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EXPLORING THE BEHAVIORAL PATTERN OF STAKEHOLDERS IN CONSTRUCTION PROJECTS WHICH USED BEST-VALUE SELECTION

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Abstract: Best-value is a procurement method that combine price and non-price factors when selecting a contractor or design-builder. While, several researchers have evaluated the impact of best-value selection on project outcomes—such as cost, schedule, and quality—there are a limited number of studies that qualitatively evaluate the experience of different parties on projects that have been procured through best-value. To address this knowledge gap, this study aims to explore project stakeholders' experience, team interactions, and behavioral patterns during best-value project execution. To achieve these objectives, three healthcare-construction case studies were selected and in-depth phone interviews were conducted with representatives of owners and contractors. The interviews were transcribed and a content analysis was implemented to explore the relationship between the procurement method and the team's behavior in those projects. Three themes of team behavior emerged from the study, including innovation, partnering, and problem solving. The results of the interviews indicate that best-value selection encourages innovation, enhances partnering, and facilitates problem solving. The results also demonstrate that the time required to go through contractor selection and project scope development are major challenges of projects procured using best-value selection. To achieve successful completion of a project, one should: provide early project planning that includes clear definition of each party's responsibilities; provide proper training; involve end users; and provide proper details in request-for-proposals. This research makes a cross comparison between the findings of this study and the existing literature related to best-value. The results of the study provide new insights regarding the team-building process through best-value selection. Furthermore, this study provides a basis for future data collection and quantitative analysis to compare various procurement methods and provides a foundation for exploring team integration in construction projects.

1 INTRODUCTION

One of the major decisions that an owner should take in the process of acquiring a new capital facility is to choose an appropriate procurement method. Traditionally, low-bid selection has been favored by public owners as a standard method for procuring construction projects as a means for efficiency, transparency, and corruption prevention (Boukendour and Hughes 2014). However, low-priced products or services can fall short of owners' expectations and may cause adverse relations between client and contractor as well as low profitability for the contractor (Yu and Wang 2012, Horstman 2013). Owners in both the public and private sectors can choose best-value procurement and introduce non-price procurement factors that may negate the shortcomings of low-bid procurement. (Yu et al. 2013).

Best-value is a procurement approach aimed at getting the highest value and customer satisfaction for the lowest price. A review best-value procurement practices for design-build transportation projects revealed that the approach demonstrates flexibility for owners since it allows for the consideration of factors that are specific to each project (Gransberg et al. 1999; Scott et al. 2006). The best-value approach deviates from traditional procurement methods by using other key factors such as past performance, relevant experience, and quality management plans as well as bid price in the contractor evaluation and selection. In addition, researchers observed that projects procured using the best-value approach consistently satisfied owner's expectations regarding price and quality. The best-value system is viewed as a balance between the consideration of price and qualifications. Abdelrahman et al. (2008) showed that best-value is useful for the owner and the project due to the reduction in cost growth from 5.7% to 2.5% and a reduction in claims and litigation by 86%. Best value motivates stakeholders to choose this procurement method since it has the potential to eliminate waste, drive better and safer projects, improve quality, emphasize value for money, increase time savings, and lower life-cycle project cost.

Although previous studies indicated that best-value selection can provide significant benefits for some projects in terms of cost, time, and quality, there is no study that specifically seeks to understand the details of what happens during the project, specifically in terms of interactions among team members. To address this knowledge gap, the purpose of this qualitative study was to explore the behavioral changes of stakeholders in best-value projects in the U.S. construction industry. The main research questions of the study were: How does best-value procurement influence stakeholder behavior in the design and construction industry? What challenges have owners/designers-builders/contractors faced through the best-value process? What steps can be taken to improve best-value implementation in construction industry? What did the stakeholders learn from being involved in a project procured using best-value? By addressing these questions, this study will help practitioners and researchers to explore team behavior in best-value projects. The following sections elaborate on this research's methods, analyses, and conclusions.

2 RESEARCH METHODOLOGY

2.1 Qualitative Method

To achieve the objectives of this study, we needed to hear the stakeholders' voices about best-value's impact on the behavioral pattern and collaborative interactions. To obtain a nuanced and detailed understanding of the issue, we chose a qualitative approach and case study as the main research methodology. The qualitative approach attempts to make sense of, or interpret, phenomena in terms of the meanings people bring to them (Denzin and Lincoln 2011). In addition, conducting a case study provides a suitable qualitative technique for this study because it helps to answer "how" questions and to capture the details of particular groups in a real-life context (Yin 2013).

