RESEARCH STUDY

WHAT WINS WORK? DEVELOPING MORE COMPETITIVE PROPOSALS:

Relationship between Contractor Qualifications & Owner Evaluation Scores

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Abstract

Construction contractors have historically been procured through price-driven methods. Yet the increased use of alternate project delivery methods, along with owner-perceived concerns over construction performance, has led many owners to introduce qualifications-based selection criteria into their procurement systems. As a result, construction contractors are tasked with preparation of qualifications-based proposal submittals ever more frequently. Contractors must therefore develop strategies to consistently differentiate their qualifications from those of their competitors, which can lead to more favorable owner evaluation scores and ultimately improve their hit rate. This paper performed a content analysis of 71 contractor proposals containing both successful and unsuccessful bids. Regression results indicate that contractor project management proposals receive more favorable owner evaluation scores when contractor-controlled, design-related, and concealed conditions content are emphasized. Regression results show that contractor scope alternate proposals are encouraged to provide a comprehensive review of potential scope options to enhance the project and ensure the associated cost and schedule impacts are clearly defined.

Research Details

INTRODUCTION

Historically, the public procurement processes utilized to hire construction contractors have predominantly followed lowest-bid selection procedures (Eriksson 2008, Yu 2012). Disadvantages of lowest-bid procurement are well documented, with owner concerns over inconsistent performance, quality, reliability, and service in the construction phase along with incentives for contractors to implement cost-cutting tactics rather than quality measures (Assaf and Al-Hejji 2006, Scott et al. 2006). Such concerns have increasingly lead owners to implement best value procurement processes (Abdelrahman et al. 2008, Kumarasqamy and Anvuur 2008, Rahmani et al. 2017, Zhang 2006). Best value is a procurement process where price and other key factors are considered in the contractor evaluation process with an emphasis on considering holistic performance and value of the construction process (Caldwell et al. 2009, Scott et al. 2006). Best value procurement has been shown to reduce cost growth, increase quality, reduce time overruns, and improve contractor cash flow (Chan and Kummaraswamy 1997, Chua et al. 1997, Sullivan and Guo 2009, Wardani et al. 2006). Research has also shown the relationship quality between construction project stakeholders can be improved by procurement strategies which focus on quality rather than the “adversarial” lowest price criteria (Jelodar et al. 2016).

Increasing application of qualifications-based evaluation criteria within the construction sector is also spurred by the growth of alternative project delivery methods (Schleifer et al. 2014), such as design-build (Gransberg and Barton 2007, Sindhu et al. 2017), construction manager at risk (Bilbo et al. 2015), and integrated project delivery (El Asmar et al. 2013). Owners have even begun incorporating qualifications-based selection procedures within traditional design-bid build (DBB) projects (Perrenoud et al. 2017, Sawyer et al. 2015, Tran et al. 2016).

As the visibility of best value selection methodologies continues to grow, it is important for contractors (who may be most familiar with lowest-bid procurement procedures) to understand how to be effective in preparing non-price submittal elements. Similarly, owners who are contemplating best value procurement, or who are simply looking to improve their existing procurement procedures, may be interested in understanding what specific aspects of contractor qualifications are most valued by peer institutions. To address these questions, this study presents a content analysis of contractor qualifications-based proposals which have been submitted in response to owner request for proposals (RFPs) within DBB vertical construction projects. The research objective is to identify specific content elements of contractor proposals that correspond with more favorable owner evaluation scores, which in turn leads to practical recommendations to assist construction contractors in preparing more competitive proposals.

LITERATURE REVIEW

Best-Value Evaluation Criteria

A variety of evaluation criteria are used within best value procurement to analyze contractor qualifications. Criteria may include, but are not limited to, technical excellence, management capability, financial capability, personnel qualifications, prior experience, past performance, safety, scope alternates and optional features offered, project completion data, and risk to the owner organization (Del Puerto et al. 2008, Del Puerto et al. 2013, Gransberg and Barton 2007, Gransberg and Ellicott 1997, Hasnain and Thaheem 2016, Stanford et al. 2016). As noted in the NCHRP Report 561, common evaluation criteria in best value procurement can be placed into four categories: management, schedule, cost, and design alternates. Zhang (2005) developed a four-package evaluation criterion set for general construction projects that included submittal items focused on the following areas: (1) financial; (2) technical; (3) safety, health, and environmental; and (4) managerial capability. Based on Xia et al.'s research (2013), ten categories of evaluation criteria included price, experience, technical approach, management approach, qualification, schedule, past performance, financial capability, responsiveness to the RFP, and legal status. The Associated General Contractors of America (AGC) recommends that non-price criteria include the categories of experience, past performance, schedule, depth of resources, and project management approach (AGC 2008). The Design-Build Institute of America (DBIA) are proponents of qualifications-based selection criteria such as capacity of the design-build team to perform the work, qualifications of key personnel, the management plan for the project, and project-specific ideas that demonstrate the ability to innovate and "think out of the box" (DBIA 2012).

Contractor Project Management Proposals

Project management proposals are among the most frequently owner-required submittals within best value RFPs (Korytarova et al. 2015). Such submittals typically incorporate details regarding the contractor's plans for controlling project cost, schedule, quality, safety, and various project risk factors (Ahmed et al. 2012, Gransberg and Barton 2006, NCHRP 561). From an owner's perspective, project management proposals provide valuable up-front insight into how each proposing contractor would approach and manage the complexities of the construction phase (Wong et al. 2000). Previous research has shown that construction projects often encounter risks early in the project schedule, which perhaps lends importance to evaluating the project management capabilities of construction teams prior to determining the final selection and award outcomes (Perrenoud et al. 2015). Singh and Tiong (2006) noted contractor management capability to be a critical contractor selection factor. Waara and Brochner (2006) found that Swedish public owners value the opportunity to evaluate the construction methods that contractors will leverage for project realization. Other studies have also cited the importance of evaluating project management expertise (Gransberg and Shane 2013, Watt et al. 2009, Watt et al. 2010). Project management proposals also incorporate qualifications of the construction team personnel in relation to specific aspects of the proposed project's scope of work (Sullivan 2011).

