commonly used in project management and illustrated on numerous commercial websites. Although accredited to Dr Martin Barnes academic debate is thin and citations are dominated by Atkinson (1999).
The relationship between quality and function is best illustrated by reference to Juran and Gryna (1988) who defined quality as the totality of features and characteristics (functions) of a product or service that bear on its ability to satisfy stated needs or implied needs. The definition of value as being a relationship between time, cost and quality is helpful in the search for characteristic factors of value for money.

Bicheno (2000: p170) describes the Kano model developed by the Japanese quality guru Dr Noriaki Kano who states that maximum quality is attained when targeted characteristics are achieved and the customer is delighted. There are three variables within the model. These are ‘basic factors’, ‘performance factors’ and ‘delighters’, which have a relationship to the presence of quality characteristics and customer satisfaction. These variables are included in the Kano model, illustrated in figure 1.

![Kano model diagram](image)

Figure 1 The Kano model (adapted from Bicheno: 2000)

In the Kano model a basic characteristic is expected to be present. The customer will be dissatisfied if it is absent and only neutral if the characteristic is completely fulfilled. The performance characteristic relates to the essential function. The customer will be more satisfied if higher levels of performance are achieved. The delighter is a performance characteristic, not specified by the customer but desired by the customer once its benefits have been revealed. There is however a time dimension to the model such that the three variables will tend to sink over time, i.e. what once delighted is now expected and higher levels of performance are always sought. For example, power
steering on small cars as a standard feature once delighted customers but now power steering is expected as a basic characteristic and its absence would lead to dissatisfaction. The relationship between time, cost and quality and definition of quality in terms of basic and performance criteria is useful in the analysis of factors to be considered in the judgement of value for money tenders.

An analysis of the factors listed above based upon Kano results in their classification into 4 types:

- **Basic characteristics.** Either the tenderer meets the required level of performance or not. This applies to such factors as health and safety and fraud prevention. Basic factors, which relate to the company as opposed to the proposed design, should be determined through the pre-qualification questionnaire such that those tendering will all meet the requirements. Alternatively, an acceptable level should be specified such that a tenderer with an unacceptable performance will not be considered. For example, any company having a company director with a fraud conviction should not apply.

- **Measurable performance characteristics.** These characteristics are those such as energy consumption, hard facilities management costs, soft facilities management costs, capital cost and time. These are valid characteristics of a tender appraisal process. In a design build lump sum tender the tenderer should be required to submit an estimate of all these costs to be used in judging the tender whether or not there is a contractual compliance requirement i.e. a proving of energy and FM costs over say the first five years of operation.

- **Non-measurable performance characteristics.** These characteristics are those such as aesthetics, contribution to community, popularity with stakeholders, etc. These are valid characteristics of a tender appraisal process.

- **Risk.** Risk is commonly defined as being a hazard, the chance of a bad consequence or loss, or the exposure to miss chance. Risk management maximises the certainty of the functional value of a project. Risk is a solution focused factor of value and is a valid criterion when viewed from the perspective of the client. However, although it could be a discrete discretionary factor in the choice of a design it is better incorporated into the scoring system as risk is an overlay on basic and performance characteristics. The client should only consider those risks incorporated into the design which affect operability; construction risks will be incorporated into the tender by the tenderer.

The 4 types give a useful classification system when determining those factors for judging value for money tenders.

**A METHOD FOR IDENTIFYING SELECTION CRITERIA**

During a value management workshop at the project programming stage, at which all client stakeholders are present, the subject of procurement should be discussed and a method of procurement selected. The criteria for judging best value for money tenders will depend on whether the tender is to be based upon a full design by the client (or client’s consultants) or whether the tender will contain elements of design by the tenderer. The primary difference in the criteria will be the relevant performance characteristics and risk. In the situation where a tender is submitted based upon the client’s design the only performance characteristics relevant are capital cost and time. The risk to the client should be the same for each tenderer. The basic characteristics of a design-bid-build project should be defined as a prescribed requirement and the information on this gleaned through a pre-qualification questionnaire. Those that do not meet the basic criteria will
not be invited to move to the next stage. In this way all qualified tenderers will meet the basic criteria.

For those tenders which contain elements of design by the tenderer a new technique is required to elicit the measurable and non-measurable performance variables. The following technique has been evolved and tested within two training workshops. It is considered that the technique is ready to go live. The stages of the new technique are described with reference to a design build project for a new primary school. The method assumes that the Value Management programming workshop is held with the head and deputy head designate for the new school together with the local councillor and representatives from; the local authority education department, the local authority facilities management department and the local community council.

**Stage 1 – Brainstorming and classifying relevant criteria**

As a part of the workshop the team should brainstorm those factors considered relevant in judging tenders. The factors should then be categorised the four sub-headings described above. An example of the brainstorming and categorisation exercise is given in figure 2.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>classification</th>
<th>criteria</th>
<th>classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. capital cost</td>
<td>Meas Perf</td>
<td>10. health &amp; safety</td>
<td>Basic</td>
</tr>
<tr>
<td>2. past performance</td>
<td>Basic</td>
<td>11. time</td>
<td>Meas Perf</td>
</tr>
<tr>
<td>3. environmental impact (green)</td>
<td>Meas Perf</td>
<td>12. aesthetics</td>
<td>Non-meas Perf</td>
</tr>
<tr>
<td>4. community use</td>
<td>Non-meas Perf</td>
<td>13. culture</td>
<td>Non-meas Perf</td>
</tr>
<tr>
<td>5. fraud prevention</td>
<td>Basic</td>
<td>14. esteem</td>
<td>Non-meas Perf</td>
</tr>
<tr>
<td>6. flexibility (upgradeable)</td>
<td>Non-meas Perf</td>
<td>15. comfort (staff &amp; pupils)</td>
<td>Non-meas Perf</td>
</tr>
<tr>
<td>7. soft FM cost</td>
<td>Meas Perf</td>
<td>16. light and airy</td>
<td>Non-meas Perf</td>
</tr>
<tr>
<td>8. hard FM cost</td>
<td>Meas Perf</td>
<td>17. commercially sound</td>
<td>Basic</td>
</tr>
<tr>
<td>9. earning potential (rented facilities)</td>
<td>Meas Perf</td>
<td>18. scope creep/claims</td>
<td>Basic</td>
</tr>
<tr>
<td></td>
<td></td>
<td>19. attitude to partnering</td>
<td>Basic</td>
</tr>
</tbody>
</table>

