This is the Pre-Published Version.
Journal of Management in Engineering. Submitted September 1, 2011; accepted December 9, 2011; posted ahead of print December 12, 2011. doi:10.1061/(ASCE)ME.1943-5479.0000119

Analysis of Selection Criteria for Design-Builders through the Analysis of Request for Proposals (RFPs)

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ABSTRACT

Selecting an appropriate design-builder is critical to the success of DB projects. The objective of this study is to identify selection criteria for design-builders and compare their relative importance by means of a robust content analysis of 94 Request For Proposals (RFPs) for public DB projects. These DB projects had an aggregate contract value of over US$3.5 billion and were advertised between 2000 and 2010. This study summarized twenty-six selection criteria and classified into ten categories, i.e.: *price, experience, technical approach, management approach, qualification,*

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Journal of Management in Engineering. Submitted September 1, 2011; accepted December 9, 2011; posted ahead of print December 12, 2011. doi:10.1061/(ASCE)ME.1943-5479.0000119

schedule, past performance, financial capability, responsiveness to the RFP, and *legal status* in descending order of their relative importance. The results showed that even though *price* still remains as the most important selection category, its relative importance declines significantly in the last decade. The categories of *qualification, experience, past performance*, by contrast, have been becoming more important to DB owners for selecting design-builders. Finally, it is found that the importance weighting of *price* in large projects is significantly higher than that in small projects. This study provides a useful reference for owners in selecting their preferred design-builders.

Key words:

Design/Build, content analysis, request for proposal, selection criteria

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INTRODUCTION

Design-build (DB) contracting is an integrated project delivery system in which the design-builder is contractually responsible for both design and construction (Songer and Molenaar, 1997), and has been demonstrated to be superior to traditional delivery system in regard to time and cost performance (Konchar and Sanvido, 1998; Hale *et al*., 2009). As key stakeholders in DB projects, design-builders take a single point of responsibility for coordination, quality, cost control, and schedule adherence. Owners should pay utmost attention in selecting design-builders. Puterto *et al.* (2008) asserted that owners would be willing to pay even more to get highly competent DB

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contractors. Selecting an appropriate design-builder has long been regarded as critical to the success of a DB project (Molenaar and Songer, 1998; Chan et al., 2001; Ling et al., 2004; Lam et al., 2008).

In the selection of design-builders, the formulation of selection criteria is of great importance as an appropriate selection process depends largely on prudent identification of selection criteria to reflect clients' needs and project objectives (Masterman and Gameson, 1994). In the real practice, owners define the selection criteria in design-build request for proposals (RFPs), which is released to elicit design and construction services. Owners can evaluate the performance of prospective design-builders against these criteria. In addition, DB owners can assign different weightings to the criteria in order to reflect their relative importance to the selection process by considering different project circumstances.

However, it is not an easy task for owners to determine the selection criteria and their relative importance in RFPs. Different sets of selection criteria and their weightings in RFPs reflect different requirements for DB competence. Owners should carefully define and summarize the evaluation criteria for specific types and sizes of projects as every design-builder has its unique competence. Otherwise, design-builders that are better qualified for the project may not be selected as the selection criteria do not address their advantages. In DB field, although various researchers and organizations have identified a number of selection criteria for design-builders (Palaneeswaran and

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Kumaraswamy 2005; Wardani et al. 2006; Gransberg et al., 2006), few mentioned the application of these criteria in real world situations.

The objective of this study is, therefore, to investigate the key selection criteria of design-builders, which are adopted by owners in the real practice, through a comprehensive content analysis of a large collection of design-build RFPs. The selection criteria identified establish the basis on which the design-builders are evaluated and selected in the real practice. An analysis of selection criteria reveals owner's consideration of the "best person" for his/her project and allows a perspective design-builder to develop a DB proposal in a manner of emphasizing the factors that are most important to the owner (Gransberg and Molenaar, 2004). It is assumed that the research findings in this paper not only demonstrate owners' understanding of competent design-builders but also reflect their philosophies of DB practices.