Contractor Scope Alternate Proposals

Many owner organizations have also begun soliciting scope alternate proposals within best value procurement processes, where contractors are encouraged to bring forward innovative ideas for the owner's consideration (Beard et al. 2001, Gransberg and Barton 2007, Lines et al. 2013, Rahmani et al. 2017, Sullivan and Michael 2011, Waara et al. 2006). The definition of the owner's intent in evaluating contractor scope alternate proposals is as (excerpted from owner request for proposals within this study's data sample) "optional ideas or services that will be reviewed by the owner…the submittal may include proposed options to increase, adjust, or reduce project scope from the stated requirements." The owner's intent within this scope alternate proposals is often to encourage contractor ingenuity and lifecycle focus, which is not to be confused with the traditional practice of value engineering, which is defined as a formal process of applying a combination of "common sense and technical knowledge" to locate and eliminate unnecessary project costs, oftentimes when the owner's budget is in jeopardy (Chen et al. 2009, Naoum and Egbu 2015). NCHRP Report 561 identified proposed design alternates as being among the most commonly identified best value parameter in their review of best value case studies for highway construction projects. Singh's (2006) survey of Singapore construction practitioners included the selection criteria of each bidding contractor's time and cost savings considerations. Gransberg and Ellicott (1997) noted that owners have long prioritized contractor proposals that focus on optional features that focus on quality and value rather than only cost.

Strategic Marketing Concepts

The hypotheses within this study build upon the theories of competitive strategy and alliance contracting. Competitive strategy holds that a firm's performance is directly related with its ability to differentiate itself from its competitors (Porter 1980, Mintzberg 1988). Firms that provide unique services and capability – combined with creative marketing – are said to have adopted a differentiation strategy, which

is in contrast to a low-cost strategy where a firm primarily aims to lower its production and marketing costs (Porter 1980). Differentiation is a strategy that focuses on creating something that is perceived by the buyer (i.e. construction owners) as being unique, typically related to the firm's reputation, qualifications for delivering high quality projects, use of innovative techniques and technology, and ability to build collaborative relationships with project stakeholders (Cheah et al. 2007).

Differentiation strategy has been established as a valid practice for construction contractors; for example, Li and Ling (2012) found that profitable Chinese architecture, engineering, and construction firms were more likely to adopt differentiation practices instead of pursuing low-cost strategies. Kale and Arditi (2003) provided empirical support that differentiation strategy was positively related with the performance of top general contractors in the United States. Dikmen et al. (2009) showed that Turkish construction companies can achieve better performance when following differentiation strategy. Cheah et al. (2007) found that differentiation strategy was one of only items to contribute directly towards the competitive advantage of Chinese construction firms in terms of revenue growth and profit growth.

The topics of how to differentiate (what activities to perform and how intensely to implement them within the construction industry) has been noted as an understudied area within the construction sector (Budayen et al. 2013). This study aims to study how contractors can apply differentiation theory in qualifications-based selection processes, which is a substantial change within an industry that has historically been organized according to low-cost strategy. When qualifications-based evaluation criteria are considered within a construction bidding process, there is substantial opportunity for contractors to apply differentiation strategy, particularly to within the common proposal documents of project management proposals (focused on differentiation via qualifications and collaboration aspects) and scope alternate proposals (differentiation through the use of innovative techniques and technology).

This study also builds upon the concept of alliance contracting. In construction, alliance contracting posits that contractors can add value by focusing on relational marketing (Davis and Love 2011, Love et al. 2010). The underlying objective of relational marketing is to "identify and establish, maintain, and enhance relationships with customers and other stakeholders, at a profit, so that the objectives of all parties involved are met" (Grönroos 1996). Studies have shown relational marketing to be effective at increasing the owner's trust in a proposing contractor when the contractor shares their knowledge and experience regarding the issues that the parties are confronted with (Davis and Love 2011). Furthermore, Love et al. (2010) found that client trust was established when their contracting partners developed realistic target costs and indicated how innovative outcomes could be attained. In the context of qualifications-based selection scenarios, contractors may improve their chances of selection if they are able to craft their proposals in a manner that builds the owner's trust. For this reason, this study aims to investigate the type of information that contractors communicate within their project management proposals and scope alternate proposals.

RESEARCH OBJECTIVE AND HYPOTHESES

Point of Departure

The literature related to best value procurement has addressed several important topics. First, previous studies have documented the type, frequency, and weight of evaluation criteria owners have incorporated into their RFPs. These findings are considered to be an indication of which qualifications-based criteria are most important from the owners' perspective. Consideration of how contractors can develop qualifications-based proposal content to achieve favorable owner evaluation scores, however, has been beyond the scope of previous research and will be the primary focus of this study. Second, previous literature of contractor perspectives in the bidding process have mainly investigated how contractors approach the bid/no bid decision. This study intends to expand upon this by concentrating on how contractors can best showcase their qualifications after they have decided to bid within a best value procurement context. Finally, substantial literature has been devoted to optimizing multi-criteria decision-making, leading to the identification of algorithms for application within owner evaluation processes (Ahmed et al. 2012, El Asmar et al. 2010, El-Sayegh 2009). Such studies are typically focused on how owners can optimally coalesce their evaluation scores from multiple criteria in a way that supports overall selection decisions. These studies generally do not delve into the specific aspects of contractor-developed proposal content that was reviewed and scored by the owners. This study aims to address this gap by incorporating empirical documentation of owner evaluation committee scoring results in relation to the content of associated contractor proposals.

Research Objective

As the use of best value procurement methods continues to grow, contractors must become adept at showcasing their expertise within qualifications-based proposal documents. Yet these may be relatively newer or unfamiliar to many contractors' business development structures, which have been built to function primarily within a low-bid marketplace. The ability of contractors to more clearly differentiate their expertise from competing firms is a critical skillset. Contractors who develop proficiency in this skillset will more consistently improve their competitiveness in best value procurement scenarios, thereby potentially increasing their hit rate and unlocking opportunities to grow both their business and profitability. Intuition holds that certain strategies, approaches, and types of qualifications-based content are more effective at communicating construction expertise to owners, and that these are learnable techniques contractors can employ to improve the corresponding owner evaluation scores they receive. The objective of research was to perform a content analysis of contractor qualifications proposals, particularly focusing project management proposals and scope alternate proposals, in order to better understand whether quantitative and qualitative content elements had a corresponding impact on owner evaluation scores, and if so, to what extent.