In Figure 2 the basic criteria relates more to the company and not to the designed solution. These issues should be discovered as a part of the pre-qualification questionnaire and the companies selected to tender for the project will therefore be acceptable on these counts. The measurable and non-measurable performance criteria relate to the building and should be judged on a weighted scale. The risks associated with the company should be dealt with through the basic criteria. Risks associated with the design should be assessed as a part of the evaluation.
Kelly et al (2004: p212) describe the generic criteria for a value system as capital cost, operations cost, time, community, environmental impact, exchange (earning potential) flexibility, esteem, and comfort. From the above brainstorming session it can be seen that all of the measurable and non-measurable performance criteria fit within the generic criteria, for example soft and hard FM costs are operational costs and aesthetics and culture could be considered parts of esteem. The generic criteria therefore are a useful checklist.

**Stage 2 – Determining the weights to factors**

To determine the weights given to the various factors a paired comparison matrix exercise is undertaken. An example for the primary school is given in figure 3.

![Figure 3 - Paired comparison to obtain factor weights](image)

From the matrix it should be noted that capital cost is excluded since all other factors will be judged in the context of capital cost. The matrix is designed to be included with descriptive text in the tender documents together with a statement of the proportions used for capital cost and other factors. In this example the judgement is made on the basis of 70% capital cost and 30% other factors.
Stage 3 – Judging the tenders

Once the tenders are received a panel, ideally including representatives from the value management workshop will convene to judge the tenders in accordance with the pre-determined weightings. The scoring is on the basis of multiplying the score against each factor by its weighting as shown in figure 4. The indicative scoring is inclusive of risk therefore an exciting and innovative design with acceptable risk will score 2. A good solution which is risk free will also score 2. For example tenderer A in figure 4 viewed from the context of operating cost has an innovative solution with little risk, however, the team were not impressed by the aesthetic which they scored as acceptable.

Figure 4 – Matrix showing weighting and scoring

The total score for each tenderer is used in a notional discounting exercise described by CIRIA (1998) to determine the best value for money. The discounting is illustrated as follows:

The notional discount is calculated by the total for each tenderer as a proportion of the full score (in this case 140) multiplied by the percentage importance given to other factors (in this case 30%). The notional discounts are therefore for each tenderer:
Tenderer A  $74 \div 140 \times 30\% = 15.86\% \text{ notional discount}$
Tenderer B  $134 \div 140 \times 30\% = 28.71\% \text{ notional discount}$
Tenderer C  $52 \div 140 \times 30\% = 11.14\% \text{ notional discount}$
Tenderer D  $101 \div 140 \times 30\% = 21.64\% \text{ notional discount}$

The tenders received are adjusted to take account of the notional discount to give their relative position in value for money terms:

Tenderer A  £2,130,000 less 15.86\% notional discount = £1,792,182
Tenderer B  £2,365,000 less 28.71\% notional discount = £1,686,009
Tenderer C  £1,950,000 less 11.14\% notional discount = £1,732,770
Tenderer D  £2,225,000 less 21.64\% notional discount = £1,743,510

Therefore, based upon the notional tenders, Tenderer B, the highest tenderer should be awarded the contract as the full solution offered gives the best value for money as proved through the value for money process.

CONCLUSION
The research undertaken has proved that there are four factors which may be used in the judgement of value for money tenders for design build namely, basic factors, measurable performance factors, non-measurable performance factors and risks. The basic factors are those which relate primarily to the company as opposed to the proposed design and should be determined through the pre-qualification questionnaire such that those tendering will all meet the requirements. The measurable and non-measurable performance factors will need to be determined for each tender but are likely to be highly correlated with capital cost, operations cost, time, community, environmental impact, exchange (earning potential) flexibility, esteem, and comfort. The risks involved with the technical solution offered by the tenderers are taken into account in the weighting and scoring matrix exercise as shown in figure 4. Whether risk analysis should be a separate exercise is an interesting but detached debate.

The criticism of the method is that the weights and scores are subjective and can be sensitive to change. In the example illustrated in figure 4, altering the weighting under the headings by one in turn had no impact on the position of the tenderers after the notional discount was taken into account. However, if tenderer B scored 4 instead of 5 in two situations then this tenderer would no longer be the lowest. Sensitivity checking is therefore of prime importance and should be undertaken with the whole panel present.

The research demonstrates a value based method capable of description within the tender documents which meets all the requirements of probity. A panel of stakeholders will construct the paired comparison and blank scoring matrix at the time of preparing the brief. A value management workshop is not fundamental to the method but preparing the necessary pre-tender documents through a value management workshop and using a panel of members from the workshop to judge tenders reinforces the probity and increases the certainty that judgements are fair. In application it appears to comply with FAR 2005.
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