DESIGN-BUILD REQUEST FOR PROPOSALS

RFP is a document in which an owner develops his/her requirements and conveys project scope to DB contractors (Harris and MaCcaffer, 1995; Molenaar et al., 2000). It is the primary solicitation instrument in design-build, which serves as an effective tool for the allocation of risk and responsibility between owners and design-builders (Migliaccio et al. 2009). A well-prepared RFP is essential because it is the owner's last opportunity to state his/her requirements and expectations before the selection of design-builders (Puerto et al., 2008). Owners needs to ensure that the required

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information is incorporated into the RFP sufficiently. Otherwise, it will be costly if they want to make changes after the project contract is awarded (Beard et al., 2001). After the release of RFPs, interested design-builders will develop DB proposals in reply to the RFPs.

In order to select the most appropriate design-builder, owners should establish the selection criteria in RFPs that are used to measure the appropriateness of prospective design-builders for the project. In addition, weighting are assigned to reflect the relative importance of these criteria. In the DB market of the U.S., public agencies are required by the Federal Acquisition Regulation to publish evaluation plan in solicitation documents (FAR, 2005). The evaluation plan consists of the major components such as selection criteria, rating system, weighting, ranking and debriefing procedures. According to Gransberg and Barton (2007), the selection criteria fall into the following five categories: price, technical, qualification, schedule, and project management. With proper selection criteria, importance weighting, and selection process in place, owners will be more likely to receive proposals that address their specific requirements and expectations precisely. Finally, the DB contract will be awarded to the bidder that offers the best value to the owner.

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RESEARCH METHODS

In this research, a rigorous content analysis was employed to investigate the various selection criteria and their importance weightings adopted by U.S. public owners in

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the design-build request for proposals (RFP). Content analysis is an observational research method that is used to systematically evaluate symbolic content of all forms of recorded communications (Kolbe and Burnett, 1991). According to Krippendorff (2004), advantages of content analysis include: (1) an ability to deal with unstructured data which "preserves the conceptions of data's sources"; (2) being context sensitive therefore findings are more relevant to those people intend to use the analyzed text; and (3) an ability to handle large volume of data. By means of counting the frequency of events or a topic depicted, content analysis is a common approach to determine the major facets of a set of data (Fellows and Liu, 2008). Content analysis is also a useful approach to capture the viewpoints of various participants which consequently are coded into key constructs or emerging themes (Nayak and Taylor 2009).

According to Guthrie et al. (2004), the first step in conducting a content analysis is to identify the materials to be analyzed. In this study, a sizable sample of actual DB RFPs in the U.S. DB market was first collected from those posted online by 85 public agencies, which include local (County, Town, City, State) governments, U.S Army Corps of Engineers, Naval Facilities Engineering Command, U.S. Air Force, Department of Defence, Department of Veteran affairs, National Aeronautics and Space Administration, Federal Highway Administration public schools, colleges and universities. The sample consisted of 94 RFPs from 32 States with an aggregate contract value of over $3.5 billion spanning between 2000 and 2010, with the majority (80%) being advertised in the past 5 years. It allows the evaluation of the

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most current approaches to DB project delivery. The RFPs cover a wide range of project types. Demographic details of these DB contracts are provided in Table 1.

Please insert Table <1> here

The second step is to determine the form of content analysis to be performed, i.e. qualitative or quantitative. The choice is largely dependent on the nature of the research. A qualitative content analysis places emphasis on determining the meaning of the data (i.e. grouping data into categories). Quantitative content analysis extends the qualitative approach by generating numerical values of the categorized data (e.g. frequencies, ratings, ranking, etc.) which may be subject to statistical analyses. Consequently, comparisons can be made and hierarchies of categories can be examined (Fellows and Liu, 2008). The content analysis in this research covers both qualitative and quantitative forms. First, all selection criteria provided in the RFPs were recorded. Second, criteria with similar meanings were assembled and subsequently coded into different main themes or categories. Next, the overall frequency of each criterion and category throughout the entire collection of DB RFPs was examined to show the popularity of these categories. The importance weightings of the selection criteria categories and their average score were also calculated in order to determine the relative importance of these criteria categories in RFPs.