Hypotheses

To address the research objective, a content analysis of two common contractor qualifications-based submittals: project management proposals and scope alternate proposals. The fundamental research proposition was that certain contractor-generated content within these proposals will influence

corresponding owner evaluation scores. The study has been organized into nine hypothesis statements related to project management proposals and eight for scope alternate proposals, as summarized below, and the overall research design is depicted in Figure 1.

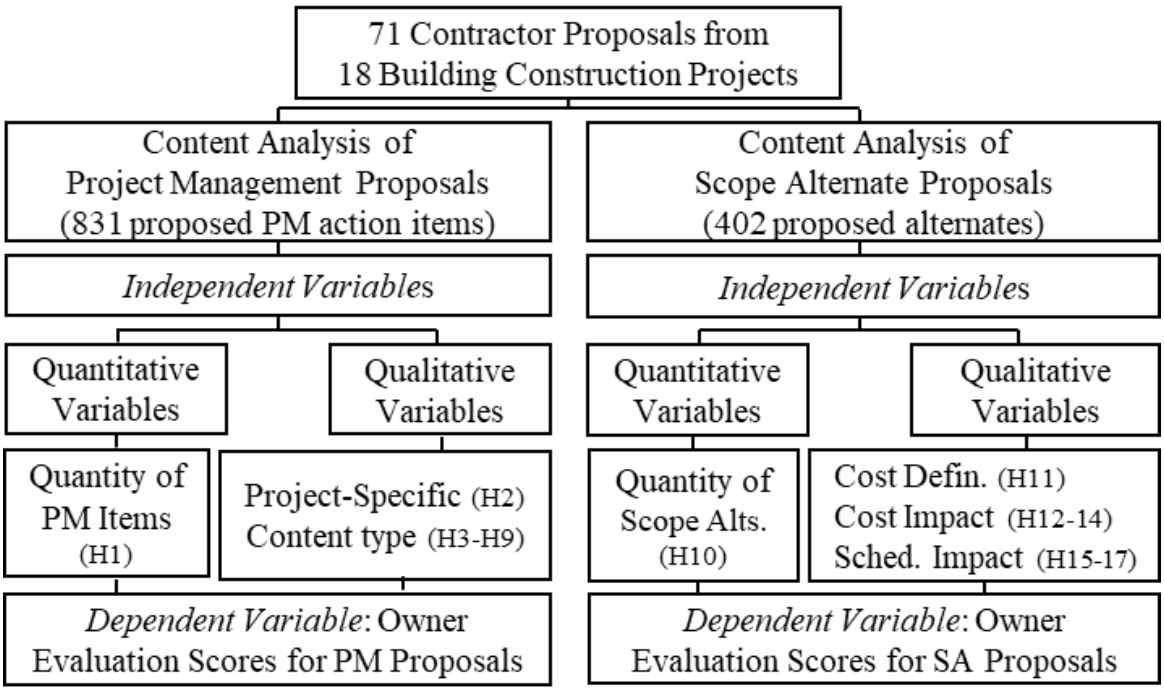

Figure 1. Research Design

Several hypotheses were developed regarding the content of contractor project management proposals based on the content analysis as well as previous literature. The hypotheses are summarized in Table 1 and described in more detail below. First, the greater quantity of project management action items relative to competing proposals were hypothesized to have a directly proportional relationship with owner evaluation scores (H1). Second, greater contractor emphasis on project-specific content was also hypothesized to have a directly proportional relationship (H2). Previous research has equated higher quality design proposals with the inclusion of project-specific proposal content (Sullivan and Michael 2010). The next seven hypotheses were related to the root-cause risk sources the contractors stated they would actively manage on the project. Substantial previous research has focused on root-cause risk sources as being of critical concern to owner project teams, who would typically be evaluating contractor qualifications-based proposals (Hassanein and Afify 2007, Perrenoud et al, 2017, Sun and Meng 2009). Greater contactor emphasis on project management items that were design-related (H3), concealed conditions (H4), and contractor-controlled (H5) were hypothesized to be directly proportional to evaluation scores. Conversely, sub- or supplier-(H6), owner- (H7), external stakeholder- (H8), and unforeseen event-related content (H9) were hypothesized to have a negative relationship with evaluations.

For contractor scope alternate proposals, the quantity of proposed items in relation to competing bidders was hypothesized to have a directly proportional relationship with the owner evaluation score received

(H10). Previous studies have shown that owners respond favorably to scope alternate proposals and are particularly interested in specific cost estimate data along with value engineering items that can result in project cost savings (Chen et al. 2009, Naoum and Egbu 2015, Sullivan et al. 2010). Based on these studies and the content analysis results, scope alternates which included explicit cost estimates were hypothesized to have a positive relationship with evaluation scores (H11). Regarding the type of cost impact that each proposed item would bring to the project, it was hypothesized that increased cost impacts would be inversely proportional (H12), decreased cost impacts (H13) would have a direct relationship, and zero cost impacts (free scope items) would have a positive relationship (H14). Finally, in terms of schedule impact, it was hypothesized that increased schedule impacts would have an inverse relationship with owner evaluation scores (H15), whereas decreased schedule impacts (H16) and zero schedule impacts alternates (H17) would have a direct relationship. Schedule-related hypotheses were derived from literature sources which highlight owner motivations for schedule acceleration and fast-tracking (Minchin Jr. et al. 2013, Wardani et al. 2006).

Table 1. Summary of Hypothesis Statements

Proposal Element	Hyp.	Independent Variable	Dependent Variable	Hypothesized Relationship
Project Management Proposal	H1	Quantity of PM Action Items	Owner Evaluation Scores	Directly Proportional
	H2	Project-Specific Content	Owner Evaluation Scores	Directly Proportional
	H3	Design-Related Content	Owner Evaluation Scores	Directly Proportional
	H4	Concealed Conditions Content	Owner Evaluation Scores	Directly Proportional
	H5	Contractor-Controlled Content	Owner Evaluation Scores	Directly Proportional
	H6	Sub- or Supplier-Related Content	Owner Evaluation Scores	Directly Proportional
	H7	Owner-Related Content	Owner Evaluation Scores	Inversely Proportional
	H8	External Stakeholder-Related Content	Owner Evaluation Scores	Inversely Proportional
	H9	Unforeseen Event Content	Owner Evaluation Scores	Inversely Proportional
Scope Alternate Proposal	H10	Quantity of Alternates	Owner Evaluation Scores	Directly Proportional
	H11	Cost Definition Provided	Owner Evaluation Scores	Directly Proportional
	H12	Increased Cost Impact	Owner Evaluation Scores	Inversely Proportional
	H13	Decreased Cost Impact	Owner Evaluation Scores	Directly Proportional
	H14	Zero Cost Impact	Owner Evaluation Scores	Directly Proportional
	H15	Increased Schedule Impact	Owner Evaluation Scores	Inversely Proportional
	H16	Decreased Schedule Impact	Owner Evaluation Scores	Directly Proportional
	H17	Zero Schedule Impact	Owner Evaluation Scores	Directly Proportional

