Best Value Procurement in Construction and its Evolution in the 21st Century: A Systematic Review

Muhammad Hasnain, (MS) and Muhammad Jamaluddin Thaheem, (PhD)
Department of Construction Engineering and Management, NIT-SCEE, National University of Sciences and Technology
Islamabad, Pakistan

This research attempts to facilitate client needs by describing the priority indicators that could help in decision making for awarding contracts. The indictors are recognized as key variables that impact the subsequent decisions of contracts award. The authors present a hierarchical review of relevant literature and integrate the factors that help in decision making using the Best Value Approach. This framework is comprised of eight dimensions of Best Value contributing factors – *cost*, *risk*, *performance*, *quality control*, *health and safety*, *project control*, *current workload* and *delay claims*. These eight dimensions aid the individual clients and organizations in selecting the most suitable contractor. The authors provide a brief understanding of Best Value contract strategy and the basis for the contract award in terms of business choice, managerial capacity and competency. This paper aims to provide a philosophy as to how Best Value decision making could be influenced by the ranking of contributing factors. This work also help in decision making by providing a hierarchical arrangement of the influential factors and the corresponding criteria for Best Value contract award.

Keywords: Best Value, Performance, Quality control, Health and Safety, Systematic review.

Introduction

In the construction sector, project success is defined in a unique way. Project success is defined by meeting design goals, fulfilling user satisfaction, organizational development and developing technological infrastructure of the country. Projects can be undertaken successfully by achieving the milestones in the designated time, conforming to the quality standards and satisfying the cost impact on the end user (A. M. Liu and Walker, 1998). For many decades, the procurement of most of the construction projects has been carried out under traditional low-bid approach. In the traditional process of contractor selection, most of the projects suffer in terms of time and cost due to the subjective bias in clients' selection mechanisms. According to the user agency, the same level of performance could not be achieved due to subjective bias in contractor`s selection process (D. Kashiwagi and R. Byfield, 2002). The complex and risky decision making in low-bid approach results in misunderstanding, reactive contractor behavior, decreased quality of work, and hostile relationships (J. Kashiwagi et al., 2010). Many owners tend to select based on the lowest price in exchange for quality of work. The actual value of a contractor depends both on cost and project specific criteria (PSC). Supreme value can be measured from contractor's credentials, or 'selection criteria', during prequalification and final tender evaluation stages (Wong et al., 2000). Most research focuses on augmenting the long term performance of projects by evaluating the key factors in selection process (Cheng and Li, 2004). In selection process, the insertion of significant elements that meet the explicit needs of the project, confirms that the selected contractor is the most qualified to build the facility. The Best Value (BV) selection method identifies the most qualified contractor based on verifiable past performance metrics instead of more traditional criteria (Abdelrahman et al., 2008).

Clients and their representatives have to deal with bidding processes which are sometimes very arduous and challenging. The traditional low-bid system of contractor selection is often used because it very easy since it does not involve a lot of effort in evaluation of contractor expertise, personnel and performance, thus making documentation easier (D. Kashiwagi and R. E. Byfield, 2002). There is a level of satisfaction with this process on part of various stakeholders like designers, vendors, suppliers, engineers and project managers (Waara and Bröchner, 2006). This process assumes that the contractors will provide good quality regardless of the price. On the other hand, Best Value ensures that the most qualified contractor is selected regardless of the price. Therefore, understanding the Best Value system can greatly benefit both clients and contractors.

Best Value

Best Value (BV) is an efficient and effective approach that minimizes the detailed wasteful communication and information, and creates a "win-win" scenario for both the client and contractor; the highest possible value at a lowest cost, high vendor profit, and minimal project cost and time deviations (D. Kashiwagi et al., 2012). BV examines various factors that need to be considered in procurement processes to enrich the long term performance and significance of the construction (Chan et al., 2004). BV underlines effectiveness, value for money and performance criteria. It focuses on establishment of best practices for public sector organizations such as formulating verifiable standards and develops sufficient contractual arrangement in delivering services to the public (Akintoye et al., 2003).

Concept of BV

The foundation of BV is based on the concept that by using multiple criteria, vendor competition increases and transparency increases thereby making it more difficult for vendors to mislead clients in their proposals. Undeniably, the quality grounds are not the same for each contractor. Therefore, it is preferable for the procurement party to select a vendor with the optimal quality at an accurate price (Herbsman et al., 1995). All the quality standards could not be implemented on a project at lowest cost. Therefore, it is thoughtful to use a cost-time tradeoff approach (Shen et al., 1999).