To select cases and gain access to reliable sources, we used a large project delivery database developed by the Construction Industry Institute (CII) and the Charles Pankow Foundation (CPF). This database includes projects' data from more than 200 building projects from across United States; such data were collected from a request to more than 8500 project managers in the past two years. To limit the scope of the study, we decided to focus on healthcare facilities because hospitals were some of the more challenging projects in the database to design and construct (Franz 2014). Here, we define healthcare facilities as hospitals, clinics, medical offices, and nursing homes. Purposeful sampling was used to select three healthcare projects that were procured using best-value selection. We then implemented a multi-case design in this research, within which we conducted case studies on three different projects. The process and criteria to select these projects were important since the participants needed to be knowledgeable about or have enough experience regarding the central phenomenon (Creswell and Plano Clark 2011). With these considerations in mind, the selected healthcare projects were chosen based on delivery method, project type, owner type, procurement, and team chemistry—Table 1.

Table 1. Overview of Case Projects and the Participants of the Interviews

ID	Project Detail	Approx. Size (sq ft)	Delivery Method*	Procurement **	Builder Involvement	Cost Growth (%)	Schedule Growth (%)	Participant's ***
A	Hospital	~500,000	DB	2 RFP	Conceptual Design	14.5	-11.6	DB ,O, End User
B	Medical Clinic Building	~30,000	DB	1 RFP	Pre-Design	-1.7	-4.8	DB ,O
C	Hospital	~177,000	IPD	1 RFP	Pre-Design	0	-5.6	DB ,O,

* DB: design-build, IPD: integrated project delivery

** 1/2 RFP: one/two stage request for proposal

*** DB: design-builder, O: owner

To reach the most knowledgeable people in a project, we used an effective type of purposeful sampling called “Snowball Sampling.” In this method, participants or informants for whom contact information is available will be asked to use their social networks and refer the researcher to the most informative person who can contribute to the study (Bernard 2013, Palinkas et al. 2013). To enhance the validity of the study, data were collected from multiple cases. For each case study, at least one owner and one contractor representative were interviewed, which helped research team to collect and compare information from multiple sources (Yin 2013).

After finding the best contacts, phone interviews were formulated according to five distinct sections: (1) a brief summary of research background, objectives, and research method; (2) a consent question for participation; (3) an opening questions to capture the participant’s perception of central phenomenon; (4) seven questions clustered around behavioral changes related to the best-value selection process; (5) five concluding questions to obtain best practices, challenges, and the interviewee’s lessons learned. There were two separate interview protocols for owners and for design-builders. Since the qualitative research is interpretative research (Creswell 2009), we made sure that all participants were acquainted with the topic; however the questions did not lead interviewees to a specific direction.

We conducted seven semi-structured interviews to gain insights from the experience of the project stakeholders in a best-value project. In total, 253 minutes worth of interviews were audio-recorded and transcribed. To protect the anonymity of the participants, projects’ name and interviewees’ personal information were coded. A comprehensive content analysis was then conducted on transcriptions using MAXQDA 11 software to identify and analyze preliminary themes and codes. More than 60 codes were defined in this process, most of which were “In-Vivo” quote and theory codes. Two independent coders analyzed the preliminary list of codes to remove redundant codes, combine similar codes, define new codes, and compare the codes with the current body of knowledge to maintain consistency. This iterative process led to defining three main themes related to behavioral pattern: innovation, partnering, problem solving; and two other themes including implementation challenges and best practices. In the next step each themes was analyzed in details to answer the research questions.

2.2 Validation and Reliability

Many perspectives exist regarding the methods of validation in qualitative approach. We consider “triangulation” as a valuable means of assessing the accuracy of the findings. In triangulation, researchers include corroborating evidence from various sources and methods to shed light on a perspective (Creswell 2013). To triangulate our interview results, we interviewed multiple stakeholders in each project and considered both the owner’s and the builder’s perspectives. Similarly, in qualitative research, “reliability” often refers to the stability of multiple coders’ responses in data sets (Creswell 2013). Our focus on reliability here was on inter-coder agreement. We used multiple coders to analyze transcript data separately. The list of codes and themes were developed in an iterative process.

