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CONTRACTOR'S ATTRIBUTES AFFECTING CONSTRUCTION PROJECTS IN PAKISTAN

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Abstract:- *Importance of construction industry in a country's economy cannot be undermined. To allow the construction industry playing positive part in economy it is necessary that construction projects complete without any complications. Time, cost and quality are the three conventional gages to quantify the Project Success, however with the advancement in field, criteria for project success has also evolved. Criteria identified from different works by this study is–on time completion of project, within estimated budget, having acceptable quality, is free from discrepancies, have minimum health and safety issues during work, does not affected by liability claims, free from any corruption charges, is environmentally sustainable, reaches end user on time and is operationally profitable. Being the active participant of construction projects – contractor role in project success is profound. Choosing suitable contractor can alter the fate of project. Attributes of contractors that can be used to choose the right contractor for a job identified by this study are; Experience of technical personnel, Staff qualification, Site organization, Type of past projects completed, Contract cost overruns, Adequacy of labor resources, Quality control, Management capability, Cash flow forecast, Size of past project completed.*

Keywords: *Construction; Contractor; Management; Quality; Cost; Time;*

1. Introduction

Construction industry is among the few industrial sectors that can play decisive role in development of a country. Knowing construction industry contributes 5-13% to GDP makes it to be the major focus in civil engineering. 85% - 90% of project cost incurs during execution i.e. actual construction phase of civil projects. Living in world of recessing economies it is very important to take every step to minimize trouble causing factors that may affect the project completion.

Global Construction Perspective predicts global construction industry is growing at faster pace. It will grow in next seven years from 7. 2 trillion USD to about 12 trillion. In developing countries, construction is to increase by110 percent while infrastructure by 128 percent. It also predicted that developing countries will overtake developed countries in market share by year 2020. Current global construction industry is 13 percent of global GDP, which will increase to 15 percent by year 2020.

Pakistan's construction industry is the most neglected industry of the country though global trends point it to be the major employment business. Despite overlooking the industry, Economic Survey of Pakistan (2013-2014) indicates that country's construction sector possess 2. 4% share in country's GDP, and 6. 95% of total labor force are employed in it. Other positive indicators of construction industry are: 11. 31 percent growth as compared to negative growth of -1. 68 percent the previous fiscal year. In 2005Federal Bureau of Statistics valued construction industry Rs. 178,819 million indicating 88 percent growth from year 2000.

Development of country is reflected by the construction work carried out there, it ranges from building of residential, commercial to industrial facilities. Construction involves planning, design, execution and maintenance including repair work. Construction industry chief contributors are owners – land developers or government agencies, consultants – design engineers or management consultants and contractors – general contractors or subcontractors. Among various stake holders of construction projects the most important one is contractor. Construction projects are highly dependent on contractors and their performance. Choosing of a capable contractor will not only maintain the quality of work but will also help in saving extra costs.

Construction project is defined by the objectives to achieve in required amount of time. However it may not be simple, and could be challenging when dealing with objectives and time, involving number of stakeholders.

Similarly defining project success is as difficult as defining construction project. According to classic project success definition, on time, under budget and in quality, are three main criteria on which project success is measured. However this concept remains vague due to modern complex requirements.

Project success is subjective in nature; it may be different to different stakeholders, and also changes from project to project due to – scope, size, environmental condition and participants. Hence to overcome the difficulty list of project success indicators or critical success factors are developed by many researchers. However these factors are not the same

for different stakeholders. One factor will be the success criteria for one stakeholder but for other it will be the risk factor.

Some researcher establishes that efficiency in project activities, customer satisfaction, corporate & administrative success and formulating future prospects are four important success dimensions.

This research is aimed at finding the attributes of contractors related to project success which are important in choosing the right contractor for the job. Research has two main ingredients, one is to define project success, and other is to relate contractor's attributes that have maximum impact on it.

2. Background

2.1. Pakistan's construction industry

Saqib et al. (2008) found that Pakistan construction activities and GDP has a unidirectional relationship. And aggregate economy of country is under constant influence of construction industry.

Among all other developing countries, Pakistan has the most maltreated construction industry, which is reflected by low per capita consumption of cement. Construction sector of Pakistan provides significant amount of employment opportunities. 40 building material industries are related in one way or another to the mother construction development sector. 2. 43 million individuals earn their living from this sector during 2003-04 (Khan, 2008).

Similar to many underdeveloped countries, Pakistan is also facing cost overruns in construction projects and significantly affects the country's economic growth. It is not working to the point where it should be, still generate enough employment opportunities (Azhar et al. 2008). Furthermore, asserted that special attention should be given to the – raw material prices fluctuation, unstable rates of manufactures materials, increase cost of machineries, procurement procedures, cost control, delays, incorrect cost estimation, inadequate planning and government support. This contributes 88 percent to cost overruns.

Governments of developing countries like Pakistan faces many challenges while initiating development projects due to financial constraints. Prioritizing the construction and development of infrastructure is always a big test to any regime in such countries (Khan et al. 2008).

Rural areas contributes majority of unskilled labor force to the Pakistan's construction industry. These are mostly illiterate and come to cities in search of employment. Pakistan skilled labor involves carpenters, plumbers, steel fixers, masons and electricians, most of them are matriculates (Saqib et al. 2008).