METHODOLOGY

Content Analysis

Content analysis is an observational research method used to evaluate the content of recorded communications after defining a structured set of data collection procedures (Kolbe and Burnett 1991, Neuendorf 2002). Researchers utilize content analysis to quantify and analyze the frequency, meanings, and relationships of certain words, phrases, or concepts within recorded communications and thereby infer the content of the document (Fellows and Liu 2008). Content analysis has been widely established as an effective research methodology within the construction literature (Bogus et al. 2013, del Puerto et al. 2013, Gransberg and Windel 2008, Jones et al. 2010, Ruparathna and Hewage 2013, and Xia et al. 2013).

A two-step content analysis approach was used within this study. First, in accordance with Guthrie's (2004) recommended first step, the materials to be analyzed were identified. The materials consisted of two contractor proposal submittals (project management and scope alternate proposals) common within best value procurement processes. The second step was to determine the data codification procedures to determine the meaning of the content included within the contractor proposals. Both content analysis steps are described in detail below.

Content Analysis First Step: Data Sample

The first step in content analysis was to collect the data sample, which consisted of 71 separate contractor proposals from 18 different projects. The contractor proposals were collected from the evaluation records two large public owner organizations, both of which were institutions of higher education. The two participating owner organizations were also similar in the fact that they were new users of best value procurement; as is common in the construction industry, each owner's traditional procurement approach for construction services relied almost exclusively on selecting the lowest qualified bidder. The selected data sample therefore represented all possible best value projects conducted by each owner to date.

Within the data sample, project scopes were generally similar due to the fact that all projects were located on university campuses for vertical institutional building projects. Project scopes consisted of a mix between new construction (four projects) and renovation (fourteen). The scopes were largely consistent in terms of functional use of the buildings, with ten projects classified as dormitories, seven as classrooms, and one as campus research space. Upon inspection, no substantial difference was found between the proposal content for new construction and renovation projects, likely due to the similarity in owner organizations, facilities, and constructions scopes. The projects were built between the years of 2011-2015, with fifteen of the projects concentrated in the years 2014-2015. Projects were considered to be small-to-medium construction based on budget size; the median project budget was $1,350,000 with a range from $115,000 up to a maximum of $28,000,000. Due to the similarity in project scopes, the participating local contractor bidder pools at each owner organization was observed to be largely consistent.

All projects were procured using a consistent best value selection process within a design-bid-build delivery system. Although best value evaluation schemes often include similar qualification-based

proposal elements, the specifics of the submission requirements, evaluation weights, and owner evaluation techniques may vary between public owners. With this in mind, the data sample was selected based on the fact that each of the two owner organizations utilized identical best value evaluation criteria (although with some variation in the scoring weights) and corresponding proposal submission formats, which maintained as much consistency as possible. The projects within the data sample also had minimal variation in evaluation scoring weights, which consisted of contractor price submissions (averaging 25-30% of the total evaluation score), project management proposals (20-25% average weight), scope alternate proposals (8-10%), references (5-10%), and contractor team interviews (30-35%).

Content Analysis Second Step: Data Codification

The second step was to determine the data codification procedures for both qualitative and quantitative content analysis. According to Fellows and Liu (2015), qualitative content analysis is used to determine the meaning of content by grouping the data into categories and quantitative content analysis generates numerical frequency values of categorized data. Within this study, a primarily quantitative approach was employed to systematically tabulate the presence of specific content elements within each contractor's project management and scope alternate proposals.

All contractor project management proposals within the data sample followed an identical format, which was specified by the owners within their Request for Proposal documents. Furthermore, the owner established a required page limit (typically between two and four total pages). The specific, owner-provided template format maintained a fully consistent format among all contractor proposals, which therefore supported a consistent content codification procedure. The template required contractors to itemize the project management action items their construction team would perform if selected for the project. Each project management "action item" consisted of a standard format, which asked the contractor to identify the project management action item, describe the potential project risks/challenges/technical elements that would be addressed by the item (organized by the root-cause source), and describe their recommended solution (means and methods) for managing the item successfully. In this manner, the owner was able to evaluate the project management approached proposed by competing contractors on each project.

Among the 71 contractor project management proposals collected for this study, quantitative content analysis identified a total of 831 individual project management action items proposed by competing contractors. Quantitative content analysis consisted of counting the number of individual action items within each contractor's proposal. Individual items were also reviewed to determine whether they directly references aspects of the project's specific contract documents, including the construction drawings, specifications, general requirements, and special conditions. An additional level of quantitative analysis was to categorize each of the line item based on the root-cause risk source that each action item would address. Due to the fact that the submission process required the contractors to self-report the risk source that each project management action would address, the content analysis was largely quantitative. Regardless, two researchers separately tabulated the quantitative frequency of these categories in order to ensure accuracy of the codification process. Although infrequent (due to the quantitative nature of the content), discrepancies between the two evaluators were reviewed such that a consensus among the

researchers was easily achieved and then verified with a third researcher who held with experience in the construction industry.

Similarly, contractor scope alternate proposals followed a specific, owner-designated template format. The owner required a page limit for these proposals of one or two pages maximum. Scope alternate proposals consisted of a list of proposed items that each bidding contractor offered as a benefit to the owner's project. These items included any scope elements above and beyond the base contract documents and specifications, including scope additions, scope deletions, scope adjustments, and additional qualifications beyond the minimum requirements. Individual scope alternates were proposed in an itemized basis, and the form provided contractors with the opportunity to specify the cost and schedule impact (if any) of each proposed item. The researchers were therefore able to tabulate the number of scope alternate items proposed within each contractor's proposal, the type of cost impact of each item (cost increase, decrease, no impact), and whether the contractor provided explicit cost definition of the impact (estimated dollar amounts) or chose to leave the cost impact completely undefined.