3 FINDINGS

The qualitative analysis revealed that early involvement is one of the most important features when using a best-value approach as procurement method. Early involvement was found to have significant impacts on the behavioral patterns of the stakeholders. The construction industry is highly fragmented in part due to a lack of communication among designers and contractors. The traditional delivery practices—such as design-bid-build—also promote separation of design and construction processes. Such a separation hinders design and construction knowledge exchange; consequently, the potential for innovation will be reduced as contractors have no input for design decisions. To address these limitations and to integrate construction knowledge into the design process, many owners prefer to use integrated delivery systems that provide overlap between design and construction (Beard et al. 2001). Project delivery methods that use design-build or integrated project delivery, such as those in the three case studies, necessitate the use of best-value or qualifications-based procurement because the builder is hired before the design is done. These innovative systems are characterized by the involvement of contractors in early stages of projects. One of the participants mentioned:

The nature of these integrated delivery methods requires considering factors other than cost, because the selected constructor will be responsible for some sections of design. Therefore, to employ alternative delivery methods, owners need to purchase combined design and construction services through best-value rather than low-bid selections (Beard et al. 2001). In all case studies investigated here, project participants had some sort of early involvement; therefore, it became important to study the relationship between time of involvement and team behavior. In total, three themes were identified: (1) innovation; (2) partnering; and (3) problem solving. Moreover, other important information which were mentioned by stakeholders categorized in two groups including challenges and best practices. These themes and their related codes are discussed in more detail below.

3.1 Innovation

One of the important benefits of best-value selection noted in interviews is its ability to encourage innovation in a project. While, leadership and top management plays a critical role in creating an atmosphere of innovation in a project, it is important to pre-qualify team members and seek people who are enthusiastically looking for better solutions. One of the owner stated that relationships are far more important than a transactional contract in creating an atmosphere of innovation:

"[...] I learned that... tapping people's intelligence is far better than holding them to a contractual [sic] terms and conditions. I learned that people, when challenged, will clearly step to the plate, and, and when they do that, and they innovate, that they have a much more satisfying life and, and job, [...]."

As mentioned before, best-value selection is required with early involvement of various parties unless a purely qualifications-based selection is used. According to interviewees, the early involvement of project stakeholders can facilitate adoption of innovative ideas in many ways. First, in traditional procurement methods, contractors have to start a project with a project design that is almost complete; however, the design can have constructability issues and require contractors to request several change orders. In contrast, in best-value selection, because a small portion of design is frequently provided, the contractor has more control over design, and as a results, cost and schedule control become much easier. As one of the owner noted that:

"[...] successful offer came in with a three month improvement on the project schedule that was laid in the RFP; there was some scheduling innovation using building information modeling, [...]."

In addition, early involvement of contractors in the design-phase and the selection of parties based on their safety performance provide opportunities to enhance safety using innovative ideas. One of the owner mentioned that:

“[...] one of the things that [early involvement] enabled was a fresh and frank discussion and dialogue on how project safety was going to be... treated. And that led to some innovative methods to work on project safety, and that of course all contributed through the relationships and the teamwork in that particularly important area for us contributed directly to the amazing project safety success, which again, don't [work] if you copied it, but it was ... over 2.7 million man hours of construction with zero loss time incidents. [...].”

Including specialty contractors in the design process can also provide several benefits for the project. For example, Franz et al. (2013) conducted comparative case study analyses to investigate the impact of specialty mechanical-contractor design involvement in the healthcare industry. They found that increasing the involvement of mechanical contractors in design-phase can reduce cost growth, schedule growth, and safety incidents, and can improve the HVAC system performance. Our findings indicate that one of the benefits of engaging trade partners in the early stage of a project is to avoid re-work. The results of interviews supported this theory and indicated that including the trade partners can reduce the amount of rework in construction projects and can lead to cheaper, faster, and safer projects. For example, one of the design-builder stated that:

“[...] having the team involved, including the trade partners, and having the leaders that were going to manage the field operations involved in the design, we only drew things once. That was our goal to only draw things one time. [...].”

Furthermore, utilizing best-value selection for hospitals provides a unique opportunity for owners to achieve higher quality. Flexibility in best-value selection allows owners to incorporate the latest technology in their facilities and to create a capability for tomorrow's growth. Such traits could further add to the value of the process.