Pakistan construction industry faces extensive non-performance issues. This creates strains between the actively involved stakeholders viz. Owner, consultant/designer and contractor. This non-performance can be traced to low-bid project procurement procedures. It generally results in contractor claims and constructability issues (Farooqui et al. 2008).

Being an under develop country; Pakistan needs to reduce the cost of construction projects. This can be effectively achieved by adopting quality assurance and control procedures. While it is pertinent to mention that it has already been performed by manufacturing industry of the country (Khan et al. 2008).

Pakistan's construction industry is driven by contractors. They play an important role in decision and policy making. However clients clinging to Total Quality Management, and enforcing that through contract agreement have some positive effects. Contractor's resistance to change the proven customs, and eyeing for short term benefits has also profound impacts on the country's construction industry (Farooqui et al. 2008).

In construction monitoring progress, secondary decision making, describing the required work and other such activities required intensive information handling. While outdated techniques used in Pakistan's construction industry have failed to achieve the required results (Memon, 2008).

Construction projects involving international firms in joint venture are always riskier than projects with domestic participants. Whereas when country like Pakistan already poverty and economic stricken this become extremely precarious to all the stakeholders involved (Jamil et al. 2008).

Hearing protective devices, proper footwear and wearing of face masks in dusty conditions are three top most non-safety practices carried out by the worker while working in potentially dangerous situations. Pakistan's construction industry is overwhelmed by contractors whose primary goal is to maximize its profits, even at the cost of human life. There is much difference in approach of small and large contractors. Big construction firms do provide training to the workers regarding safety procedures. However their numbers are limited, while most of industry participators do not follow such processes and are not bothered to devise safety policies (Farooqui et al. 2008).

2.2. Contractor – Main Stakeholder

Banki et al. (2009) painstakingly studied the construction projects and found that their success is greatly influenced by the contractor performance. Selection of contractor as not only must for quality of the project but also will help in saving extra costs. Contractor selection is foremost important activity in construction processes. Overall project success is highly related to it (Ramezaniyan et al., 2012).

According to Turskis (2008), see contractor selection to be the important event in course of construction activities. It very important that proper evaluation of contractor is carried out before awarding the contract. For that purpose most suitable credential which could be perused are past experience, financial soundness and technical abilities to handle a project.

Construction industry is overflowed by smaller construction companies, with limited technical and management expertise, affect the material hauling, labor management and successful biding to tenders. It generally contributes to poor performance (Ofori, 1992). Hatush and Skitmore (1997) related the construction work to contractor selection. When contractor is incapable then probability that estimated cost will be exceeded, increases. Project is also prone to disputes and bankruptcy. Even the work will be of lower quality than the specified.

While Baykasglu et al. (2009) recommend the selection of suitable contractor in order to succeed in achieving the project objectives. Ng and Tang (2010) linked the efficiency of construction process with selection of capable contractor. Also highlighted that contractor selection is part of project management decision making, while facing multi-conflicting goals many researchers have developed a "universal criteria" that can be used for general purposes.

Lowest bid price criteria is widely used in construction industry for the contractor selection purpose, however it is the prime cause which impede the selection process. While it is recommended to use varying attributes which may range from project complexity to risk management practices (Doloi, 2009). Similar studies carried out reveals that increase in construction business failure is due to the incompetence of contractors. Hence decreased in productivity, cost overruns and schedule overruns all accounts to the increased in industrial costs.

According to Nieto-Morote and Ruz-Vila (2012), in contractor's selection procedure, decision making abilities of the subject and character of construction projects widely affect the overall process. Similarly Plebankiewicz (2012) using fuzzy sets studies the contractor prequalification procedure, proposed and develop two stages process for contractor selection. Lesniak et al. (2012), also proposed well studied prequalification process rather than casual selection.

Foremost reason for failure in project delivery is criteria on which the contractor is selected, which in most cases is lowest bid price (Walraven and Vries, 2009). Due to shortage of work most contractors, to remain in business quote a bid lower than the least sustainable price with the expectation that they will cover through claims. Contractor selection is the process of appraisal of contractors attributes however is faulty in itself, owner always give preference to some over others (Wei et al., 2012).

Effective prequalification process for selection of contractors is very important, as project success is the result of – contractor abilities to tackle risk, complexity, organizational capability and technical expertise (Arslan et al., 2008). It is in great need to practice the multi-criteria instead lowest-price principle.

2.3. Contractor's Project Success Criteria

Study performed by Doloi et al. (2010), in which he analyzed the 43 technical attributes of contractor selection while linking them to the project success factors/objectives. He argue that contractor abilities in handling of technical work by applying suitable methods, overall experience in business, principal amount available to have substantial impact on project objectives. Later he studied the performance of 29 contractor's in Australia by linking it to the qualification criteria. Where he found that skills in regulating the work and methods adopted for technical processes are the most vital attributes of contractor.

Ahadize (2007) illustrated that critical success factors of construction projects despite several studies remained perplexed. Project success is a complex issue. Some of success factors may be common across project types, while some will remain unique to projects of specific characteristics.

Similarly Hatush and Skitmore (1997) performed a study by using Delphi technique to assess the prequalification criteria against traditional cost, time and quality indicators. They found that most of financial related attributes (financial standing & constancy, credit rating) of contractors are importantly considered by owner while pre-qualifying a contractor. In addition to those technical and management experience of staff were also identified. In Delphi process six experts were interviewed with two expert validators.

