

Client-eye price-value tendering optimization

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Abstract

Tendering situations have shown deficiencies in guidelines for pricing and appreciating the projects, leading to corrupt activities of officials involved, poor workmanship, and unjustifiably high prices, among others. The paper develops a mathematical models that is easy to apply, in setting preliminary guidelines for setting standard on the price and value of the projects. A mathematical theorem and a lemma are also developed and proved to confirm the mathematical optimization, which serves as preliminary optimization for the tendering process. Cost savings and value addition are integrated in the process of using the model. Project price/value optimization occurs in the model when negotiation and negotiation guidelines are incorporated in the model. The model encourages involving the reputable tenderers in the competition and elimination of disreputable ones, and discourages compromises on value and quality. In closing, paper recommends use of the mathematical optimization as the basis for effecting the ultimate costing/value optimization for the tendering and the project.

Keywords: Cost saving, Negotiation, Optimization, Tendering, Value add

Introduction

The term ‘consultants’ refers to professionals who provide advice, or services, in a specific area of specialization (Williams & Van Triest, 2023). Poocharoen, Jongruck, Chattragul et al. (2023) remark that the consultancy industry is miscellaneous, as there are different types of consultants, including business consultants, human resources consultants, information technology (IT) consultants, finance consultants, management consultants, operations consultants, strategy consultants, and more. The title of a consultant is not a protected professional one. Hence, this makes it possible for anyone, even without the suitable credentials, to title themselves as a consultant. Genuine consultants provide their services to

clients in various forms, including reports, presentations, and customized software, or other products. Good genuine consultants (GGCs) provide quality consulting services to their clients, and charge the clients reasonable prices for the units of work they provide. They may work on a temporary or contract basis until a particular need has been satisfied. To become a GGC, one needs to focus on key skills and build relationships with the right clients. Moreover, every GGC has a track record, either as an organisation, or individuals who are to be deployed on a project have acquired relevant experiences or track records from where they were before.

Several benefits of hiring a GGC for a business or organization. Some of the key advantages of using GGCs include expertise, cost saving, competitive advantage, objectivity, customization, short-term goal achievement, leveraging new skills, outside market knowledge, networking, and market research (Charles & Ochieng, 2023). The GGCs have *expertise* by possession of their specialized knowledge and experience in their respective fields. This expertise can help to improve processes and operations in the clients' settings to effect increased efficiency, productivity, and profitability. Use of GGCs help clients towards *cost saving*. Contracting a GGC can be more cost-effective than employing a full-time employee with the same level of expertise (Przybysz, Orzechowska & Cichowicz, 2017), especially when the tasks required are seasonal. GGCs can be more affordable, as they provide targeted solutions to specific problems. *Competitive advantage* becomes factual as GGCs can bring best practices and innovative ideas to the client's business, giving the client a competitive edge in the market. As an *objective* outsider, a GGC's perspective can help clarify client's goals, align business direction, and identify areas for improvement. GGCs are also good at *customization*, as they can adapt their services to fit the client's specific needs and requirements, guaranteeing the client the best of their consultation. GGCs do work and leave the client's premises, to only *achieve short-term goals*. That is, GGCs can assist the client to achieve short-term objectives and goals to provide immediate results and progress. GGCs also *leveraging new skills* to benefit their clients. Engaging a GGC can transfer knowledge to the client's existing team to learn new skills and knowledge, which can be beneficial for the client's organization in the long-term. The GGCs encounter almost every client, and therefore, have *outside market knowledge*. They then would often have a broad and deep knowledge of business trends, industry challenges, and new technologies, which can be beneficial to the client organization. Due to their various engagements, the GGCs have plentiful networks. This extensive *networking* of the GGCs can be beneficial for the client's business and help the client connect with experts who may provide valuable services or advice. GGCs also engage in *market research*. They can offer access to

market information, analyze trends, and help the client to make informed decisions for the client's business's long-term success (Lasrado, Pereira, Lasrado et al., 2018).

The so-called 'developing economies' (that are mostly waning) can benefit immensely from use of GGCs. This is by noting that the GGCs exclude the ordinary consultants who establish and register companies due to an advice from a decision-maker in a project that is required in government. However, consultants have become excuses for national economic destruction by looters of the economies in desperate 'developing countries' economies (Bond, 2006). GGCs prefer to make presentations to their clients openly, explaining the value of their work and justifying the charges they claim. This paper argues that clients should not be overcharged, and they should receive value for money. The model explains the way clients can receive best project services but pay the least possible price for these projects. Using the "best price best value" attitude, the objective is to develop a project pricing model where the client receives the highest project value at lowest consultant cost price.