Best Value Contract Strategy

The BV contract strategy is implemented in various stages. It consists of a competitive selection phase, a clarification phase and finally the execution phase (J. Kashiwagi et al., 2010). Comprehensive comparison of values and prices is done in competitive selection phase. Since this process caters most of the factors mutually, BV is always the "Best Value proposed for the lowest price" and is relative (D. Kashiwagi et al., 2014). After identification of BV, the contractor should ascertain what they are going to do in clarification phase in which the contractor is encouraged to justify his capability, performance and expertise. The detailed proposal (clarification) is then put into contract along with the contractor's price. The contract is finally signed and the contractor is obligatory to deliver the project in execution phase (Savicky et al., 2014).

Comparison of BV and traditional methods

In the traditional low-bid contract system, the bidders do not have any pricing information of other competitors and the bidder who offers the lowest price wins the contract. Consequently, all the bidders tend to lower their bid-price just to win the contract (Yasamis et al., 2002). This low-bid selection method hinders the quality of the product and services because bidders are not inclined to fully understand the needs of the client (D. T. Luu et al., 2005). As a result of contractor's diminutive performance, the whole project might suffer time and cost overruns which provides a gateway for legal issues like arbitration/ litigation (Assaf and Al-Hejji, 2006).

The BV is different from the traditional method in a sense that it utilizes the expertise of industry professionals by minimizing the management and control of vendors. Experts can think in the best interest of the owner, identify the risks associated to the project and able to prescience the consequences of decision making (D. Kashiwagi and R. Byfield, 2002). Since the owner is not the expert, it is the responsibility of the expert vendor to deliver the project assignments and to compete upon the capabilities to identify and resolve the problems with their accompanying prices. Based upon the expertise, the vendor then clarifies in detail the procedures to be adopted to meet the client's expectations (Chan et al., 2002).

Advantages of BV Procurement

The prime advantage of BV is that it identifies expertise as the only factor that can minimize risk of nonperformance and any attempt to manage and control a vendor is inefficient and costly (D. Kashiwagi and R. E. Byfield, 2002). By using performance information, expert vendors show their high performance on similar projects and address the needs and concerns of client (Abdelrahman et al., 2008). BV encourages the vendor to describe and provide accurate solutions to the problem and methodology that a non-expert vendor can identify expert vendor and utilize expertise to lower cost and risk (Kelly et al., 2009).

Disadvantages of Traditional Procurement

Low-bid practices result in poor wages and working condition and low environmental standards, thus declining the quality and sustainability of products and services (Baloi and Price, 2003). Designers, project managers, politicians, and contractors were comfortable with the existing traditional ‘‘low-bid’’ process. This process ‘‘assumes’’ that all contractors will provide an ‘‘equal’’ quality product but most of the clients find the contractor who offers to undertake the project at the lowest price (Flyvbjerg, 2013). The major reason why the low-bid process continues to be used, despite its subjectivity and bias, is because it is easy to document and explain a low bid (D. Kashiwagi et al., 2014).

BV Contributing Factors

BV is not an isolated concept, it has its origins and contributions within the project performance and team related factors. This study suggests that BV is most effective when it is based on key evaluation criteria for contractors. Based upon the study of previous researches, the criteria contribute the project award are:

1. Cost
   Cost is one of the most significant criteria for measuring project success. It is defined as the basis at which the general conditions that are mentioned in contract stimulate the project completion within the expected budget (Bubshait and Almohawis, 1994). It cannot be suggested as the cost that is only constituted in tender sum, but it covers cost which is being utilized in various stages of project leading form inception, designing, and execution to maintenance. Overheads and profits of contractors are also summed up in cost. It can be measured as unit cost or lump sum. In acquisition, price plays a vital role where the requirements are well defined and risks are negligible. On contrary, where requirements are not well defined, non-price criteria may dominate (Watt et al., 2010). The Best Value Source Selection (BVSS) energizes creativeness and improvement from contractors who intended to fulfill the requirements of public projects and augments the flexibility in selecting best proposal (Zhang, 2006).

2. Risk
   Project risk is an ambiguous event whose occurrence negatively impacts the project outcomes such as cost, quality, schedule and scope (Rose, 2013). In measuring risk, identified risks are further ranked both qualitatively and quantitatively. In this way, the risks are highlighted for further analysis. Project risks and their sources can be classified using various approaches. From the perspective of contractor, project-related risks can be classified that have an impact on project performance in terms of cost (Baloi and Price, 2003). Incentive-based contracts were introduced to overcome the issues that occur in traditional forms of payment. Both client and contractor share the risks and the reward in incentive-based contracts (Floricel and Miller, 2001).