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RESULTS OF THE CONTENT ANALYSIS

Twenty-six (26) selection criteria were identified and recorded through the content

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analysis of RFPs. Cluster of themes of the selection criteria were summarized and organized based on the meanings of these selection criteria. Finally, ten (10) categories of the selection criteria were coded, comprising:

1. *price,*
2. *experience,*
3. *technical approach,*
4. *management approach,*
5. *qualification,*
6. *schedule,*
7. *past performance,*
8. *financial capability,*
9. *responsiveness to the RFP,*
10. *legal status.*

The frequencies of selection criteria and coded categories were calculated by dividing the number of their appearance by the total number of RFPs. The results, shown in Table 2, illustrate the popularity of these categories. According to the results, *price* (with 91% frequency) and *experience* (with 83% frequency) are the most frequently used categories in RFPs to select design-builders. All categories have the frequencies of more than 50% except *financial capability*, *responsiveness to RFPs*, and *legal status*.

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Of the 94 RFPs, 56 allowed the relative weightings of selection categories to be obtained and these were further examined to enable their prioritization. During the content analysis, each RFP receives a total of 100 points which are distributed among the criteria categories according to their importance weightings stipulated in the RFPs. The summation of total points for each criteria category determines their weightings in the sample. The weightings of criteria categories were thus calculated by dividing total points of each category by the entire points distributed among all the categories. Figure 2 demonstrates the results of this analysis. It clearly shows that *price* is the most important criteria category, which accounts for 27% of the total weightings. This is followed by *experience* (17.1%), *technical approach* (14.2%), *management approach* (13%) and *qualification* (11%). The remaining categories of *schedule, past performance, financial capability, responsiveness to the RFP*, and *legal status*, in total, account for 18% of the weightings.

Please insert Figure <1> here

This is followed by the calculation of the average number of points for each criteria category. The total number of points was divided by the number of RFPs in which it appears. Figure 2 shows the results of the analysis, with price having the highest points (32 points) and the legal status the lowest (7 points). It delivers a direct message on the relative importance of each category specified in RFPs.

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The final phase of analysis involved comparing relative importance of selection

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criteria within different project sizes and types. Table 3 and 4 show the results of this analysis. In order to examine whether the weightings of criteria categories vary significantly within these subgroups, the Mann-Whitney U-test and Kuruskal-Wallis H-Test were conducted. The Mann-Whitney U-test is a nonparametric statistical procedure for comparing two samples that are independent, or not related (Corder and Foreman, 2009). It was used to compare the weighting of criteria category in projects with different sizes—small and large. The size classification is based on the North American Industry Classification System, with the 33.5 million USD (or less) as the size standard for small construction business (NAICS, 2007). The Kruskal-Wallis H-test can be used to compare more than two populations thus is used to compare the weightings of criteria categories in projects with different types—residential, commercial, institutional, industrial and processing, heavy civil and highway, and renovation.

Please insert Table <3> here

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The results of statistical analysis in Table 5 show that only the *price* category has the statistically different weightings in small and large projects, and all the other categories of selection criteria have similar importance weightings in projects with different sizes and types. For the *price* category, the average points of price are 35.6 points in large projects whereas the average number reduces to 24.2 points in small projects. According to Table 5, the importance weightings of *price* in large DB

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projects are significantly higher than those in small DB projects since the significance value $p=0.043<0.05$. This indicates that owners usually become more concerned with budget issue when project size increases. It is mainly because, in large DB projects, majority of owners prefer to work with traditional design consultants to complete quite a substantial amount of design work before engaging design-builders. The higher level of design proportion creates a less complex selection process in which the price of proposal gains more weighting (Molenaar and Gransberg 2001).

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DISCUSSION

The content analysis provides insight as to how owners evaluate the competence of design-builders in DB RFPs. The results of the analysis show that price, experience, technical and management approach and qualification are the major categories for selection. In addition, the content analysis shows the category of price gains higher weightings when the project size increases.

In DB RFPs, owners define and weight the selection criteria in order to select the most competent design-builders. However, it is not unusual that some criteria are easier to measure than others. Additionally, for such criteria as *qualification* and *experience*, it is difficult to measure them objectively. If an owner has a vague description of selection criteria, it will be difficult for DB firms to respond to the

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criteria and for the owner to evaluate the responses. Therefore, owners should have a clear description of selection criteria in RFPs. It not only enables owners to receive qualified proposals, but also helps reduce the cost of reviewing these proposals.