Literature Review

Project context

Project tendering refers to a competitive procurement process followed in selecting a main contractor or supplier for a client project (Marović, Perić & Hanak, 2021). A project (P) is a set of tasks (T_i , $i = 1, 2, \dots, n$) that need to be completed within a defined timeline to achieve a specific outcome. Mathematically, this notion is written as $P = T_1 + T_2 + \dots + T_n$. It can be a provisional endeavour undertaken by an individual or by several individuals in collaboration, involving research, design, or construction. Projects are described by their unique goals, distinctive start and end, and the need for careful planning and management. They can be small-scale tasks or large, complex undertakings, which can be managed by one person or a team. In project management, a project is typically defined as a series of interdependent tasks with a common goal. This suggest that

$$P = \sum_{i=1}^n T_i \quad (1)$$

There is a level of expectations called terms of reference (V) for every project. This V is explained by the individual tasks. Hence, $V = V_1 + V_2 + \dots + V_n$. Also, every project has a price called cost (C) to it. The tenderers for projects itemize the price such that each task is

costed. Hence, $C = C_1 + C_2 + \dots + C_n$, where the C_i are the respective costs for the tasks $T_i, i = 1, 2, \dots, n$. By expressing these ideas mathematically, they means that project (1) is required to have value (2) and to cost (3), where

$$V = \sum_{i=1}^n V_i \quad (2)$$

$$C = \sum_{i=1}^n C_i \quad (3)$$

The optimization problem is for the client's benefit, where V is maximized while C is minimized. Negotiation is going to be applied, as the tenderers often set the prices that benefit them, and are probably market-related in the case of GGC cases.

Negotiation

Negotiation is a discussion between two or more parties aimed at resolving areas of difference, gain an advantage for an individual or collective, or craft outcomes to satisfy various interests (Kaufmann, Schreiner & Reimann, 2023). It is a civil method by which people resolve differences. It is a process in which agreement or compromise is achieved while eluding argument and dispute. In this paper, negotiation is a strategic discussion that involves two parties, client and tender, to resolve an issue in a way that each party finds to be acceptable. Negotiation shall involve these two parties bargaining in an attempt to reach an agreement. There are cases where negotiations are not honest, as bullying companies or even some nations sometimes enter into negotiations with the intention to win 'at all cost' (Mehta & Ghosh, 2021). This approach to negotiation(s) is generally termed 'negotiating I bad faith'.

Negotiating in good faith (NIGF) entails entering negotiations with the genuine purpose of reaching an agreement, and being completely willing to satisfy the terms of the deal concluded (Yalden, 2023). This is when the parties in negotiations respect each other's decision-making processes, each one making reasonable and realistic proposals, and dealing honestly and fairly with the other party. The NIGF concept is entrenched in legal and ethical principles (Sarghi, 2023; Sherwood, 2023). It is also often an obligation in many contexts, such as business negotiations, collective bargaining, and negotiations with locals around the location of the business. Negotiating parties are expected to avoid behaviours that indicate bad faith (Cooper, 2017; 2023). Caraway (2023) enlighten that negotiating in bad faith (NIBF) can include approaches such as embracing an inflexible non-negotiable position, insisting on making

unilateral suggestions that are harmful to the negotiation process, or refusing to make counter-proposals when rejecting other's parties suggestions.

Tendering process

Suppose that a project has been defined the client has decided on the project terms, and has also set the minimum requirements. That is, equation (2) has been let loose to the tender market. In return, several consultants are going to prepare equation (3) in return. Only submissions from GGCs will be considered for evaluation, none from mediocre consultant, and the best few (say, k) will be shortlisted. Denote the best k GGCs' proposal submitted to have the following values and prices:

$$V_j = \sum_{i=1}^n V_{ji}, \quad j = 1, 2, \dots, k \quad (4)$$

$$C_j = \sum_{i=1}^n C_{ji}, \quad j = 1, 2, \dots, k \quad (5)$$

The GGC submitting the proposals are required to indicate the work breakdown structure (WBS) (Jarvinen, 2023), a method for completing a complex, multi-step project by dividing it into smaller, more manageable tasks. A WBS is a respected instrument in project management that assists in making a project manageable and quantifiable. Due to this description, the WBS enables amalgamation of scope, cost, and deliverables into a single tool. Hence, the WBS empowers the evaluators of tenders to obtain information regarding a project budget. This therefore enables evaluation of equation (5), the proposed budget/cost of project.