3. Performance
   Past performance of contractor is evaluated prior to its selection. In this process, various attributes such as human resources, machinery and equipment, skill level of project team, optimized resource utilization and number of key personnel are evaluated. In order to improve the overall performance of contractors, they must focus to complete the project in stipulated time, reduce delays and establish good relationships with sub-contractors (Xiao and Proverbs, 2003). Contractor enactment play a dynamic role in success of project since it is the party who has the duty to deliver the project. Augmented contractor performance definitely enhances the user gratification, contractor repute and their effectiveness in the market. Research shows that there is much room for further investigating the contractor performance (Alarcón and Mourgues, 2002) .The contractors who are able to finish by the deadline of project are more viable to bring out future projects (Chan et al., 2002). Therefore, during selection, those contractors who have excellent past performance record should be given preference in contract award (Khosrowshahi, 1999).

4. Quality Control
   The assessment of quality is subjective. In the construction industry, quality is defined as the totality of features required by the products or services to satisfy a given need; fitness for purpose (Arditi and Gunaydin, 1997). Specification is defined as workmanship guidelines provided to contractors by client at commencement of project execution (Boukamp and Akinci, 2007). Corporate-level quality refers to the quality expected from a construction

company in addition to the product and/or service quality. Corporate quality culture promotes quality conscious work environment and corporate-level quality in a construction company. It establishes and promotes quality and continuous improvement through values, traditions and procedures (Arditi and Lee, 2003). Contractors achieve client satisfaction by establishing strong quality culture and delivering higher quality services and facilities. Owners expect that the contractors must deliver the highest quality in each aspect. Therefore, it is of importance to owners to encourage the contractors who follow high quality standards (Cox et al., 2003).

5. Health and Safety
   Health and safety is defined as the extent to which the general conditions are implemented on the project without major injuries and accidents on site (Bubshait and Almohawis, 1994). In a rapidly built environment, general reminders to implement safety are very important to avoid fatalities. Additionally, warning signs must be displayed to develop a safe and healthy environment at workplace. These warning signs keep the workers attentive to follow safety rules, enable them to communicate the hazards, provide them the necessary instructions about using personal protective equipment (Toole, 2002).

6. Project Control
   The project monitoring and controlling process should be initited from planning phase which involes appropriate breakdown into smaller components, using performance metrics and anayltical tools, Earned Value Management (EVM) and performance forecasting (Nepal et al., 2006). The procedure of evaluating project cost and perfomance has been significantly analyzed (Rose, 2013). In order to quantify the progress based on WBS and cost accounts, several models have been developed. The researchers are still an awful long way from achieving the lowest possible level of scope breakdown to evaluate progress without messing with data handling (Chan et al., 2001).

7. Delay Claims
   In the construction process, delay claims are considered to be an area of uncertainty and severance (Wood and Ellis, 2005). The cost of disruptions is production related and often problematic to justify. Several issues may arise such as how to alleviate the risks relating estimation, resource utilization, poor workmanship, plant breakdown, deprived quality or impaired material (Shi et al., 2001). In case of potentially problematic aspects of delay claims in a construction project, study reveals that various aspects like pre-contract negotiation, clarity in project scope, and agreement between contractor, owner and project team are likely to lessen the conflict among parties and increase the certainty in achieving project success (Aibinu and Odeyinka, 2006).

8. Current Workload
   Current workload refers to the number and size of projects that a company is carrying out at the moment. It gives the information that whether the resources will be available for a particular project depending upon the workload during construction (Singh and Tiong, 2006). A company having undertaken few projects at one point in time, then they would have ample capacity of resources to incorporate on multiple projects. In case the company has undertaken many projects then the resources will be distributed, as hence a limited capacity will be available for the projects (Al-Harbi, 2001).

Methodology

A systematic review has been conducted to develop a typology of existing work. Tranfield et al., (2003) stated that systematic review delivers collective discernments through theoretical interfusion of prevailing studies. The traditional approach for qualitative research encompasses the summarized findings which results the accumulation of knowledge as understood through current literature of different fields of knowledge (Ruediger Kaufmann et al., 2012). In contrast to the qualitative approach, management research is wide-ranging and has diverse logic which requires quantitative study of heterogeneous publication from various journals and conferences (Edmondson and McManus, 2007). The methodology for systematic review is rather more flexible and account for different conceptualizations and reasoning of the reviewed studies (Chai et al., 2013).