3.2 Partnering

Partnering is an effective tool for improving the productivity of stakeholders, achieving cost effectiveness, providing opportunities for innovation, and decreasing confrontational interactions in construction projects (Wong and Cheung 2005). The role of partnering and trust-based relationships has become an important foundation in innovative delivery methods for achieving successful projects (Pena-Mora and Harpoth 2001). Some of the design-builders highlighted the importance of this long-term partnering in selecting teams in best-value selection:

“The team first was build based on prior positive experience working together. So ... we assembled the team based on the fact that we have collectively worked together and been successful before... all decided to come together because we had previously been able to work together, and... make money together and deliver high quality work together.”

Building trust among various team members is necessary for establishing a long term and effective partnering relationship (Wong et al., 2005). The interviewees repeatedly mentioned that best-value selection enhanced trust among project teams; for example, one of the interviewee called the best-value project as *“Nirvana, full of honesty.”* Considering that trust is pivotal attitudinal point in a collaborative environment and that there is a positive relationship between partners' trust levels and their partnering success (Wong and Cheung 2005), best-value selection can facilitate collaborative decision making in a project.

3.3 Problem Solving

It was found that people who were involved early in the project and selected based on criteria other than cost could offer alternative solutions for equivalent results that ultimately provided more values to the owner. Several other studies verify these findings (Mendelsohn 1997, Jergeas and Put 2001, and Arditi et al. 2002). Making major decisions early in the project provided more time for project stakeholders to make

decisions related to uncritical activities. Such flexibility in time provided confidence in the project team. For example, one of the design-builder stated that:

“[...] One example is... structural steel. Because we were involved early, and we were... having full visibility of the, the design process, we were able to have the confidence that the... basic layout of the building had been settled, and we could order structural steel, and be able to start structure early while still allowing for full time to design the interior, because we had confidence that the basic structural grid had been settled. That ultimately resulted in saving... it ultimately was 6 months overall for the project, but just the structural steel alone gained the project 2 months by being able to order earlier. [...].”

According to interviewees, best-value selection also allows team members to work together and discover their strength and weaknesses, this can have positive impact on problem solving. One of the design-builder mentioned that:

“[...] we worked for nine months together before we started actual construction. In those 9 months, we had opportunities to... have growing pains in our relationship. [...] when we got to the construction phase, we were able to build upon the lesson learned, the relationships, the problem solving that we did early on during the design phase, and, and... better problem solve later when the stakes were higher at the time of construction. [...].”

Some interviewees stated that when the team is formed early in a project, the hierarchy of authority becomes clearer from the beginning, which leads to easier problem solving. People in such a project were able to develop an understanding that they needed to solve problems without escalating them. Even when they had to raise an issue with the ultimate decision makers, they believed in the commitment of the decision maker to find the right solution. More importantly, when a decision was made, the team would accept it and move forward. Some interviewees named this phenomena as “trust between parties.” One can infer that using early involvement jointly with best-value selection provides an opportunity to establish trust between parties and facilitate problem solving. Furthermore, interviewees consistently mentioned that early involvement can provide better team experience in a project. Such an experience can lead to higher commitment from team members to project goals.

3.4 Implementation Challenges

Best-value selection provides several benefits for both owners and contractors; however, there are some challenges in implementing this procurement method. While previous studies mentioned legal barriers in best-value implementation (Hilger 2009), the identified challenges through interviews provided unique perspective on potential barriers to successful implementation of best-value selection. For example, although the current literature portrays that the use of the best-value can reduce both time and cost growth (Scott et al. 2006), the findings of the interviews provided us with evidence that owners and contractors assume timing will be a challenge. One of the owner stated that they had a challenge to allocate enough time for the evaluation of proposals:

“... In the sense of the process it takes us to go through a best-value process, [it] takes a lot longer than if you just use cost. So for me, when I best-value a piece of equipment, I have to look at the, that equipment, plus all options to go along with that equipment, and I look at 3 or more different vendors. So in order to evaluate all of those vendors that provide me a quote for a piece of equipment, I have to go through each one of those and evaluate it...”

Another contractor said that in order to achieve best-value, they had to change a piece of the equipment. This change required them to go back out to several different vendors again and gain more information to achieve what they expected. Also, one of the representative of end user group stated that while this change impacted project time and cost, they could achieve long-term benefit:

“...it had a domino effect. Once we changed that piece of equipment, then it made major changes to the construction site. Best-value, for the next 50 years, [...]”