Gransberg and Barton (2007) conducted a similar research study to analyze the evaluation criteria in Federal design-build request for proposals. Their research examined 110 RFPs evaluation plan with an aggregate contract value of 1.5 billion spanning between 2000 and 2002. It categorized the evaluation criteria in design-build RFP evaluation plan into the following five categories: Price, Technical, Qualifications, Schedule, and Project management. The comparison of the research findings between Gransberg and Bartion's study (2007) and the current study is shown in Table 6.

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The major disparity between Gransberg and Barton's study (2007) and this research is the importance weighting of price, which decreased from 47.1% to 27%. With the same calculation method, the average number of points for price in Gransberg and Barton (2007)'s study is 48 points compared with 32 points in this study. Although *price* is still the most important category of selection criteria, its relative importance reduces substantially. This may be attributable to the fact that the RFPs in Gransberg and Barton (2007)'s study dated back to nearly 10 years ago when price was given more emphasis in the selection system and the majority of the RFPs stated "Price equals to all other factors combined". In recent years however, with an increase of DB

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experience of both owners and DB contractors, more and more owners put emphasis on the qualification/competence of design-builders and tend to leave projects to design-builders at very early stage with Guaranteed Maximum Price (GMP) contract to establish a price that cannot be exceeded (Beard et al., 2001; Chan et al., 2007). As a result, the relative importance of price decreases in the evaluation system.

In Gransberg and Barton (2007)'s study, the category of *qualification*, which includes requirements for individual credentials, experience, and the past corporate performance record for similar projects, accounts for 27% of the total weightings. In this research, the categories of *experience, qualification*, and *past performance* in total, account for 35% of the total weightings. The increase of weighting is consistent with the fact that, in the current DB market, the qualification/competence of design-builders becomes more important to DB owners. A well-qualified design-builder with a strong track record of successful past performance is more likely to win a DB contact.

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CONCLUSIONS AND RECOMMENDATIONS

In DB procurement, the selection of appropriate design-builders is crucial to the success of DB projects. The primary objective of this paper is to identify selection criteria/categories and their relative importance for design-builders through a robust content analysis of a sample of 94 RFPs. The findings show that, although price is

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still the most important selection criterion, its weighting decreases substantially compared to the previous study, i.e. Gransberg and Barton (2007). In addition, the category of *price* has significant higher weighting in larger DB projects. The research findings also indicate that the competences of design-builders, which mainly include qualification, experience, and past performance, are becoming more important in the selection system. This is consistent with the fact that there are an increasing number of DB owners using request for qualification (RFQ) to shortlist qualified design-builders prior to the RFP process.

The research findings of this study provide a number of practical implications. First, for DB owners, especially the inexperienced ones, the best-value selection process is recommended for DB procurement unless the lowest contract price is legislatively mandated. The best value is the term for agencies selecting teams via some combination of price and qualification (Molenaar and Gransberg, 2001). It allows various elements to be considered in selecting a competent design-builder on the basis of the total performance. Second, for design-builders, they should demonstrate their competence through not only technical solutions but also a good track record and qualification in order to win the DB contract. The research findings in this study provide design-builders with a useful guideline to examine their DB capability.

The content analysis of a collection of 94 RFPs produces some useful conclusions. However, it is worth note that there are some limitations associated with this study.

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First, the number of RFPs collected is still relatively small and some RFPs do not contain enough information for quantitative analysis. Second, more work is needed in order to validate the research findings in view of the known subjectivity and possible bias of the content analysis. Nevertheless, the research study provides useful information for the practical application. Additionally, future research study can also be conducted to establish guidelines or framework for the selection of appropriate design-builders based on the findings of the current study.

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Table 1 Summary of the Data Sample

Project type	Number of RFPs
Commercial building	16
Institutional building	35
Residential building	8
Heavy civil and highway	9
Industrial and processing	18
Renovation projects	8
Total	94

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Table 2 Coded categories of selection criteria