Based on the previous research regarding contractor selection procedure, a total of 19 factors have been identified. The sources used for searching the literature included "ASCE," "Science Direct," "Taylor & Francis Online," "Cibw117" and "Emerald Insight" etc. Semantic technique and keywords are used in searching process. A total of 62 research publications from different journals of project management, and construction engineering and management published between the years 2000-2015 have been studied. This particular period is selected to focus on the recent trends and examine the attributes that are presently effective in this area of research. The identified factors have been shown in Table 1.

Table 1

Overview of Best Value Contributing Factors Typologies

No.	Factors	References
1	Proposed Tender Price	Greenwood and Wu (2012) Gajjar et al. (2014) Bertolini et al. (2006)
2	Low project life cycle cost	Kagioglou et al. (2001) D. Kashiwagi et al. (2014) Crawford et al. (2006)
3	Financial capability	Xia et al. (2014) Al-Harbi (2001) Brady et al. (2005)
4	Additional financial resources for priority projects	D. Kashiwagi and R. E. Byfield (2002) Zhang (2006) Assaf and Al-Hejji (2006)
5	Transfer of risks related to construction, finance and operation	Hai and Watanabe (2014) Savicky et al. (2014) Eriksson and Westerberg (2011)
6	Ability to mitigate unforeseen risks	Gajjar et al. (2014) Zavadskas et al. (2010) Taroun (2014)
7	Past performance and expertise of the company	Gransberg and Molenaar (2004) Bassioni et al. (2005) Kim and Huynh (2008)
8	Number of key personnel	Yeung et al. (2009) Hai and Watanabe (2014) Assaf and Al-Hejji (2006)

9	Optimized resource utilization	Wong et al. (2000) Wang and Huang (2006) Gajjar et al. (2014)
10	Training and skill level of project team	Wong et al. (2000) Cheng and Li (2004) Dainty et al. (2005)
11	Quality control measures	Edum-Fotwe and McCaffer (2000) Elazouni and Metwally (2000) Lin and Shen (2007) T. V. Luu et al. (2008)
12	Meeting design requirements	Haponava and Al-Jibouri (2011) G. Liu et al. (2004) Crawford et al. (2006)
13	Managing user expectation and satisfaction	Yasamis et al. (2002) Beatham et al. (2004) Flyvbjerg (2013)
14	Health and safety performance	Cheung et al. (2001) Cho et al. (2009) Pan et al. (2012)
15	Environmental impact	D. T. Luu et al. (2005) El Wardani et al. (2006) Abudayyeh et al. (2007)
16	Project control processes	Al-Jibouri (2003) Dainty et al. (2003) Vanhoucke (2012)
17	Actual schedule achieved for similar works	Abdul-Rahman et al. (2006) Odeh and Battaineh (2002) Frimpong et al. (2003)
18	History of claims and disputes.	Olander (2007) Ullah Khan (2014) Zaneldin (2006)
19	Number and size of projects in hand	Fong and Choi (2000) Topcu (2004) Watt et al. (2010)

Grouping & Analysis

A total of 19 factors have been identified that affect the decision making in selecting the most suitable contractor as shown in Table 1. Upon further studies and investigation of related literature, these factors are grouped into eight main criteria. These criteria are developed by extracting the factors from the previously carried out relevant research and available literature. As a result, the above mentioned factors are referred to as sub-criteria and their grouping has resulted into formulation of main criteria as shown in Table 2.

Table 2

Grouping of Factors

No.	Criteria	Identified Factors
1	Cost	Proposed tender price Low project life cycle cost Financial capability Additional financial resources for priority projects

2	Risk	Transfer of risks related to construction, finance and operation Ability to mitigate unforeseen risks
3	Performance	Past performance and expertise of company Number of key personnel Optimized resource utilization Training and skill level of project team
4	Quality control	Quality control measures Meeting design requirements Managing user expectations and satisfaction
5	Health and safety	Health and safety performance Environmental impact
6	Project control	Project control processes Actual schedule achieved for similar works.
7	Delay claims	History of claims and disputes.
8	Current Workload	Number and size of projects in hand

Yearly appearance of Factors

In the next step, yearly appearance of these factors has been studied in order to observe the temporal progress in the published literature. An attempt has been made to classify these factors on the basis of year of appearance. For inclusion in the table, a factor has to appear at least once every two year. The yearly appearance has been shown in Table 3.