Finally, all quantitative content analysis was normalized on a per project basis to allow comparison across projects with varying scopes of work. For example, if "Contractor A" identified seven scope alternate proposal items, yet the average competing contractor on the same project proposed fourteen scope alternate items, then Contractor A's total quantity of Scope Alternate Items was recorded at being fifty percent below the average competitor. Table 2 provides a summary of independent variables that were measured as a part of the content analysis, along with descriptive statistics of the normalized output data that was then used for further statistical analysis.

Dependent Variable Measure: Owner Evaluation Scores

The dependent variable of owner evaluation committee scores was analyzed in conjunction with the independent variables from the contractor proposal content analysis. Within each project, owner evaluation committees provides an evaluation score for every competing contractor's project management proposal and separately for every scope alternate proposal. Owner evaluation committees consisted of three to six professional members of the owner organization, including the project manager and representatives from the owner's capital projects, facilities management, end user, and procurement departments. The evaluation scores were provided on a 0 to 100 percent continuous scale, where 0 percent corresponded with the lowest possible evaluation score and 100 percent corresponded with the maximum possible evaluation score. The evaluation procedures were such that each contractor proposal received a single evaluation score.

Table 2. Summarized Results of Content Analysis

Hyp.	Independent Variable	Raw Unit of Measure within Content Analysis (per contractor proposal)	Normalized Descriptives (per project basis)		
			Min. (%)	Max. (%)	Std. Dev. (%)
H1	Quantity of PM Action Items	Number of items included within each contractor's proposal	−88.9	133.3	43.7
H2	Project-Specific Content	Number of items directly referencing the contract docs.	−100	216.7	59.8
H3	Design-Related Content	Number of items classified as this root-cause source	−100	275.0	74.8
H4	Concealed Conditions Content	Number of items classified as this root-cause source	−100	500.0	111.0
H5	Contractor-Controlled Content	Number of items classified as this root-cause source	−100	209.5	63.5
H6	Sub- or Supplier-Related Content	Number of items classified as this root-cause source	−100	400.0	136.9
H7	Owner-Related Content	Number of items classified as this root-cause source	−100	300.0	109.0
H8	External Stakeholder-Related Content	Number of items classified as this root-cause source	−100	400.0	87.3
H9	Unforeseen Event Content	Number of items classified as this root-cause source	−100	320.0	84.4
H10	Quantity of Alternates	Number of alts. included within each contractor's proposal	−100	233.3	55.9
H11	Cost Definition Provided	Number of alts. with a specific dollar value estimate	−100	275.1	64.8
H12	Increased Cost Impact	Number of alts. proposed to increase the project cost	−100	400.0	109.0
H13	Decreased Cost Impact	Number of alts. proposed to decrease the project cost	−100	600.0	118.4
H14	Zero Cost Impact	Number of alts. proposed with zero effect on project cost	−100	600.0	150.6
H15	Increased Schedule Impact	Number of alts. proposed to increase schedule duration	−100	600.0	135.1
H16	Decreased Schedule Impact	Number of alts. proposed to decrease schedule duration	−100	600.0	123.8
H17	Zero Schedule Impact	Number of alts. proposed with zero effect on sched. dur.	−100	300.0	85.2

RESULTS

Project Management Proposals

The relationships between the dependent variable of owner evaluation scores and the independent variable measures of contractor project management proposal content were investigated using bi-variate correlation analysis. The Pearson's correlation test results, shown in Table 3, revealed several elements of contractor project management proposals to be significantly correlated with owner evaluation scores. The strongest correlations were for the quantity of project management action items contained within contractor proposals (0.579, $p < 0.01$) as well as the project-specific nature of the proposal content (0.580, $p < 0.01$). Three root-cause risk sources, Contractor-Controlled, Design-Related, and Owner-Related content each had a directly proportional relationship with owner evaluation scores (0.437, 0.347, and 0.269, respectively). The remaining variables did not have statistically significant bi-variate relationships.

Variable selection testing was performed via hierarchical multiple regression to determine which proposal characteristics are most influential in predicting the corresponding owner evaluation scores. Hierarchical multiple regression has been widely used in construction research (Bowen et al. 2014, Cao et al. 2015, Lines et al. 2016, Oyewobi et al. 2016, Phua and Rowlinson 2004) as well as project management settings (Mir and Pinnington 2014, Nijstad et al. 2012). In order to generate a best-fit model for project management proposals, three hierarchical regressions – stepwise, forward, and backward – were performed. The tests were performed by including the seven root-cause risk sources the contractors stated they would actively manage on the project. This was done to focus the results on the particular quality-related content that contractors can incorporate into their proposals.

Each hierarchical multiple regression test contains specific decision-criteria for the inclusion (or exclusion) of independent variables within the selected regression model. These decision criteria are based upon changes in model R-square values as follows. The stepwise and forward methods each begin with an empty model and add significant predictors until no additional variables meet the significance criteria for entry. The main difference between the stepwise and forward methods is that the stepwise method considers variables for entry based upon overall model significance, whereas the forward method adds variables based upon their partial correlations. The third variable selection method, backward hierarchical multiple regression, begins with a full model (in this case, including all significantly correlated predictors) and considers the variable with the smallest partial correlation for removal ($p < 0.05$) until no more variables meet the criteria to be removed. Due to the fact that R-square itself can be easily inflated by the inclusion of additional independent variables, the adjusted R-square values are also reported for each regression model (see Table 4). It is noted that the difference between the R-square and Adjusted R-square values is fairly small, which indicates that the selected models are reliable and free from overfitting concerns.

As shown in Table 4, consensus was achieved among the three variable selection tests. The selected best-fit model explained approximate one-third of the variation in owner evaluation scores and included the root-cause risk sources of contractor-controlled content, design-related content, and concealed conditions content ($R2 = 0.336$, $F[11.283]$, $p = .000$). The selected regression was given by the equation as follows [Owner Evaluation Scores for Project Management Proposals = (0.146) Contractor-Controlled Content + (0.110) Design-Related Content + (0.054) Concealed Conditions Constant + (0.533)].