No.	Criteria category	Frequency
1	**Price**	**91%**
	price proposal (proposed price, price breakdown)	90%
	Life cycle cost and cost effectiveness	5%
2	**Experience**	**83%**
	Experience of design-builders with comparable projects, facilities	45%
	Experience of personal assigned to the project	29%
	General experience of the firm and specific experience with DB	23%
	Specialized experience (value engineering, partnering, LEED, etc.)	16%
	Experience (familiarity) of local environment	11%
3	**Technical approach**	**72%**
	Design solution, design creativity	44%
	Construction approach/technology	22%
	Achieving LEED certificate and environmental mitigation approach	16%
4	**Management approach**	**68%**
	Management plan for cost, quality, safety, risk, etc.	62%
	Organization/team structures, organizational stability, project staffing	25%
	Commitment to small/minority/women/local business participation	25%
5	**Qualification**	**62%**
	Proper license/resumes of all key personal and subcontractors	52%
	Business reference and pertinent certificates	13%
	Sufficient available staff resource within the team	12%
6	**Schedule**	**60%**
	Proposed schedule, planning and scheduling approach to meet time requirement	60%
7	**Past performance**	**54%**
	Record of performance on similar projects with relative to budget, schedule, quality, safety, and compliance to laws, regulations and requirements	50%
	Reputation and previous owners' satisfactory	5%
8	**Financial capability**	**37%**
	Warranty, surety (ies), insurance, Bonding capacity	30%
	Sufficiency and stability of financial resources	9%
9	**Responsiveness to the RFP**	**37%**
	Understanding and insight related to project and owner's need	23%
	Compliance with requirements in RFPs	17%
	Presentation and interview performance	4%
10	**Legal status**	**14%**
	Litigation history/record	7%
	Current legal status including suits, claims, conflicts of interests, bankruptcy	7%

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Table 3 Relative importance of selection criteria by project size

Size	**Price**	**Exp.**	**Tech.**	**Mgmt**	**Qualif.**	**Sched.**	**Perf.**	**Finc.**	**Resp.**	**Legal**
Small (N=42)	24.2	16.9	14.7	13.0	11.4	5.3	7.6	2.0	2.3	.9
Large (N=14)	35.6	16.6	12.1	11.9	8.4	6.2	3.4	1.4	1.8	1.8

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Table 4 Relative importance of selection criteria by project type

Type	**Price**	**Exp.**	**Tech.**	**Mgmt**	**Qualif.**	**Sched.**	**Perf.**	**Finc.**	**Resp.**	**Legal**
Commercial (N=9)	24.4	15.5	16.1	10.5	10.5	7.2	4.4	2.8	5.5	2.8
Civil& highway (N=8)	29.4	15.64	6.24	14.4	11.9	5.0	8.7	1.2	3.1	1.2
Renovation (N=10)	27.6	16.6	15.70	15.6	6.3	6.3	6.5	4.0	0.1	0.1
Industrial (N=8)	13.7	22.5	11.2	12.6	18.0	2.5	9.4	2.5	3.1	1.9
Institutional (N=18)	31.3	15.4	16.8	12.1	9.5	6.4	5.3	0.5	1.1	0.8
Residential (N=3)	36.7	18.3	13.3	10.0	10. 0	1. 7	6. 7	0.1	0.1	0.1

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Table 5 Test statistics for different project sizes and types

	Price	**Exp.**	**Tech.**	**Mgmt**	**Qualif.**	**Sched.**	**Perf.**	**Finc.**	**Resp.**	**Legal**
Mann-Whitney U-test for sizes	**.043**	.985	.722	.636	.337	.592	.155	.178	.518	.917
Kruskal-Wallis H-test for types	.252	.948	.326	.878	.233	.505	.840	.548	.078	.579

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Table 6 Comparison of two research studies

	Gransberg and Barton (2007)	The current study
Number of RFPs	110	94
Contract value	1.5 billion USD	3.5 billion USD
Issued period of RFPs	1999-2002	2000-2010 (80% of them were issued after 2005)
The weighting of price	47.1%	27.0%
The weighting of technical	13.1%	14.2%
The weighting of qualification	27.3%	34.9% (Experience 17%, Qualification 11%, Past performance 6.8%)
The weighting of management	10.6%	13.0%
The weighting of schedule	1.9%	5.6%
Others	--	5.3%

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Figure Caption List

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Figure 1 Average weighting of the criteria categories