Table 3

Yearly appearance of Factors

No.	Criteria	Identified Factors	Yearly Appearance							
			2000-2001	2002-2003	2004-2005	2006-2007	2008-2009	2010-2011	2012-2013	2014-2015
1	Cost	Proposed tender price	✓	✓	✓	✓	✓		✓	✓
		Low project life cycle cost	✓	✓		✓	✓	✓		✓
		Financial capability	✓		✓		✓			✓
		Additional financial resources for priority projects		✓		✓				
2	Risk	Transfer of risks related to construction, finance and operation.	✓	✓			✓	✓	✓	✓
		Ability to mitigate unforeseen risks						✓		✓
3	Performance	Past performance and expertise of company	✓	✓	✓	✓	✓	✓	✓	✓
		Number of key personnel	✓		✓	✓	✓			✓
		Training and skill level of project team	✓		✓					
		Optimized resource utilization	✓			✓				✓
4	Quality Control	Quality control measures	✓	✓	✓	✓	✓			✓
		Meeting design requirements		✓	✓	✓		✓		✓
		Managing user expectation and satisfaction		✓	✓		✓		✓	✓

5	Health & Safety	Health and safety performance	✓		✓		✓		✓	✓
		Environmental impact	✓		✓	✓	✓			✓
6	Project Control	Project control processes		✓					✓	
		Actual schedule achieved for similar works.	✓	✓	✓	✓	✓	✓	✓	✓
7	Delay Claims	History of claims and disputes.			✓	✓				✓
8	Current Workload	Number and size of projects in hand	✓		✓	✓		✓		✓

Appearance and Criticality of Factors

After reviewing 62 papers on this subject, the factors show various differing trends. For the sake of understanding and simplicity, the appearances of factors are calculated in the 62 research papers. This shows the frequency of occurrence of each factor in research papers which have been studied in the selected period of publications. The appearance of each factor has been calculated by taking the ratio of its occurrence in research papers to the total number of studied research papers. This not only provides an insight to the latest trends on procurement strategies for the past 15 years but also in finding the number of appearances and further calculating the relative significance or criticality of the identified factors. Their frequency of appearance and their importance are shown in Table 4.

Table 4

Appearance and criticality of Factors

No.	Criteria	Identified Factors	Appearance	Importance
1	Cost	Proposed tender price	20	32.2 %
		Low project life cycle cost	14	22.5%
		Financial capability	10	16.12%
		Additional financial resources for priority projects	5	8.06%
2	Risk	Transfer of risks related to construction, finance and operation	21	33.87%
		Ability to mitigate unforeseen risks	3	4.83%
3	Performance	Past performance and expertise of company	35	56.45%
		Number of key personnel	12	19.35
		Optimized resource utilization	6	9.67%
		Training and skill level of project team	3	4.83%
4	Quality Control	Quality control measures	30	48.38%
		Meeting design requirements	13	20.96%
		Managing user expectations and satisfaction	12	19.35%
5	Health and Safety	Health and safety performance	28	45.16%
		Environmental impact	10	16.12%
6	Project Control	Project control processes.	7	11.29%
		Actual schedule achieved for similar works.	19	30.64%

7	Delay Claims	History of claims and disputes.	8	12.90%
8	Current Workload	Number and size of projects in hand	6	9.67%

The factor "past performance and expertise of company" possesses highest percentage (56.54%). It indicates that BV procurement strategy has great emphasis on evaluating the contractors on the basis of their past performance. The competency and seriousness of contractor could only be determined by measuring performance of executed projects. The second most important factor is the "quality control measure". It includes the processes adopted by the contractors to determine quality policies and steps that need to be taken to ensure client satisfaction. The factor "health and safety performance" show a significant contribution as it ensures the proper handling and usage of equipment and to facilitate the worker with adequate personal protective equipment (PPE). The other important factor is "proposed tender price". It enables the client to make comparison between the tenders and cost plan to assess the inherent value within different tenders and allowing values for money.

Considering the above data, the criticality of factors enabled us to determine their relative percentages; some factors such as *performance*, *health and safety*, and *quality control* have greater percentages as discussed above. Although factors like *risk*, *cost* and *project control* are showing less deviation comparatively. Figure 1 below illustrates this comparison and shows that both *delay claims* and *current workload* have lowest percentages.