Table 3. Pearson's Correlation Results between Project Management Proposal Content and Owner Evaluation Scores

Hyp.	Variables	H1	H2	H3	H4	H5	H6	H7	H8	H9
H1	Quantity of PM Action Items	1								
H2	Project-Specific Content	.852**	1							
H3	Design-Related Content	.418**	.433**	1						
H4	Concealed Conditions Content	.261*	.281*	-.151	1					
H5	Contractor-Controlled Content	.803**	.632**	.123	.060	1				
H6	Sub- or Supplier-Related Content	.249**	.045	-.016	.432**	.114	1			
H7	Owner-Related Content	.511**	.381**	.305**	-.169	.450**	.017	1		
H8	External Stakeholder-Related Content	.057	-.159	-.252*	-.071	.105	.150	-.033	1	
H9	Unforeseen Event Content	.024	.015	.020	.038	-.112	-.115	-.026	.142	1
DV	Owner Evaluation Scores	.587**	.580**	.347**	.216	.437**	.063	.269*	-.189	-.072

* Correlation is significant at the 0.05 level
** Correlation is significant at the 0.01 level

Table 4. Variable Selection Testing via Hierarchical Multiple Regression for Project Management Proposals

Model description		Model results				
Test	Model	R	R square	Adjusted R square	F	Significance
Stepwise and forward	1[a]	.437	.191	.179	16.251	.000
Stepwise and forward	2[b]	.527	.278	.256	13.069	.000
Stepwise and forward	3[c]	.579	.336	.306	11.283	.000
Backward	1[d]	.601	.361	.290	5.078	.000
Backward	2[e]	.599	.359	.299	5.984	.000
Backward	3[f]	.598	.358	.308	7.235	.000
Backward	4[g]	.595	.354	.314	9.021	.000
Backward	5[c]	.579	.336	.306	11.283	.000

[a]Predictors: (constant), Contractor-Controlled Content
[b]Predictors: (constant), Contractor-Controlled Content, Design-Related Content
[c]Predictors: (constant), Contractor-Controlled Content, Design-Related Content, Concealed Conditions Content
[d]Predictors: (constant), Contractor-Controlled Content, Design-Related Content, Concealed Conditions Content, External-Stakeholder Related Content, Sub- or Supplier-Related Content, Owner-Related Content, Unforeseen Event Content
[e]Predictors: (constant), Contractor-Controlled Content, Design-Related Content, Concealed Conditions Content, External-Stakeholder Related Content, Sub- or Supplier-Related Content, Owner-Related Content
[f]Predictors: (constant), Contractor-Controlled Content, Design-Related Content, Concealed Conditions Content, External-Stakeholder Related Content, Sub- or Supplier-Related Content
[g]Predictors: (constant), Contractor-Controlled Content, Design-Related Content, Concealed Conditions Content, External-Stakeholder Related Content

Scope Alternate Proposals

Pearson's correlation coefficient test results are shown in Table 5 for contractor scope alternate proposal content analysis. Several statistically significant bi-variate relationships were found. The quantity of alternates proposed (0.495, $p < 0.01$) was found to have a directly proportional relationship with evaluations scores, along with the inclusion of explicit cost definition (0.484, $p < 0.01$), more cost additive items (0.297, p¬ < 0.05), and more items identified to have zero impact to the project schedule (0.403, $p < .01$). No other significant correlations were found.

Results of variable selection testing via hierarchical multiple regression for scope alternate proposals are shown in Table 6. After considering all quality-related independent variables, the selected best-fit model was based on the backwards hierarchical multiple regression test, as the model explained the greatest variance in the dependent variable of owner evaluation scores. The independent variables of cost definition provided, increased cost impact, and zero schedule impact were included within the best-fit model ($R2 = 0.308$, $F=[9.928]$, $p = .000$). The selected regression was given by the equation as follows [Owner Evaluation Scores for Scope Alternate Proposals = (0.114) Cost Definition Provided + (0.051) Increased Cost Impact + (0.069) Zero Schedule + (0.504)]

Table 5. Pearson's Correlation Results between Scope Alternate Proposal Content and Owner Evaluation Scores

Hyp.	Variables	H10	H11	H12	H13	H14	H15	H16	H17
H10	Quantity of Alternates	1							
H11	Cost Definition Provided	.783**	1						
H12	Increased Cost Impact	.227	.241*	1					
H13	Decreased Cost Impact	.367**	.198	-.140	1				
H14	Zero Cost Impact	.092	.143	-.249*	-.164	1			
H15	Increased Schedule Impact	.055	.178	.144	-.001	.190	1		
H16	Decreased Schedule Impact	.021	-.117	.136	.000	-.151	-.075	1	
H17	Zero Schedule Impact	.747**	.549**	.003	.246*	.231	-.228	-.152	
DV	Owner Evaluation Scores	.495**	.484**	.297*	.209	-.010	-.014	.038	.403**

* Correlation is significant at the 0.05 level
** Correlation is significant at the 0.01 level

Table 6. Variable Selection Testing via Hierarchical Multiple Regression for Scope Alternate Proposals

Model description		Model results				
Test	Model	R	R square	Adjusted R square	F	Significance
Stepwise and forward	1[a]	.484	.234	.223	21.126	.000
Backward	1[b]	.576	.332	.258	4.468	.000
Backward	2[c]	.576	.332	.269	5.296	.000
Backward	3[d]	.574	.330	.278	6.390	.000
Backward	4[e]	.570	.324	.283	7.923	.000
Backward	5[f]	.555	.308	.277	9.928	.000

[a]Predictors: (constant), Cost Definition Provided
[b]Predictors: (constant), Cost Definition Provided, Increased Cost Impact, Zero Schedule Impact, Decreased Cost Impact, Decreased Schedule Impact, Increased Schedule Impact, Zero Cost Impact
[c]Predictors: (constant), Cost Definition Provided, Increased Cost Impact, Zero Schedule Impact, Decreased Cost Impact, Decreased Schedule Impact, Increased Schedule Impact
[d]Predictors: (constant), Cost Definition Provided, Increased Cost Impact, Zero Schedule Impact, Decreased Cost Impact, Decreased Schedule Impact
[e]Predictors: (constant), Cost Definition Provided, Increased Cost Impact, Zero Schedule Impact, Decreased Cost Impact
[f]Predictors: (constant), Cost Definition Provided, Increased Cost Impact, Zero Schedule Impact

DISCUSSION

Results indicate that certain quantitative and qualitative aspects of contractor project management and scope alternate proposals have a direct impact on owner evaluation scores. The intent of the discussion section is to describe specific recommendations that contractors should consider when crafting qualifications-based proposal submissions. These recommendations are limited to the independent variables investigated within this study. The authors have also include a discussion of the potential rationale behind why owners provide favorable evaluation scores for certain proposal elements, which is based upon the collective industry experience of the authors as well as cross-references to extant pieces in the literature.