Most of the participants stated that although selecting contractors based on best-value process can be time-consuming, the results paid off. In order to develop a better team and better partnering culture, and to get more value for the ultimate user, it was better for owners to take their time to select the right partner, and then to let the team self-form and develop a trust-based relationship. One of the owner noted that:

“... [it is believed that] The time required to go through the full best-value process, will result in a longer overall project time-line. This project proved that that is not always the case, and that the, the savings in time during execution often more than make up for... the extended procurement timeline up front.”

Another challenge in best-value procurement stems from a vague definition of parties' responsibility, which can lead to higher expectations. For example, a contractor noted that the owner sometimes expected them to make the decision that gave the most value to the client without recognizing that even under best-value procurement, there are still ultimately some business decisions:

“[...] sometimes the owner expects that you're going to... give them some scope for free, because... you promised that you were going to give them best-value.”

On the other hand, an owner stated that sometimes the contractor or design-builder do not have enough incentives to reduce project cost:

“[...] contractors or design builders... expect that because they were selected as best-value, that... there should never be any pressure on price. So that, 'hey, you selected me because I was best-value, so now that... I need you to cover this cost, you should not complain because you already told me that you selected me 'cause I was better than the competition.'”

In these cases, stakeholders need to adhere to their contract. One of the stakeholders suggested that providing a clear definition of each party's responsibility would help to reduce relationship problems.

Another challenge in a project procured using best-value is related to scope development. Proper scope definition proved to be primary factor that impacts cost, time, quality, and relationship (Cho and Gibson 2001, Gransberg et al. 2006). The best-value procurement provides flexibility for owners to build a final product that provides highest value for them; however, the results of interviewees indicated that such flexibility can lead to scope creep. One should note that a design-build delivery method executed under best-value procurement can affect the project scope since the project criteria are usually identified in a broad, generalized manner rather than a narrow, specifically defined one. The detailed planning should be available in the request for proposal, since the chance for a portion of the proposal to not meet an owner's objective is fairly high, resulting in either a change to the scope or a reduction in scope to meet the budget. In addition, the process of risk assessment during the pre-contract procurement phase can reveal programming flaws or incompatibilities, creating a change that could result in a bidding addendum prior to the award of the contract (Hilger 2009). One of the design-builder explained the difficulty of defining scope in a best-value project:

“Scope definition and expectations is probably one of the more significant challenges. You know, having the, the balance between properly defining the scope, while allowing true flexibility for the design builder. It's ... an intricate challenge. “

3.5 Best Practices

According to interviewees, to get the most benefits from best-value selection, there is a need for appropriate and early project planning that includes clear definition of each party's responsibilities, authorities, and hierarchy structure. For example, the design-builder should have enough authority to

influence design decisions; alternatively, by developing an appropriate reward system from the beginning, contractors would have incentives to meet all required outcomes and even surpass owner's expectations.

While best-value provides an environment for project team members to collaborate, there is a learning process for each team member who is participating in this process. Training is an essential tool for formally communicating changes in policies to a wider audience as part of project implementation. The process to deploy procedure and train staff should introduce the basic concept and procedure, and should provide open communication to further promote best-value implementation. Furthermore, staff turnover and losing key personnel in the middle of a project highlights the importance of regular training to make sure that all parties remain committed to the project goals. One of the owner explained the training challenge related to team-participant turnover in the best-value project:

"...the challenge of keeping people from reverting back to their old traditional behaviors of, of silo and blame casting. And so there's a, a constant need to educate and, and re-inform people of the commonality of the goals, regardless of the selection process. It's, it's the nature of the, of the construction process. So there's new people constantly coming onto the team and others leaving, so there needs to be a constant educational process, so that all new participants understand the goals and the, and the methodology for the, for the delivery mentality."

Some interviewees mentioned that one of the factors that enhances the chance of success in a project is to take users on tours and get their feedback. While this action has low cost, it increases integration of various parties in a project. These interviewees said the users and owner should not be considered on opposite sides of a war, and all affected stakeholders should be brought to consultation to achieve success throughout the project. Some other interviewees also suggested that it is a good idea to use best-value approach to choose subcontractors too.

In design-build projects, it is necessary to develop detailed documents after the procurement, but the detailed requirements and information should be provided with requests for proposals to clarify the owner's expectations. Most of the interviewees emphasized that the best-value request for proposal (RFP) should be in a higher level of detail than what requesters normally provide. Such information would offer tremendous benefits. The combined detailed RFP, contract, and assurance lead to less control but more transparency in relationships. However, there is a challenge about balancing the amount of detail required while leaving enough room and authority for the design/builder to come in:

"... I would certainly have some dialogue with the new owner about, you know, what the right level is, and... trying to, to find that sweet spot if you will, between, not enough information which is going to lead to a longer design process, and too much information which is going to lead to... a designer that is constrained and therefore lacks full ownership of those design elements."