Web-based project management system was studied by Nitithamyong and Skibniewski (2007). During their study work they chart out an important criterion to help measure the performance of contractor. It included 42 factors, sorted in 04 groups. The study pointed towards 42 factors, distinctly grouped according to their nature, into four. Those groups were labels as; project nature, team, supplier and system used for management. Whereas was defined by identifying thirty six measure, similar grouped together. Total of six groups were crafted. Those were time, cost, quality, risk, communication and strategic.

By using Spearman Rank Correlation technique, Russel and Jaskelskis (1992) classified the owner decision making criteria. According to them most of the owners select the contractor on the basis of their financial standing, relevant experience and previous accomplishments. This was established after the perusal of twenty judgment factors and sixty seven sub-factors used by seventy two private owners, seventy eight public owners, and forty two construction managers for prequalification of contractors.

Empirical studies were also conducted to establish a correlation between project performance and identified factors.

To study the Singapore construction industrial knowledge of project success criterion, Sing and Tiong (2006) took the initiative. Results were deduced from 128 questionnaire responses received from different professionals of construction sector, containing quantity surveyors, developers, contractors and clients. They stated that though there exist many gages to gauge the contractor during selection process but the experience in similar field, followed by qualification and experience level of staff, and financial records of the contractor could be assumed to the most important.

97 projects in which failure established to be caused by project managers or organization were studied by Pinto and Mantel (1990), in which they identified a set of factors which could be managed by administration of organization to

allay failure. Quite contrasting in characteristics, however were related to definition of "failure" specific to project, those identified were; the sort of project, and the point at which project is at the moment in its life cycle.
Tan et al. (2007) studied the Hong Kong construction industry and came up with a list of contractors key attributes affecting construction projects, which are; Bank credibility rating, Relationship with material supplying agency, Compatibility of with local culture, Mechanism of selecting subcontractor, Understanding of the local traditions, Staff appraisal, Organization structure, Human resource training programs, Equipment/plant depreciation rate, Level of investment in Research & Development, Geographic region of the business activities, Number of quality awards and punishments, Proportion of technical and professional staff in an organization, Mechanism for workforce recruitment, Mechanism of distributing benefits and reward, Career prospect within organization, Past success rate in pre-qualification exercises and success in the final bidding stage.
Staff qualification, Litigation tendency, Quality policy, Quality control, Quality assurance and Adequacy of labor resources – were the key attributes identified by El-Sawalhietál. (2OO7). Baykasogluetál. (2009) identified Size of past project completed, Experience in the region and Contract time overruns as main contractors' attributes affecting construction projects.

3. Research methodology

This investigative study falls into the description research, which describe the characteristics of population or phenomena without questioning the occurrence of its cause (Shields and Rangarajan, 2013). For such study, data is generally collected using surveys.
Normally to find out facts, ideas and views analytical surveys are performed by using structured questionnaires. Which has advantages of saving time, ease of analysis and have support for external and internal validity. Hence the most suitable method of data collection was found to be conducting survey using structured questionnaire.
Taking advantage of the pilot study for establishment of success criterion, contractor's attributes less relevant to Pakistani environment were identified and dismissed from the final questionnaire.
Final questionnaire was subdivided in two parts. First part collects some background information of the respondents, questions relates to gender, age, job experience and sector of construction industry. Second section contains core questions related to the research, as explained below;

- Questionnaire contained 42 questions.
- Questions were categorized as;
  - Financial attributes
  - Management attributes
  - Technical attributes
  - Past experience attributes
  - Organization attributes
  - Operational attributes
  - Quality attributes
  - Resources attributes

Respondents were asked to rate each factor on a Likert scale of 5-point; where 1 means Not Important, 2 Slightly Important, 3 Moderately Important, 4 Very Important and 5 Extremely Important.
After the collection of data from various sources, it is extremely vital to properly arrange the data. Without proper sequence analyzing is nearly impossible. Questionnaires collected in different forms as were sent in different formats. Responses collected through online means have advantage over hard copies, as it need little work for further sequencing. Whereas hard copies need to be properly data mined and entered in the analyzing sheets. So for that purpose collected information is appropriately registered.
The following tests performed on the collected data along with its normal ranges and assumptions are briefly discussed.

- Reliability Test
- Normality Test
- Kolmogorov-Smirnov and Shapiro-Wilk Tests
- Kruskal-Wallis Test

4. Data Analysis and Results

4.1. Identified Attributes

Contractor's attributes identified from the literature and pilot survey are given in table 1

Table 1: Contractor's Attributes

Attributes	Code	Attributes	Code
Revenue (income)	CA-1	Size of bid preparing team	CA-22
Growth rate of total assets	CA-2	Experience of technical personnel	CA-23
Bonding capacity (security given by banks or other)	CA-3	Knowledge of particular construction method	CA-24
Cash flow forecast (future cash inflows and out flows)	CA-4	Work programming	CA-25
Size of past project completed	CA-5	Mechanism of selecting subcontractor	CA-26
Length of time in business	CA-6	Contractor's IT knowledge	CA-27
Size of the company	CA-7	Career prospect within organization	CA-28
Type of past project completed	CA-8	Contacts with local authorities	CA-29
Past success rate in pre-qualification exercises	CA-9	Incentives to the staff	CA-30
Past success rate in the final bidding stage	CA-10	Ratio of technical and professional staff in the organization	CA-31
Past record of conflict and disputes	CA-11	Political contacts	CA-32
Contract cost overruns	CA-12	Mechanism for staff recruitment	CA-33
Contract time overruns	CA-13	Timely decision making ability	CA-34
Staff qualification	CA-14	Human resource training programs	CA-35
Organization structure	CA-15	Health and safety records	CA-36
Management capability	CA-16	Relationship with material supplying agency	CA-37
Site organization	CA-17	Extent of subcontracting	CA-38
Documentation	CA-18	Quality control	CA-39
Staff appraisal	CA-19	Quality policy	CA-40
Coordinating procedures	CA-20	Quality assurance	CA-41
Bid preparing team experience	CA-21	Adequacy of labor resources	CA-42