Project Management Proposals

Contractors that discussed a greater quantity of project management items were found to receive higher owner evaluations. Owners may be inclined to review the identification, prioritization, and analysis of isolated technical elements of the project during evaluations, particularly when contractors position these items in terms of the qualifications and solutions their team will bring to the project. This finding indicates that owners value contractor input on how the challenges and complexities of construction operations would be managed if the contractor were to be awarded the project. In order to demonstrate superior expertise in relation to their competitors, contractors should recommend actionable approaches, mitigation plans, and resolution strategies as a part of their project management proposals.

A potential explanation of owner rationale is that oftentimes the owner's project manager or construction representative is a participating member of the owner's evaluation committee. These individuals are keenly aware that they will be tasked with identifying and mitigating a multitude of challenges throughout the construction phase. Therefore, according to the principles of alliance contracting, it is understandable that contractors can establish trust (and therefore receive higher evaluation scores) when they share their experiences regarding issues that the project is confronted with (Wenger 1999, Wenger and Snyder 2000).

The content within contactor project management proposals should be project-specific in nature. This requires that contractors move beyond traditional marketing content, standard promotional information, and boiler-plate proposal language. All too often this type of marketing "fluff" can be overtly focused on selling the contractor's qualifications rather than explaining or demonstrating how their expertise, experience, and know-how will be applied to minimize the technical challenges faced by the particular project under consideration. Several commonly used marketing statements are: "We will work with the owner to manage back pointing quantities," "We will use our X years of experience to minimize any issues," and "We use the best pre-qualified list of subs and suppliers"). These statements could be "copy-and-pasted" to virtually any project, regardless of scope, and are therefore much too generic to truly differentiate a contractor's qualifications.

Contractors can ensure that their proposals are project-specific by using the format of proposing step-by-step action plans for how their construction team would address explicit aspects of the project scope. Owners appear to respond favorably when it is apparent that a contractor has taken the time to consider the unique aspects of their project, especially in contrast to competitors whose proposals primarily consist

of generic marketing content. This result further support the concept of trust building within alliance contracting, particularly that contractors can gain the owners trust by crafting proposals to enable the owner to gain a more detailed understanding of the project than the owner would ordinarily receive from more traditional, price-oriented competing proposals (Davis and Love 2011).

Thorough discussion of contractor-controlled items was found to have a positive relationship with owner evaluation scores. This type of content typically consisted of planning and scheduling analysis, examination of construction means and methods, and emphasis of particular technical skillsets carried by the contractor's team individuals. Providing this content is likely comforting to owner evaluation committees because it showcases that the contractor is qualified in the core competencies necessary to manage the project on behalf of the owner. This result is supported by Mokhtariani et al.'s (2017) assertion that construction is a service-oriented business; therefore, contractor marketing materials are recommended communicate how the contractor will deliver their construction services to the owner.

Identification of design-related risk elements also had a positive relationship with evaluation scores. Contractors should communicate their understanding of critical aspects of the project's drawings and specifications. Contractors should be forthcoming with design errors and omissions they foresee, provide recommended solutions (or options), and, wherever possible, define the potential impacts to project cost and schedule. This finding may be somewhat counterintuitive for contractors who feel they should not openly discuss design errors within a competitive bidding process; however, this information helps contractors stand out from their competitors by showcasing their in-depth understanding of the construction operations that will be required to build the design. Providing this type of content directly within their proposal also ensures that the information is not shared with competitors, which further differentiates a contractor's proposal from competing bidders. The growing practice of early contractor involvement and participation in the pre-construction process also supports the idea that owners appreciate constructability input related to the project's design (Tatum 1987, Love et al. 2014).

Contractors who identified the concealed conditions that may impact the project tended to receive more favorable evaluations scores. This may be because owners perceive this type of information as conveying the contractor's familiarity with the project site as well as their past experience in managing similar conditions. Jergeas and Put (2001) lend clarity to this result in their finding that contractors can identify risks and provide risk management strategies prior to construction even beginning on site.

Scope Alternate Proposals

Owners tend to award more favorable evaluation scores to contractors who provide greater quantities of scope alternate items for consideration. Results of this study seem to indicate that owners do indeed seek contractor innovation. This agrees with Allen and Helms' (2006) finding that contractors can attract client interest when their marketing materials foster a reputation of innovation, creativity, and being technologically advanced. Contractors who proposed a greater quantity of scope alternates than their competitors were found to receive more favorable evaluation score, presumably due to the more comprehensive and thorough nature of their offerings. This finding suggests that contractors should not be timid about bringing forward ideas, options, and alternatives for the owner's consideration. Owners can be open to innovation and are prone to reward contractors who provide options beyond the base

specifications and construction documents. Contractors are encouraged to allocate time and resources towards value engineering analysis during the bidding phase in situations where the owner is considering qualifications-based evaluation criteria. Contractors who are able to bring forward more options, innovative approaches, and unique solutions are often viewed favorably by owner evaluation committees.

Owners gave higher evaluation scores to contractors who provided greater definition of the cost impacts associated with proposed scope alternates. This finding is perhaps explained by Love et al.'s (2008) contention that project cost is often the most important consideration for a public sector client. Based on this finding, contractors are advised to explicitly quantify the anticipated budget impacts of each scope alternate they identify. The appropriate level of cost definition should of course be within reason based upon availability of relevant data. If early cost definition is too resource-intensive during the bidding stage, then contractors are recommended to provide an approximate budget impact in the form of a budget range or a rough order of magnitude estimate. Contractors who do not take the time to quantify the impacts of their proposed scope alternates are missing an opportunity to make their proposals more attractive to owner evaluation committees.