Figure 2 Average points of selection criteria categories

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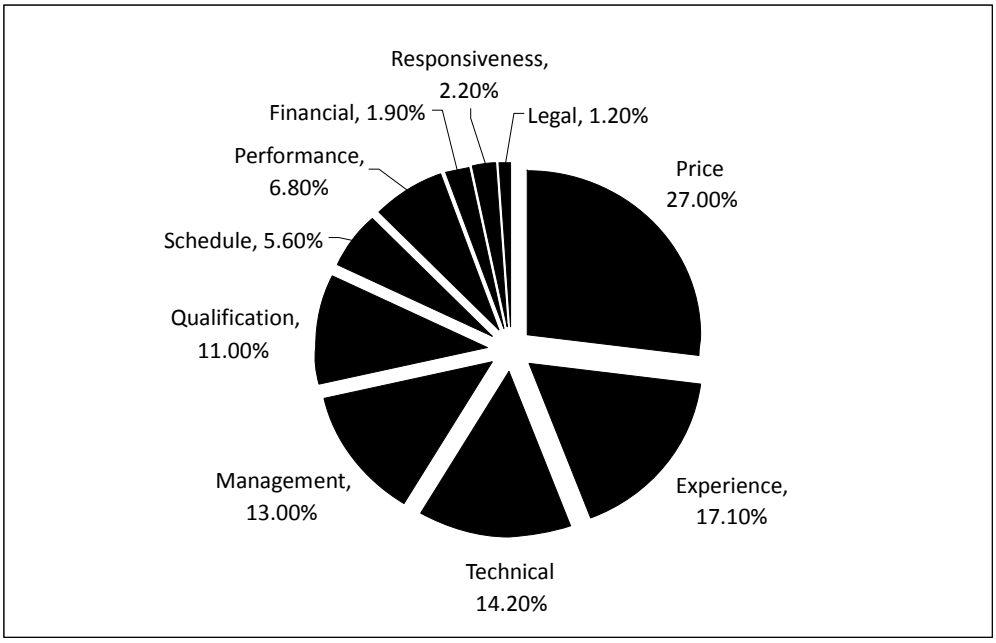

Figure 1 Average weighting of the criteria categories

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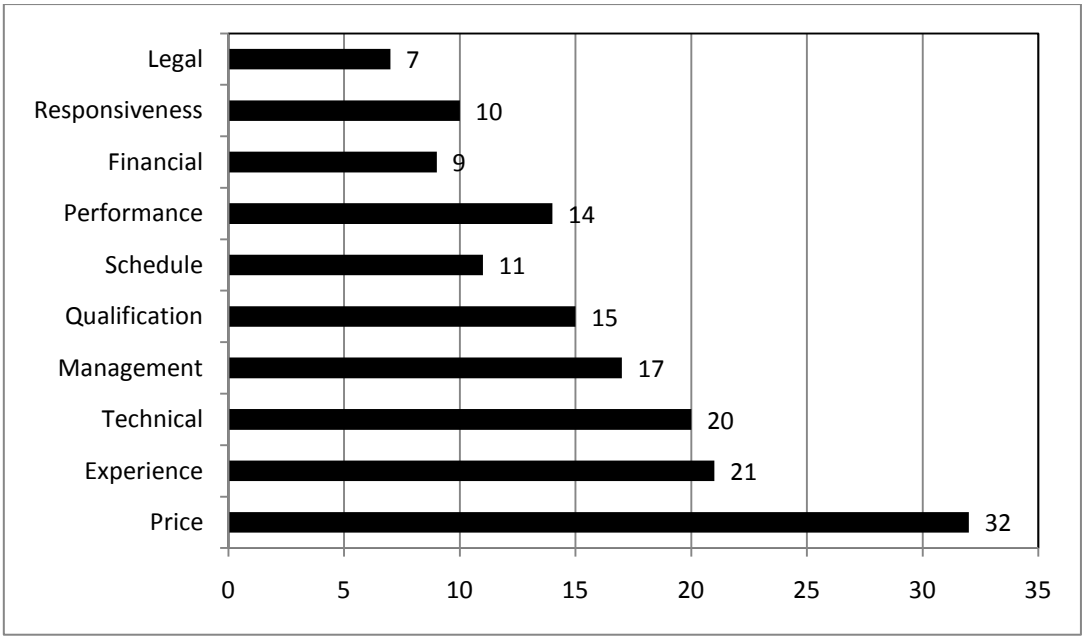

Figure 2 Average points of selection criteria categories

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