In total, the themes, implementation challenges, and best practices found here resonate with findings of other studies. Previous studies found that the following factors significantly impact the degree of success achieved through the implementation of best-value (Anderson and Russell 2001): training, appropriateness of method for projects, communication, initial agreement, post-award agreement, integration of design, upper management support, a clear definition of the best-value criteria (both objective and subjective), a sound selection method for "trade-off" between cost and non-cost criteria, and an appropriate award algorithm to align selection method with best-value objectives. Our findings are consistent with the outcomes in other literature, thereby validating the concurrence between our qualitative investigation and the existing understanding of best-value procurement.

4 CONCLUSION

One of the owner's early decisions that has a significant impact on project performance is selecting the procurement method. Traditionally, the public sector prefers low-bid selection; however, projects initiated based on the lowest price may not meet quality requirements or—more importantly—may lead to

adversarial relationships between stakeholders. Thus, some owners use procurement methods such as best-value selection. Several quantitative studies have been conducted to investigate the impact of best-value selection on project performance; however, the number of studies that explore the role of this selection process on team behavior during the project is limited. To address this knowledge gap, we studied best-value process using qualitative research technique. We purposefully selected three healthcare projects that used best-value as a procurement method and interviewed different stakeholders involved in the project. A rigorous content analysis was conducted on transcripts using two coders. The extracted three themes illustrated how best-value selection impacts on team behavior and performance.

The first theme showed that early involvement, considering the proper selection criteria, and maintaining flexibility—all of which are inherent in the best-value approach—enhanced innovation and creativity in projects. Since construction participants seem reluctant to innovate on their own, providing a collaborative environment helps develop trust among parties and facilitate innovation (Ozorhon 2013). The second theme focused on the impact of best-value selection on facilitating partnering. This finding is supported by previous literature, which noted that changing a challenging partnering relationship to an effective one requires building trust among team members, a process that is facilitated by best-value selection (Wong et al. 2005). The third theme is concerned with the impacts of the best-value on the problem solving process. Both the literature (Jergeas and Put 2001, and Arditi et al. 2002) and the interviews performed in this study indicate that the best-value approach due to early contractor involvement helps teams respond to problems quickly and avoid conflict escalation. The other group of codes landed on the challenges of implementing best-value selection—particularly in terms of time and role/responsibility definition—and last group of codes documented experts' opinions about the best practices that inspire behavior improvements and the most benefits from the project procured using best-value. To summarize, this study provided evidence that best-value selection can indirectly enhance the performance of a project by bringing all parties together early and by facilitating collaborative problem solving. The unique contribution of this study is to help practitioners to understand how best-value selection helps project stakeholders to form high-performance teams based on the trust.

There are some limitations of this research that are worth noting. First, the researchers' reflexivity might lead to bias in coding processes. To solve this issue, an unbiased coder can analyze the interviews and compare findings. Second, the projects were selected from successful cases and all of these cases involved early contractor involvement through design-build and integrated project delivery. No instances of design-bid-build projects that used best-value and performed poorly were studied; although the certainly exist. To address these limitations, further case studies should be conducted on projects with poor performance and later builder involvement. In spite of these limitations, the study provides a clear advancement in the body of knowledge.

For future phases of this study, the research team aims to conduct several semi-structured interviews on other project types to obtain a holistic view of the best-value selection impact on team behavior. The results will be used to develop a grounded theory to explain how high performance teams can be formed. It is also suggested to implement mixed methods analysis for comparing various procurement methods and provide a comprehensive guideline to establish an integrated team in a project.

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References

- Abdelrahman, M., Zayed, T., Hietpas, J. and Elyamany, A. 2008. Rational Best-Value Model Based on Expected Performance. *Journal of the Transportation Research Board (TRB)*, **2081**: 46–55.
- Anderson, S. and Russell, J. 2001. *Guidelines for Warranty, Multi-Parameter, and Best Value Contracting*. Chapter 4: NCHRP Report, **451**: 56-75.