Somewhat surprisingly, contractors who proposed cost-additive scope alternates received higher evaluation scores. This appears to contradict the common perception that owners are most interested in minimizing costs and is counter to the industry norm of awarding to the lowest bid. This result may indicate that owners are interested in the additional expertise, services, and alternatives that contractors have to offer within the context of creating the highest quality project outcomes. It may also be indicative of Chen et al.'s (2012) finding that having a long-term quality perspective is a critical success variable for effective construction partnering relationships. Although the owner may not have additional funding available, owners can prefer to be presented with options for consideration and understand that additional services may correspond with fair compensation in the form of additional costs. Owners are increasingly viewing construction as a service experience, and contractors have the opportunity to differentiate themselves by looking for opportunities to add value above and beyond the base scope of work and associated requirements in order to offer better service to their clients.

When proposing scope alternates, contractors should be conscious of the associated effect to the project schedule. Owners tended to provide higher evaluation scores when contractors clearly indicated that their scope alternate proposal items would not impact the project schedule. The fact that increased schedule impact items did not have a relationship with evaluations scores may indicate that, although they are open to innovative ideas, owners are also motivated to complete their projects in a timely fashion. Budayan et al.'s (2013) lends support in their finding that a major mode of differentiation is a contractor's ability to assure the project will be completed on time. Kale and Arditi (2003) also concluded that competing on the basis of schedule is a key method by which contractors can differentiate themselves in the marketplace.

Contractors who offered more cost saving items than their competitors did not receive higher evaluation scores. This appears to support the industry trend of declining emphasis on lowest-bid procurement systems (Sawyer et al. 2015). Sophisticated owners may no longer be exclusively focused on the lowest cost option at the time of contract award; rather, they are increasingly focused on holistic project performance. Perhaps some of this finding is due to project-specific requirements. For example, contractors may propose cost savings options that reduce the quality of materials or equipment that the

owner's team is not willing to consider or may not be in line with the owner's overall project objectives. Consequently, such submissions may not receive negative evaluations, but also likely would not receive overwhelmingly favorable scores.

CONCLUSIONS

As the use of best value procurement methodologies continues to become more widespread in the construction industry, contractors must be aware of proposal strategies to showcase their qualifications to owner evaluation committees. By organizing their proposals to emphasize proven content elements, contractors can consistently and repeatedly improve their evaluation scores, which in turn increases their competitiveness and ultimately their profitability. The objective of this study was to identify certain content elements of contractor best value proposals that have an impact on the owner evaluation committee's evaluation scores. The methodological approach was to perform a content analysis on a sample of 71 contractor proposals (containing both successful and unsuccessful bidders) comprised of 831 individual project management proposal action items along with 402 individual contractor-proposed scope alternates.

Results indicated that certain proposal elements do in fact have a direct relationship with owner evaluation scores. Within their project management proposals, contractors are recommended to thoroughly identify how their team will manage technical challenges that will be encountered in the construction phase, ensure their proposed solutions are actionable within the specific context of the project's scope, focus on contractor-controlled means and methods, and identify management solutions related to both the design and potential concealed conditions. For instances where owners solicit scope alternate proposals, contractors are encouraged to perform a comprehensive review of potential scope options to support the owner's project objectives and ensure the cost and schedule effects of these items are clearly defined.

Research Contributions

Although many studies have investigated best value procurement of constructions services, much of the previous literature has focused on the owner's perspective of the evaluation process. For example, studies have documented the type, weight, and frequency of evaluation criteria that owners most commonly incorporate within their Request for Proposals. Another prevalent area of inquiry has been devoted to owner award algorithms to investigate how owners can optimize multi-criteria decision-making models within their evaluation processes. Yet little research has examined the contractor perspective of best value procurement. This study addresses this gap by empirically analyzing the contractor proposal content and contributing practical approaches for contractors to better differentiate their proposals from their competitors.

Within the existing body of knowledge, the vast majority of studies have investigated best value procurement within the context of alternative project delivery methods – such as design-build and construction manager at risk – while a limited number of studies have examined design-bid-build projects. The data sample compiled in this study was restricted exclusively to DBB projects that utilized best value

procurement. The context in which the data sample was compiled therefore represents a meaningful contribution, particularly considering the fact that best value procurement represents a somewhat substantial departure from the low-bid procurement schemes that have traditionally dominated the DBB system.

The unit of measure for the study's dependent variable – which was empirically collected from evaluation scoring results – represented another contribution to the body of knowledge. Extensive research has previously been conducted on the topic of multi-criteria decision making of owner evaluation scoring processes. Yet such studies frequently utilize simulated data to analyze the various decision algorithms employed by owner organizations. Few studies have incorporated empirical data of owner evaluation committee scoring results, which lends credibility to the practical recommendations that industry professionals can gain from this study.

Finally, the research findings contribute several recommendations to industry professionals. Contractors can directly apply the strategies discussed to improve their evaluations cores. For highly qualified contractors, best value selection is a welcome change in the sense that they have the opportunity to increase their hit rate and more competitively pursue projects where they can demonstrate their project-specific expertise. From the owner's perspective, this study contributes legitimacy to best value selection processes because the results indicate that qualifications-based criteria are clearly able to differentiate the expertise of competing contractor teams. Owner organizations should be cognizant that construction services are not a commodity and that contractors bring substantial professionalism and innovation regardless of the delivery system.

Limitations and Recommendations for Future Research

The content analysis did not account for different characteristics of the projects. For example, the analysis did not account for differences in project size, schedule, complexity, time of year, or facility type. The present study accounted this by normalizing the data on a project-by-project basis. Furthermore, the intent of this study was to focus on the entire population of best value projects implemented by the participating owner organizations, which also restricted the projects to vertical building construction. However, future research may consider a more granular analysis of the proposal content that is most appropriate for a variety of project characteristics, particularly if larger data sets are collected.

The study did not control for the control specific owner-provide information within the request for proposals. There is a possibility that the quality and clarity of certain information may have an effect on contractor proposals, especially considering that contractors are forced to base their entire proposal response upon what is provided within the owner's RFP. The authors attempted to control for this by compiling a dataset from owner organizations who were using virtually identical evaluation criteria and evaluation scoring methodologies; however, there is always variation in RFPs on a project-to-project basis. Future research is encouraged to consider certain RFP elements such as the procurement schedule and duration, release of the owner's project budget, publication of the owner's project schedule, and provision of other key project constraints.

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