4.2. Reliability Test

Reliability test is performed to measure the validity of the data. Results of the study need to be reliable so that with confidence it can be applied to the conditions in which it is done. It shows that the results will be repeated if such study is performed again under the same condition. Value of Cronbach's Alpha is the best indicator of reliability. Cronbach's Alpha also shows the internal consistency of questions or any other elements of study which are being solicited. Table 2 shows the acceptable value ranges of the Cronbach's Alpha, whereas table 3 shows the results of reliability test.

Table 2: Cronbach's Alpha Ranges (Wikipedia)

Cronbach's alpha	**Internal Consistency**
$\alpha \geq 0.9$	Excellent
$0.7 \leq \alpha < 0.9$	Good
$0.6 \leq \alpha < 0.7$	Acceptable
$0.5 \leq \alpha < 0.6$	Poor
$\alpha < 0.5$	Unacceptable

Table 3: Reliability Test Result

Response	Valid	Excluded	Total	Cronbach's Alpha	No. of Items
N	119	0	119	0. 753	42
%	100	0	100		

Starting from reliability test, this test reflects the consistency among the elements which are being investigated. And it also measures how the results reflect the whole population. Its value ranges from 0 to +1, while normal ranges and their meanings are provided in table 2

Test results of this study as shown in table 2 provides Cronbach's Alpha value 0. 753, which falls in the acceptable range. It authenticates the questionnaire. This reflects the similar nature of all the attributes which are being investigated. And confirms that if similar questions are asked again, results will not be much different from the current findings.

4.3. Normality Test Result

As the numbers of responses collected were less than 2000 hence it was decided to test normality using Shapiro-Wilk test, as recommended. Table 4 gives the result of test.

Table 4: Normality Test Result

Factor	Shapiro-Wilk Statistic	df	Sig.
CA-1	0. 762	119	0. 000
CA-2	0. 829	119	0. 000
CA-3	0. 817	119	0. 000
CA-4	0. 840	119	0. 000
CA-5	0. 825	119	0. 000
CA-6	0. 895	119	0. 000
CA-7	0. 856	119	0. 000
CA-8	0. 762	119	0. 000
CA-9	0. 860	119	0. 000
CA-10	0. 898	119	0. 000
CA-11	0. 857	119	0. 000
CA-12	0. 791	119	0. 000
CA-13	0. 850	119	0. 000
CA-14	0. 769	119	0. 000
CA-15	0. 833	119	0. 000
CA-16	0. 801	119	0. 000
CA-17	0. 784	119	0. 000
CA-18	0. 856	119	0. 000
CA-19	0. 859	119	0. 000
CA-20	0. 868	119	0. 000
CA-21	0. 910	119	0. 000
CA-22	0. 731	119	0. 000
CA-23	0. 750	119	0. 000
CA-24	0. 823	119	0. 000
CA-25	0. 910	119	0. 000
CA-26	0. 837	119	0. 000
CA-27	0. 756	119	0. 000
CA-28	0. 832	119	0. 000
CA-29	0. 804	119	0. 000
CA-30	0. 882	119	0. 000
CA-31	0. 875	119	0. 000
CA-32	0. 835	119	0. 000
CA-33	0. 846	119	0. 000
CA-34	0. 829	119	0. 000
CA-35	0. 827	119	0. 000
CA-36	0. 735	119	0. 000
CA-37	0. 833	119	0. 000
CA-38	0. 875	119	0. 000
CA-39	0. 806	119	0. 000
CA-40	0. 854	119	0. 000
CA-41	0. 859	119	0. 000
CA-42	0. 828	119	0. 000

This test work on hypothesis that sample is taken from normal distribution. Hence we reject the hypothesis if value of p comes out to be less than 0.05. Which means sample data does not follow normal distribution.

By looking at the test result presented in Table 4, we came to conclusion that sample data does not follow normal distribution. This also confirms that data is non-parametric hence conventional parametric tests or regression analysis is not recommended. Ranking study is found to be the most suitable analysis techniques, which is followed worldwide in contemporary times. Henceforth we also opted for ranking of the attributes.