Sundry expenses

A sundry expense is an expense that occurs rarely, is often very low when it occurs, and is insignificant to business operations (Department of Agriculture, 2005). They are not easy to estimate, and cannot be classified as regular expenses. These expenses are deviations from the budget, which may occur due to unforeseen circumstances. In the modelling in the subject of Statistics, the equations include a component or term that represents a random error (More, Tripura, Nayek et al., 2023). The regression model is typical of this feature. According to Sen and Srivastava (2011), a regression analysis is a set of statistical processes used to estimate the relationships between a dependent (or outcome, or response) variable and some independent variable. The pairs of value and cost are regression equations, and introducing the errors terms (v_j and ζ_j), these equations well take the forms:

$$V_j = \sum_{i=1}^n V_{ji} + v_j, \quad j = 1, 2, \dots, k \quad (6)$$

$$C_j = \sum_{i=1}^n C_{ji} + \varsigma_j, \quad j = 1, 2, \dots, k \quad (7)$$

In the pairs of value and cost, the second equation errors may influence the project price, and the sundry expense ς_j should be kept at the minimum. It is beneficial on the client's side to keep this sundry variable to the minimum. On the other hand, if the first equation is kept low, then the project value is compromised. It is therefore important that v_j is increased as high as possible, because it is value/worth and worthy for the client. This notion leads to added value.

Added-value

Attributes that increase the worth of an item are usually said to be value-adding, or added value. Value add (VA) refers to the extra economic value that a company adds to its products or services beyond the cost of producing them (Calandra, Secinaro, Massaro et al., 2023). This added value can take the form of additional features, special qualities, or improvements that increase the product's perceived value to clients. VA can be created in several ways, such as adding a brand, offering after-sales services, or improving the product. The concept of VA is used in financial economics to calculate the difference between the market value of a product or service and the sum value of its constituents. Adding value to a product or service enables companies to attract more clients, which can boost revenue and profits. In consulting, the GGC can use VA to win a project against competing GGCs, build a relationship with the client, and it is also to build reputation (Dunigan, Grisé, Jackson et al., 2023; Mehta & Baskaran, 2023; Spassova, 2023). It is necessary to attempt VA.

Optimization Initiation for Client's Benefit

Project-based optimization

The initial step for the client to optimize the prize-value project setting is to accept the minimum price for the highest value, which is the project-based optimization (PBO). That is, the optimal setting using PBO is:

$$V_{PBO} = \max_j V_j, \quad j = 1, 2, \dots, k \quad (8)$$

$$C_{PBO} = \min_j C_j, \quad j = 1, 2, \dots, k \quad (9)$$

The V_{PBO} and C_{PBO} in equations (8) and (9) are not necessarily both coming from the same GGC. It is even possible that the GGC who came with C_{PBO} may have offered V_{min} while the one who offered value V_{PBO} could have charged C_{max} . The actual optimization in this scenario will happen when the client negotiates successfully with the GGC who submitted the V_{PBO} valued proposal, but pricing at C_{PNO} level.

Task-based optimization

Each proposal that the GGCs submitted presents its own WBS. The client can use the task-based optimization (TBO) by accepting the minimum cost of each individual task from all the GGCs, and pairing it with the maximum value of every task from all the GGC submitted proposals. That is, the client chooses the value V_{ji}^{max} and pairs it with the C_{ji}^{min} cost for all i, j . This means that under TBO, the optimised setting is:

$$V_{TBO} = \sum_{i=1}^n V_{ji}^{max}, \quad j = 1, 2, \dots, k \quad (10)$$

$$C_{TBO} = \sum_{i=1}^n C_{ji}^{min}, \quad j = 1, 2, \dots, k \quad (11)$$

Both PBO and TBO reduce the project cost, while increasing the project value. Both of them can only be achieved by negotiation because no client submits optimal pairs (8) and (9) together, or (10) and (11) together. It is left to determine which of these two pairs is the ultimate optimal solution.