Relative Contribution of Each Criteria

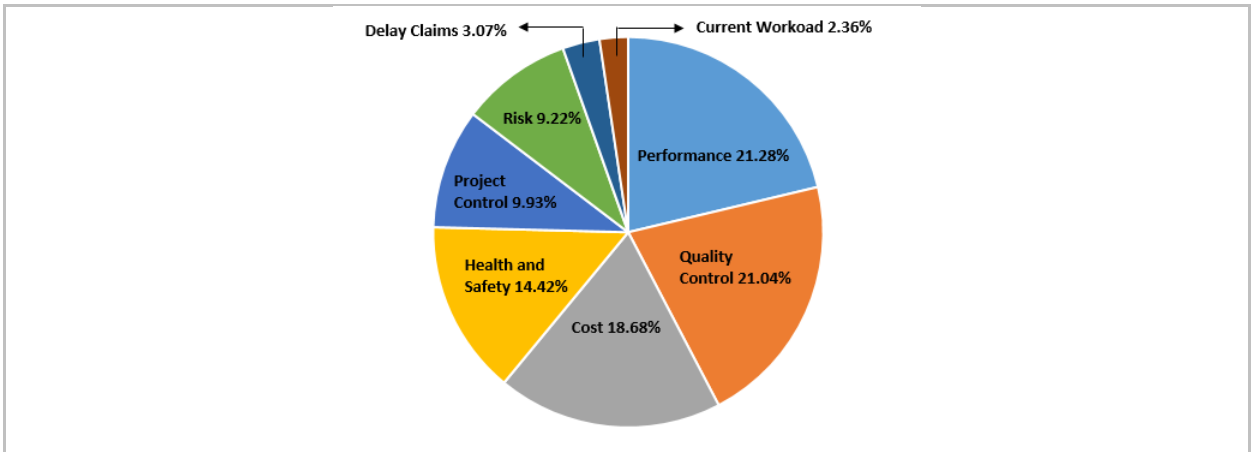

Figure 1: Relative Frequency of Criteria.

Figure 1 presents a clear picture of the components that the researchers have devised through the 21st century in BV literature. Since the execution phase is the most critical of a project and involves many risks, it has been delegated to the contractor who has the responsibility to complete according to the requirements of the owner. Some attributes are pivotal for contractor selection in which the *performance* is the most imperative. This includes attributes such as *"past performance and expertise of company," "number of key personnel," "optimized resource utilization"* and *"training and skill level of project team"*. The first one has higher criticality and the last has lower. As a general rule, individual attributes may have varying importance but if

any of them is reported to have very high frequency, the averaging effect will result in an importance boost into the overall criterion.

Classification of Criteria on the basis of Journal

In the next step, the frequency of factor appearance in major journals was categorized. It is deduced based on detailed observations that some journals have evaluated many factors while some have only examined one. It is evident in Figure 2 that "International Journal of Project Management" has included all the factors. So it may be considered as the most comprehensive journal that researchers can seek guidance from. Some journals like "Construction Management and Economics," "Benchmarking: An International Journal" and "Journal for the Advancement of Performance Information & Value" constituted six criteria. Furthermore, "Automation in Construction" and "Building and Environment" included only one factor. This shows that they do not share the same level of comparative focus on the BV literature. The classification on the basis of journals have been shown in Figure 2:

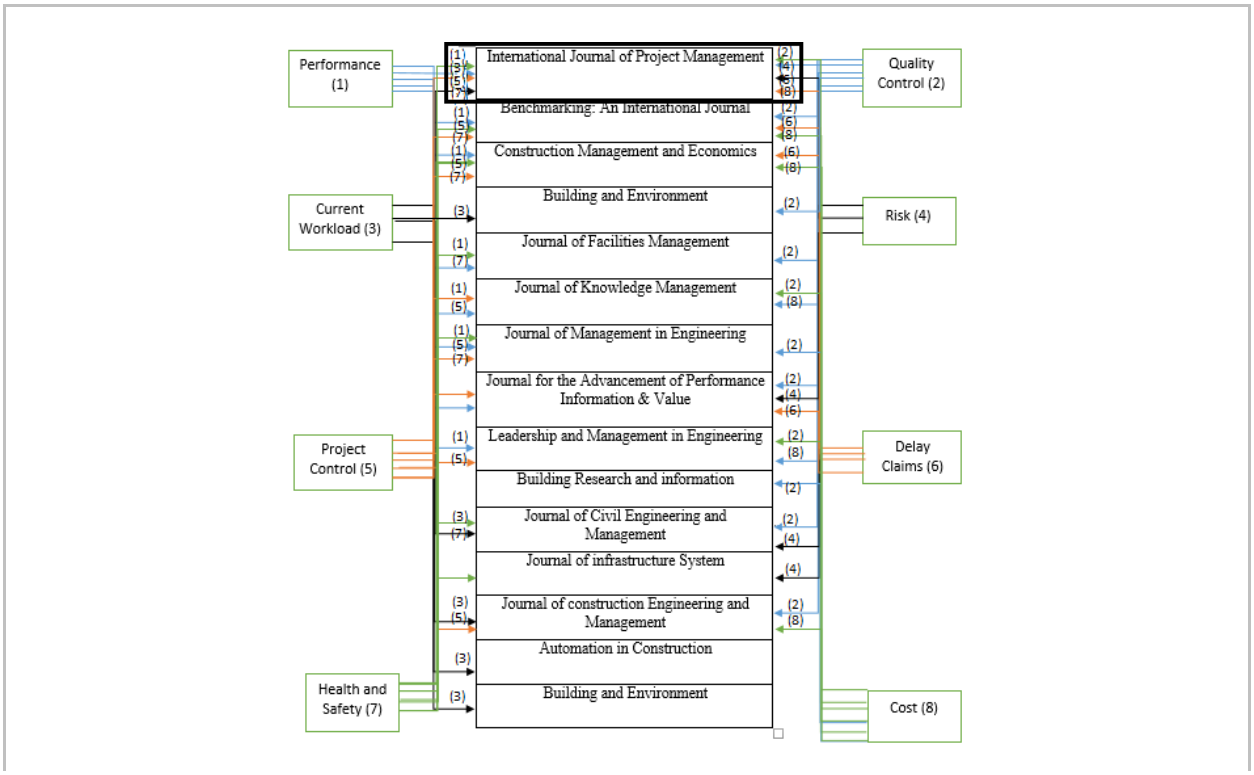

Figure 2: Appearance of Factors in various Journals.

Classification of Identified Factors on the basis of sources

In the final step, the sources of articles covering these factors have been identified. Famous libraries of research publications like "ASCE library" and "Science Direct" constituted all the eight factors and most of the papers regarding this field have been downloaded from these sources. "Taylor and Francis Online" is on the second rank. "Emerald Insight" and "Cibw117" included six factors each. Factors along with their respective sources are given in Table 5:

Table 5

Sources of Factors

Criteria	Sources	Criteria	Sources
Performance	Taylor & Francis Online ASCE Library Emerald Insight Cibw117 Science Direct	Cost	Taylor & Francis Online ASCE Library Emerald Insight Cibw117 Science Direct
Quality control	Taylor & Francis Online ASCE Library Emerald Insight Cibw117 Science Direct	Health and safety	Taylor & Francis Online Emerald Insight ASCE Library Science Direct
Project control	ASCE Library Emerald Insight Cibw117 Science Direct Taylor & Francis Online	Delay claims	Taylor & Francis Online Emerald Insight Cibw117 ASCE Library Science Direct
Risk	ASCE Library Cibw117 Science Direct	Current Workload	ASCE Library Taylor & Francis Online Science Direct

Results and Discussions

Factors Identification Chart

There are several factors that influence the success of project enactment which were identified through an in-depth review of articles as mentioned previously. The contractor and subcontractor perform activities in the construction stage. The elements include contractor performance, site supervision, contractor cash flow, overheads, effective cost control system and onsite communication. An attempt has been made to formulate a new structure that includes the criteria affecting the project success is developed. It can be used as basis for further examination on selection criteria for general construction projects and specific projects like roads, buildings, dams, bridges, etc. Therefore to provide more ease in finding the literature about BV, a more systematic way of project success is established.

The published literature has been limited to 21st century to make it comprehensive and to identify the latest trends regarding the topic. Initially, some work was carried out using BV in which the researchers had identified some factors that would affect the decision making. Since every research is an ongoing flux, it is not viable to only rely upon the factors that have been initially identified. Efforts have been made to find loopholes that affect the long term decision making process. As time progressed, the conditions that were previously reigned in a particular area did not necessarily remain the same in upcoming decision making process, and hence, an inference can be made about the futuristic change in the process. As a result, the maturation of the phenomenon is necessary to be studied.