4.4. Kruskal-Wallis Test

To perform the Kruskal-Wallis test, responses received from each respondent were separately arranged. There were 119 total respondents; factors were tested against assumed P-value of 0.05 results are presented in table 5

Table 5: Kruskal-Wallis Test Result

Attribute	Significance	Attribute	Significance
CA-1	0. 546	CA-22	0. 541
CA-2	0. 194	CA-23	0. 106
CA-3	0. 873	CA-24	0. 153
CA-4	0. 232	CA-25	0. 821
CA-5	0. 881	CA-26	0. 211
CA-6	0. 158	CA-27	0. 176
CA-7	0. 746	CA-28	0. 061
CA-8	0. 320	CA-29	0. 786
CA-9	0. 547	CA-30	0. 745
CA-10	0. 521	CA-31	0. 869
CA-11	0. 802	CA-32	0. 245
CA-12	0. 220	CA-33	0. 802
CA-13	0. 637	CA-34	0. 194
CA-14	0. 797	CA-35	0. 092
CA-15	0. 184	CA-36	0. 335
CA-16	0. 697	CA-37	0. 400
CA-17	0. 611	CA-38	0. 510
CA-18	0. 717	CA-39	0. 403
CA-19	0. 885	CA-40	0. 868
CA-20	0. 571	CA-41	0. 864
CA-21	0. 328	CA-42	0. 104

It is used to test the relation between three or more samples, based upon assumption that these samples are taken from same location. It has advantage that it does not assume population distribution to be normal.
All the 42 factors were found to be with P-value or significance greater than the 0.05. Results show that client, consultant and contractor all possess same opinion of the identified factors.

4.5. Ranking

Relative Importance Indices (RII) was selected for ranking and analysis purposes, which is given by;

$$RII = \frac{\sum W}{A \times N}$$

Where W is the weightage given by the respondents (ranging from 1 to 5)
A is the highest weight (i.e. 5 in this case)
N is the total number of respondents
RII value ranges from 0-1
Table 6 shows the results of the calculation.

Table 6: Attributes Ranking

Rank	Code	Attributes	*RII*
1	CA-23	Experience of technical personnel	*0. 866*
2	CA-14	Staff qualification	*0. 854*
3	CA-17	Site organization	*0. 850*
4	CA-8	Type of past project completed	*0. 829*
5	CA-12	Contract cost overruns	*0. 807*
6	CA-42	Adequacy of labor resources	*0. 803*

Rank	Code	Attributes	*RII*
7	CA-39	Quality control	*0. 790*
8	CA-16	Management capability	*0. 787*
9	CA-4	Cash flow forecast (future cash inflows and out flows)	*0. 783*
10	CA-5	Size of past project completed	*0. 782*
11	CA-18	Documentation	*0. 775*
12	CA-40	Quality policy	*0. 771*
13	CA-19	Staff appraisal	*0. 770*
14	CA-7	Size of the company	*0. 768*
15	CA-41	Quality assurance	*0. 766*
16	CA-11	Past record of conflict and disputes	*0. 763*
17	CA-13	Contract time overruns	*0. 753*
18	CA-20	Coordinating procedures	*0. 741*
19	CA-1	Revenue (income)	*0. 733*
20	CA-3	Bonding capacity (security given by banks or other)	*0. 731*
21	CA-15	Organization structure	*0. 711*
22	CA-37	Relationship with material supplying agency	*0. 711*
23	CA-2	Growth rate of total assets	*0. 709*
24	CA-34	Timely decision making ability	*0. 709*
25	CA-32	Political contacts	*0. 708*
26	CA-33	Mechanism for staff recruitment	*0. 686*
27	CA-9	Past success rate in pre-qualification exercises	*0. 659*
28	CA-21	Bid preparing team experience	*0. 645*
29	CA-38	Extent of subcontracting	*0. 635*
30	CA-6	Length of time in business	*0. 634*
31	CA-30	Incentives to the staff	*0. 632*
32	CA-10	Past success rate in the final bidding stage	*0. 627*
33	CA-31	Ratio of technical and professional staff in the organization	*0. 625*
34	CA-35	Human resource training programs	*0. 612*
35	CA-29	Contacts with local authorities	*0. 598*
36	CA-28	Career prospect within organization	*0. 583*
37	CA-24	Knowledge of particular construction method	*0. 573*
38	CA-25	Work programming	*0. 561*
39	CA-27	Contractor's IT knowledge	*0. 543*
40	CA-36	Health and safety records	*0. 533*

Rank	Code	Attributes	*RII*
41	CA-22	Size of bid preparing team	*0. 52*
42	CA-26	Mechanism of selecting subcontractor	*0. 454*

5. Discussion

Figure 1 shows the graphical form of RII value of the top attributes. Top ten attributes that are identified by this study are:1) Experience of technical personnel, 2) Staff qualification, 3) Site organization, 4) Type of past projects completed, 5) Contract cost overruns, 6) Adequacy of labor resources, 7) Quality control, 8) Management capability, 9) Cash flow forecast (future cash inflows and out flows), 10) Size of past project completed.