Optimization Solution to Benefit Client

Theorem:

TBO is the definite solution

Proof:

It suffices to prove that the project value in PBO is not higher than the value in TBO and simultaneously prove that the project cost in TBO is not more than the one in PBO. For any $j = 1, 2, \dots, k$, from equation (8),

$$\begin{aligned}
 V_{PBO} &= \max_j V_j \\
 &= \max_j \sum_{i=1}^n V_{ji} && \text{(substituting equation (4))} \\
 &\leq \sum_{i=1}^n V_{ji}^{max} \\
 &= V_{TBO}
 \end{aligned}$$

Then, from equation (9)

$$\begin{aligned}
 C_{PBO} &= \min_j C_j \\
 &= \min_j \sum_{i=1}^n C_{ji} && \text{(substituting equation (5))} \\
 &\geq \sum_{i=1}^n C_{ji}^{min} \\
 &= C_{TBO}
 \end{aligned}$$

This leads to the following:

Lemma:

TBO provides the optimal solution for client (value, cost) tendering project proposal.

Proof:

It suffices to show that TBO provided the highest value at the least cost for the client. The above theorem shows that

$$V_{TBO} \geq V_{PBO} \tag{12}$$

$$C_{TBO} \leq C_{PBO} \tag{13}$$

Discussion

The discussion in this paper considers that only the GCC are involved when intense comparisons of the tenderers are made. This means that any company that tendered without

reputation in the work required is disqualified immediately upon a satisfactory finding that this is indeed the case (Cayanan, 2023; Laryea, 2011). This means that references on the past projects of the GCC, and the visitations to the work done, should be possible and permissible, in order for the client to satisfy themselves and do justice to the judgement if it becomes necessary. Moreover, any unreasonable outlier value or cost, such as above-market project cost/prices and below-market value, lead to the consideration to eliminate the tenderer(s) concerned. However, if they are proven GGCs, they could be requested to consider adjusting the prices to market-related benchmarks. Compromises on the low value/quality in cases of the work/tasks should be discouraged, and retaining the tenderers submitting wishy-washy quality should be done with extensive caution. It is generally discouraged to retain such consultants. Moves or decisions contrary to removing an unfit tenderer may be considered some kind of corruption (Bowen, Edwards & Cattell, 2012).

In the discussions, the TBO is a logical guide that can be used for negotiating with a leading GCC tenderer. It is, however, emphatically not the proposed final outcome of the project situation when tendering takes place. The client has the TBO, and even the PBO, as scientific guidelines and a strong position from which to start negotiating with the GGC that is in the forefront from the proposals submitted. The argument is that the prices set by each GGC should be market related.

Upon ascertaining that only the genuinely leading GCCs are included, the negotiations should start in the direction of value-for-money pursuit. According to Arneson (2023), inclusion of tenderers not fitting the criteria is tantamount to exploitation of the proper GCCs who submitted proposals. Right from the start, the negotiations should consider and openly declare the whole scope, covering price/cost of the project, anticipated sundry expenses, and VA (Alkarbi, 2023; Dabash, 2023) in order not to surprise the parties in the middle of the negotiations.

The client should consider only the leading GCC when it commits to VA in a formal and acceptable fashion, who keeps the price close to the TBO level (not too far higher), which does not inflate the price using the sundry route, and who pledges integrating some beneficial VA components to the mix. If the leading GCC can lead to a closure that they accept the negotiated terms, then they should be appointed. Otherwise, other leading GGCs should be approached.

Conclusion

The setting of the project price was two-fold, project total which compares the totals of all the submissions, and task-based which considered prices on individual tasks and add the component results. Both are acceptable when considering that the prices are set by the GCCs. This gives confidence that the charges proposed by the GCCs are market-related.

The system calls for elimination of untested consultants since practical application and not theory is required on VA client projects. The paper condemn compromises on poor quality and unreasonably high or inflated prices. Apart from meeting the criteria on the project, the GCC who is awarded the tender should be the leading one who is also willing to assist the client to save costs and add value to its business.

A scientific approach is proposed to set minimum and maximum standards on both value and project price. This shows that hard and soft skills are embedded in a single model to enhance fairness in the selection of, and awarding a project to, a worthy tenderer. Apart from the caution that the client needs to uphold, the discussions point that negotiating openly and in good faith are essential for enhancing good client and tenderer relationships. This approach, however, does not in any way suggests making unreasonable compromises.

Recommendations

It is important that consultants when they are given projects, they improve or add value to the client's business, and they should not suck too much money for their own sake when the client benefits less. The study recommends that the client should

- Not accept consultants' high prices that are not tested against the market prices;
- Insist on appointing GCCs who help in saving costs while adding value to their business;
- Settle for project price and value that are close to optimized levels; and
- Not miss the opportunity to negotiate terms of the project before the project starts.

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