- Arditi, D., Elhassan, A., and Toklu, Y. C. 2002. Constructability analysis in the Design Firm. *Journal of Construction Engineering Management*, ASCE, **128**(2): 117–126.
- Beard J. L., Loulakis M. C., Wundram E. C. 2001. *Design-Build: Planning Through Development*. 1st ed., McGraw-hill, USA.
- Bernard, H.R. 2013. *Social Research Methods: Qualitative and Quantitative Approaches*. 3rd ed., SAGE Publications, Inc., USA.
- Boukendour, S. and Hughes, W. 2014. Collaborative Incentive Contracts: Stimulating Competitive Behavior without Competition. *Construction Management and Economics*, **32**(3): 279-289.
- Cho, C. and Gibson Jr., G. 2001. Building Project Scope Definition Using Project Definition Rating Index. *Journal of Architectural Engineering*, ASCE, **7**(4): 115–125.
- Creswell, J. W. 2013. *Qualitative Inquiry and Research Design: Choosing among five approaches*. SAGE Publications, Los Angeles, USA.
- Creswell, J. W. and Plano Clark, V. L. 2011. *Designing and Conducting Mixed Methods Research*. 2nd ed., Sage, Thousand Oaks, CA, USA.
- Creswell, J. W. 2009. *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. 3rd ed., Sage, Thousand Oak, CA, USA.
- Denzin, Norman K. and Yvonna S. Lincoln. 2011. *Handbook of Qualitative Research*. Sage, Thousand Oaks Publications, Inc., USA.
- Franz, B., Leicht, R., and Riley, D. 2013. Project Impacts of Specialty Mechanical Contractor Design Involvement in the Health Care Industry: Comparative Case Study. *Journal of Construction Engineering Management*, ASCE, **139**(9): 1091–1097.
- Gransberg, D., Koch, J., and Molenaar, K. 2006. Developing Design-Build Project Scope. *Preparing for Design-Build Projects*, ASCE E-Book, 31-66.
- Gransberg, D.D., Dillon, W.D., Reynolds, L., and Boyd, J. 1999. Quantitative Analysis of Partnered Project Performance. *Journal of Construction Engineering and Management*, **125**(3): 161–166.
- Hilger, P. 2009. *Best Value Procurement: Lessons Learned*. University of Minnesota.
- Horstman, A. 2013. *Performance Indicators in the Best Value Approach*. Master Thesis, University of Twente.
- Jergeas, G. and Put, J. V. 2001. Benefits of Constructability on Construction Projects. *Journal of Construction Engineering Management*, ASCE, **127**(4): 281–290.
- Mendelsohn, R. 1997. The Constructability Review Process: A Constructor's Perspective. *Journal of Management in Engineering*, ASCE, **13**(3): 17–19.
- Ozorhon, B. 2013. Analysis of Construction Innovation Process at Project Level. *Journal of Management in Engineering*, ASCE, **29**(4): 455–463.
- Palinkas, L. A., Horwitz, S. M., Green, C. A., Wisdom, p. W., Duan, N., and Hoagwood, K. 2013. Purposeful Sampling for Qualitative Data Collection and Analysis in Mixed Method Implementation Research. *Administration and Policy in Mental Health*, Published online.
- Peña-Mora, F. and Harpoth, N. 2001. Effective Partnering in Innovative Procured: Multicultural Project. *Journal of Management in Engineering*, ASCE, **17**(1): 2–13.
- Scott, S., Molenaar, K., Gransberg, D., Smith, N. 2006, *Best-Value Procurement Methods for Highway Construction Projects*. NCHRP Report 561, **4**(1): 21-33.
- Wong, P. and Cheung, S. 2005. Structural Equation Model of Trust and Partnering Success. *Journal of Management in Engineering*, ASCE, **21**(2): 70–80.
- Wong, P., Cheung, S. O., and Ho, P. K. M. 2005. Contractor as Trust Initiator in Construction Partnering-Prisoner's Dilemma Perspective. *Journal of Construction Engineering and Management*, ASCE, **131**(10): 1045-1053
- Yin, R. K. 2013. *Case Study Research: Design and Methods*. 5th ed. Sage, Thousand Oaks, CA, USA.
- Yu, W., Wang, K., and Wang, M. 2013. Pricing Strategy for Best Value Tender. *Journal of Construction Engineering and Management*, ASCE, **139**(6): 675–684.
- Yu, W. and Wang, K. 2012. Best Value or Lowest Bid? A Quantitative Perspective. *Journal of Construction Engineering and Management*, ASCE, **138**(1): 128–134.