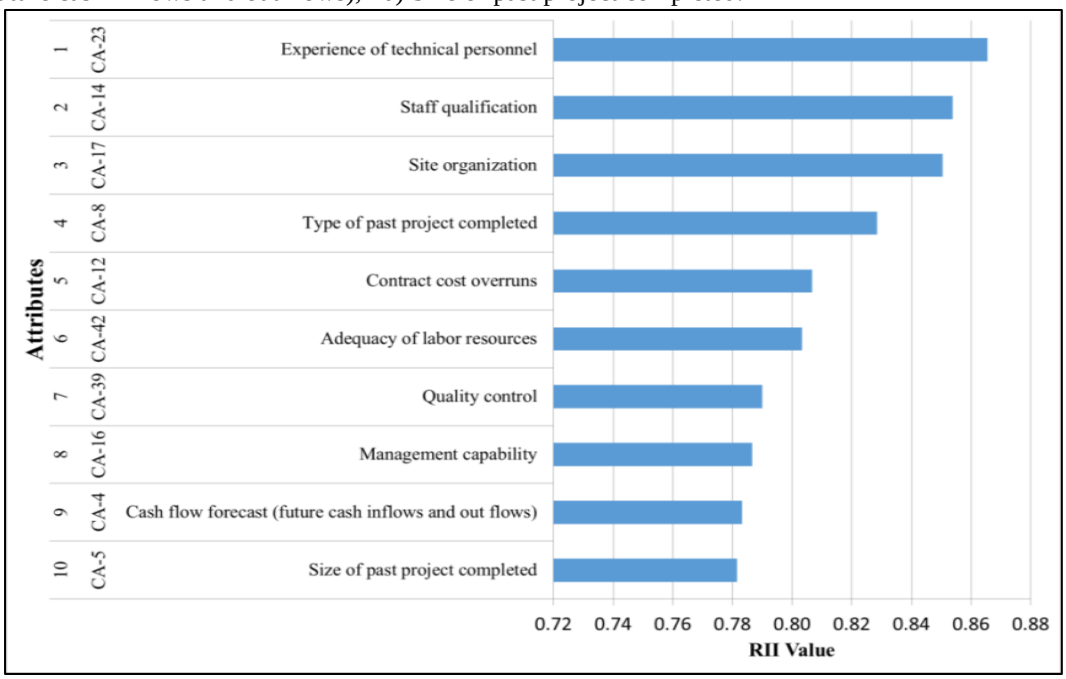

Figure 1: Top ten attributes RII values

Upcoming sections discuss the significance of top ten identified attributes.

5.1 Experience of Technical Staff

Technical staff experience is the most highly rated factor, with RII value of 0.866. Frequency distribution of the responses is show in figure 2, it is evident from the figure that much of the respondents found it to be the most effective attribute of the contractors which can play important role in construction projects outcome.

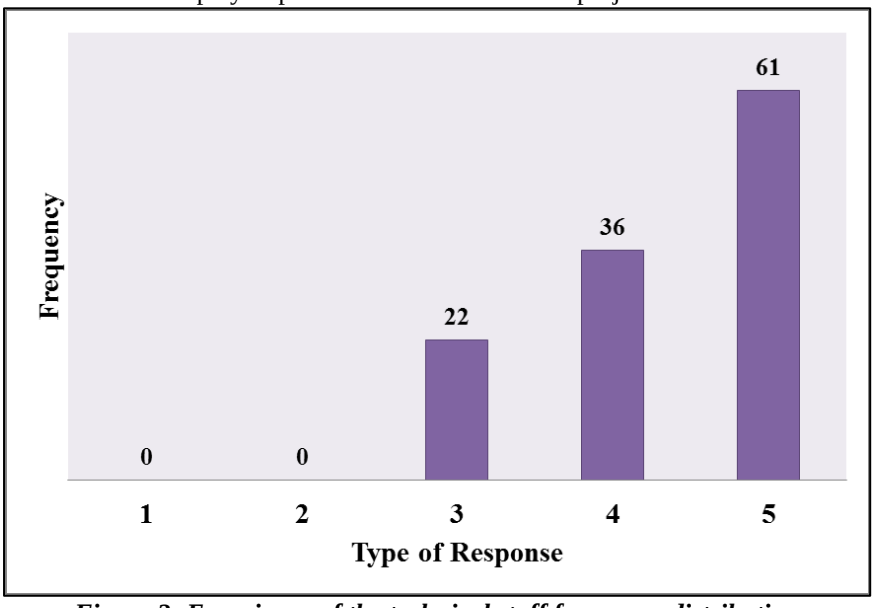

Figure 2: Experience of the technical staff frequency distribution

Human resource is key to organization success, projects are developed, managed, operating and utilized by the people (Nguyen, 2004), whereas technical knowledge enable them to adopt the correct method for utilizing machinery or equipment. While studying the delay causes in construction sector of developing countries, it has been concluded that lack of experienced technical staff is a major problem that most of the developing countries are facing.

5.2. Staff Qualification

RII value of 0.854 makes the staff qualification 2nd on the ranking list. Figure 3 shows the responses collected during survey, which affirms its second position on the list, as responses only falls in the 3, 4 and 5 categories.