Considering the literature on BV, the analysis is graphically represented in Figure 3. It shows the crux of this research by indicating the factors which have been identified by the researchers initially. Some factors have been eliminated and new factors have emerged successively, whereas some of them show no change in their appearance over the period of study. Therefore, all of the aforementioned factors should be considered in contractor selection using BV approach. This distribution also shows that some factors like *cost, quality control, project control* and *performance* have appeared continuously which shows that, despite an evolution of new factors, they demonstrate equal strength over the time. Their continuous emergence in each year shows the significance of these criteria in decision making process of contractor selection.

It is important to note that publications in 2000-2001 have considered all the factors, excluding *delay claims* that arise on construction sites, suggesting that most of the criteria were resolved at the early stages of research in BV procurement process. After that, it can be observed that *current workload* was also not reported in 2002-2003. *Risk* is a key criterion that a contractor should be capable of mitigating but the content analysis shows that it has not been contemplated from 2004-2007. Ample research has been carried out in risk management but risk in decision making has not been considered in the mentioned years. In a similar way, some factors have been ignored in successive years while some have been reported.

The objectives of the BV tendering process guarantee its competitiveness, transparency, equity, fairness and efficiency. Contractors should be clustered on the basis of their capability to meet project requirements. BV provides an efficient way of clearing out the incompetent contractors by assessing them on the basis of identified criteria.

Additionally, the past performance, which has been rendered as the most significant criteria, needs to be substantiated in the selection process. The previous records of contractors should be kept in a register which can be effectively reused for the upcoming projects as it provides evidence for improving the contractor's performance and maintaining their business propagation. The key point is that presently all of the identified factors show some importance. Considering the fact that project execution phase is the most difficult among all phases, it is essential to investigate the contractor ability to meet the execution by examining the aforementioned factors. This shows that the construction industry has evolved in terms of the contractor selection processes. The historical development of Best Value contributing factors is shown in Figure 3.

Figure 3: Historical development of Best Value contributing Factors.

Conclusions & Recommendations

The Best Value Approach for contractor selection focuses primarily on past performance and the level of quality that the contractor has delivered on previous projects. In traditional methodologies, cost is typically the only selection factor. Despite the fact that the selection process in a traditional low bid system is seemingly simpler, it has a lot of issues regarding project delivery, schedule and quality control. Thus it poses serious questions on the project success. Apart from these attributes, research shows that there are some other factors that need to be addressed. This research focuses on the said factors which have been reported in the past few years and through their evolution over time.

The process of contractor selection considering criteria other than low-bid can strengthen the overall success of the project. The current research has presented some paramount practices in this area and also highlighted a well-regulated approach to contractor selection. The aim is to augment the schedule and quality of construction projects while nurturing satisfying and constructive working atmosphere among the parties involved. Such an environment can only be achieved by targeting factors that are mentioned above in contractor selection process. In order to strike a balance in successful project outcomes, criteria like quality control, performance, health and safety must be considered on priority.

The results provide a significant contribution to the body of knowledge regarding contractor selection. Particularly, this research underlines the prominence of typical criteria that is used in

contractor selection. The appearance of each criterion and their criticality guides researchers to develop a weighting system during contractor evaluation. In doing so, a win-win situation can be achieved for both the users and tenderers, particularly with respect to risk, performance and quality control.

In recommendation, currently it is observed that all the identified factors are being considered. Some factors like *performance*, *project control*, *quality control*, *cost*, *health and safety* appear most frequently in recent publications. In this study, the factor, *current workload*, which is placed at bottom position, must be contemplated for future studies. If the contractor has undertaken several projects simultaneously then it is cumbersome to monitor and administer all of them equally. As a result, poor quality and performance hinders the project success. Hence during selection, besides performance and quality control, number and size of projects in hand must also be evaluated.

Based upon the analysis of existing literature, it is authenticated that BV procurement strategy is simple to implement and flexible enough to adjust to the project specific and client preferable requirements. These criteria not only discourse the ultimate performance and overall cost of the work but also subsidize to the efficient execution of the work. It is quite cumbersome for the agencies to completely inspect quality into the work. Therefore, such awarding mechanism is needed that state the Value rated elements for decision making.

The industry needs a more robust and flexible decision making model since every construction project is unique in the sense that each project differs in site conditions, associated risks, human resource etc. In most circumstances, where projects suffer many disputes in terms of cost and schedule, it is difficult to identify what the best solution. This ultimately results in disputes and time deviations focused on solving such issues. If all such factors are catered before awarding the contract, such issue could be eliminated which would definitely save time and money and keep the relationship between parties pacified.

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