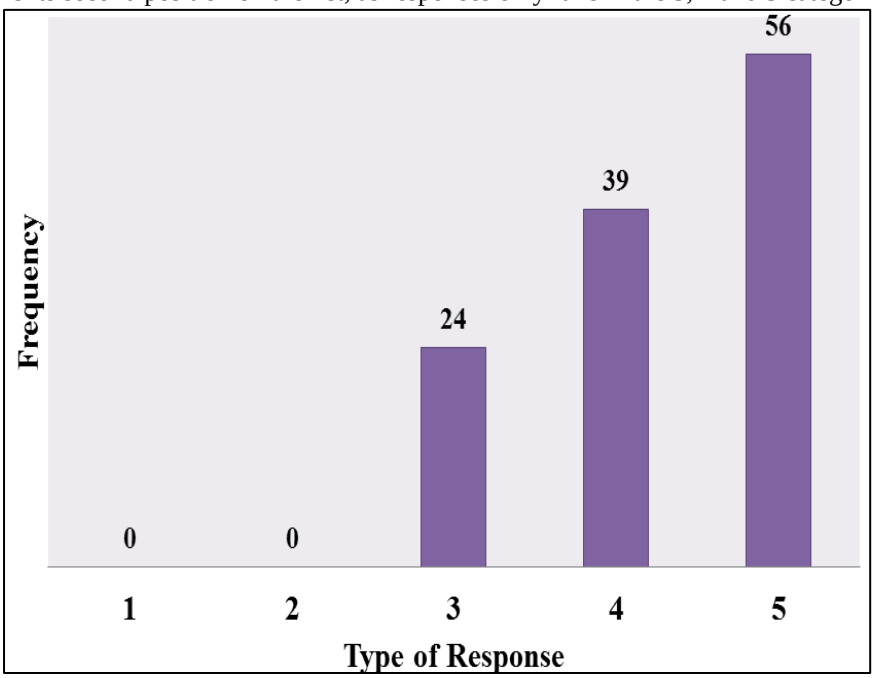

Figure 3: Staff qualification frequency distribution

Respondents found staff qualification as a major contributor to the project success. Al-Zahrani and Emsley (2013) stresses upon the need of qualified staff, and asserted that without the required skills it is very difficult to complete the project successfully.

5.3. Site Organization

Itranks third (RII 0. 850) on the list of contractor's attributes. 88. 24% of the respondents gave Site Organization rated either 4 or 5, which reflects its importance, figure 4 shows frequency distribution.

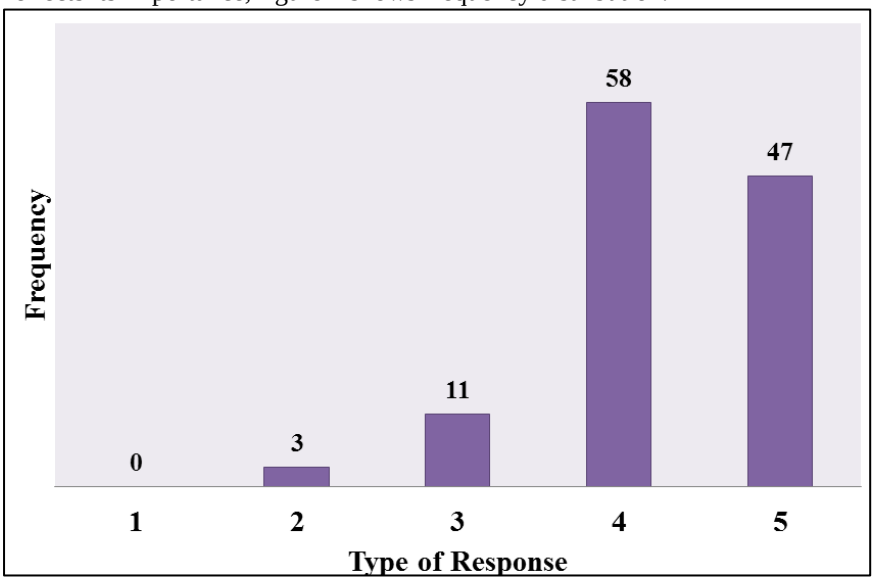

Figure 4: Site organization frequency distribution

Site organization can play important role in successfully completing the construction projects. Site organization not only affect site daily workings but also the contractor-client and contractor-consultant communication processes. Site

organizations are bend by the hostile behaviors, and it may play role in harmonizing the progress of different construction works carrying out simultaneously.

5.4. Type of past projects completed

Forth on the ranking figure 5 with RII value of 0. 829. Out of 119 respondents 56 gave Type of past projects completed "5", 25 "4" and 37 "3", as shown in frequency distribution figure below. It reaffirms the importance of past history of contractors in terms of projects taken.

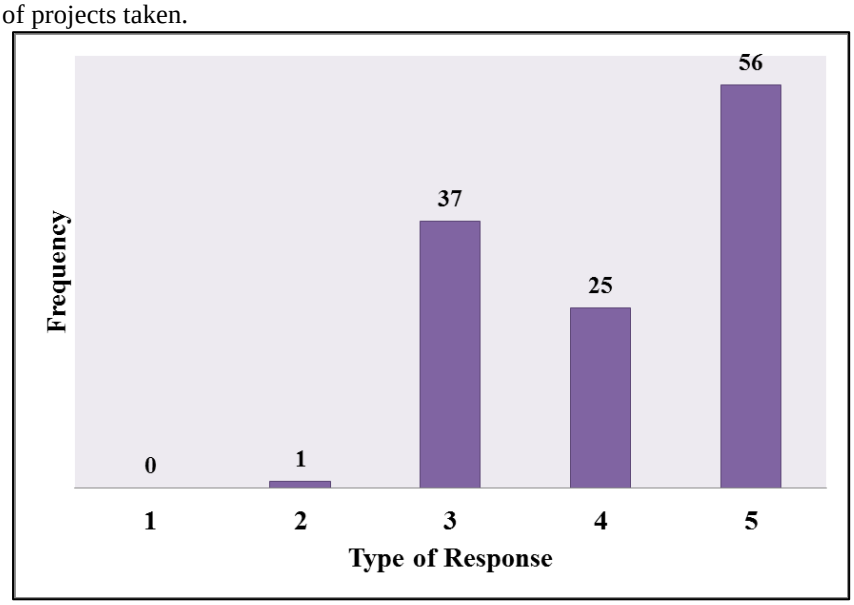

Figure 5: Type of past projects completed frequency distribution

One of the core success driving factors is the type of past projects completed (Gudienė et al., 2013). Holt et al. (1994) found contractor experienced in similar field is less risky than one without or with different projects experience. He further added that existing experience of similar projects contributes a lot in achieving project objectives.

Similarly worked carried out by Fagbenle et al. (2011) in Nigeria establishes that subcontractor's past experience highly influences selection process.

5.5. Contract cost overruns

Contract cost overruns were also perceived as important factor in construction projects. RII value is 0. 805, putting it fifth on the important factors list. Figure 6 shows that none of the respondents gave it "1" or "2" on the Likert scale during survey.

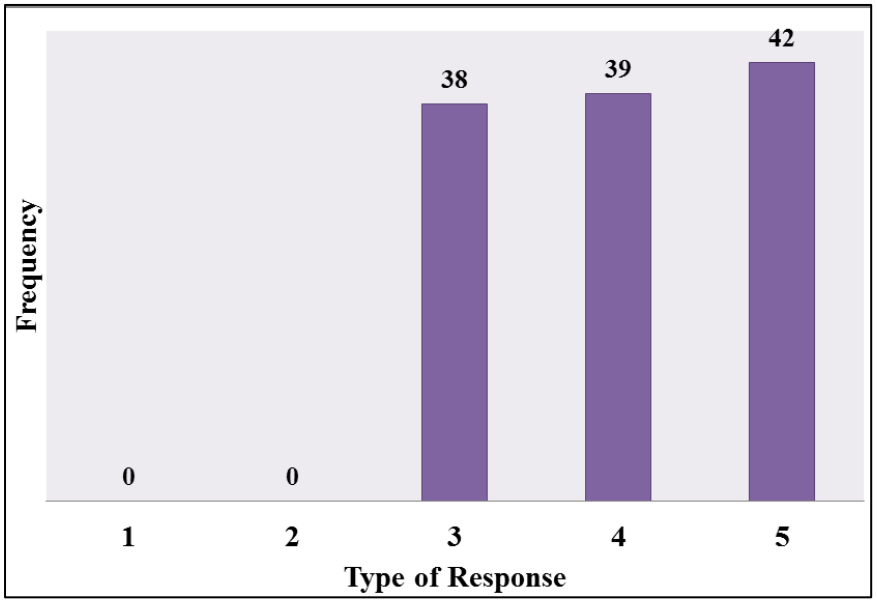

Figure 6: Contract cost overruns frequency distribution

Cost overrun is defined as when original estimated cost of the project is outstripped by the actual cost. Azhar et al. (2008), studied the cost overruns in Pakistan, they found that most of the contractors quote their bid on the existing or the normally projected prices. Material cost fluctuate rapidly while contractors fail to fathom the effects, which makes most of the time cost overruns inevitable. They proceeded the study by presenting top ten cost overrun factors among

them factors related to contractors were; poor site management, poor cost control abilities, improper planning. While taking of greater risks by medium size construction firms is also an important contributor to cost overruns.

5.6. Adequacy of labor resources

RII value of 0.803 put Adequacy of labor resources sixth on the attributes list. 73. 95% of the respondents rated this attribute greater than "3", which reiterates the importance as indicated by the RII value. Frequency distribution is shown in figure 7.

Most of the clients asses technical abilities of contractor by measuring their resources. To Mohammad pour et al. (2008) the most important factor is providing of most suitable skilled labor. Lack human resource management strategy in the construction firms is major reason for shortage of skilled labor.

Various studies have been carried out around the globe concerning labor resources. In United States owner companies are mostly concerned with shortage of skilled labor (CURT 2010). And according to some estimates United States construction industry is among the fastest growing industry hence in great need of labor resources.

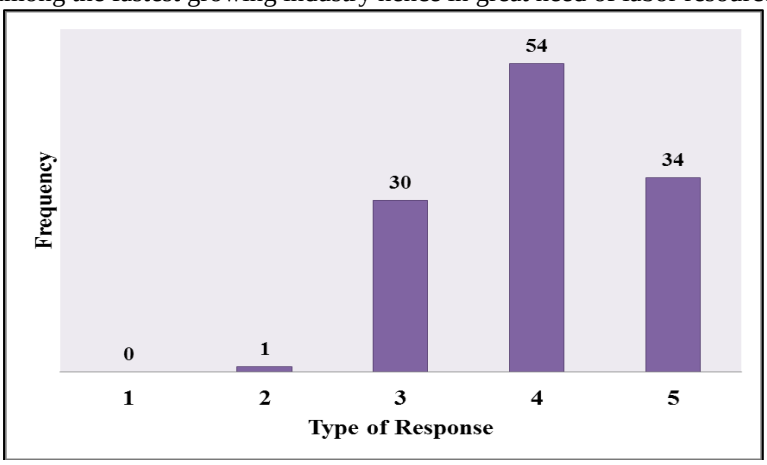

Figure 7: Adequacy of labor resources frequency distribution

United Kingdom is in similar situation, it has been reported that UK's construction industry is facing acute shortage of labor resource hence must draw labor from all sources irrespective of age, gender and ethnic background. Similar stories also reported inadequacy of labor resources in South Africa and Japan as well.

5.7. Quality Control

Quality is as important as cost and time. It ranks seventh on the list (RII value 0.790), and received rating "3" or above during the survey as shown in figure 8.

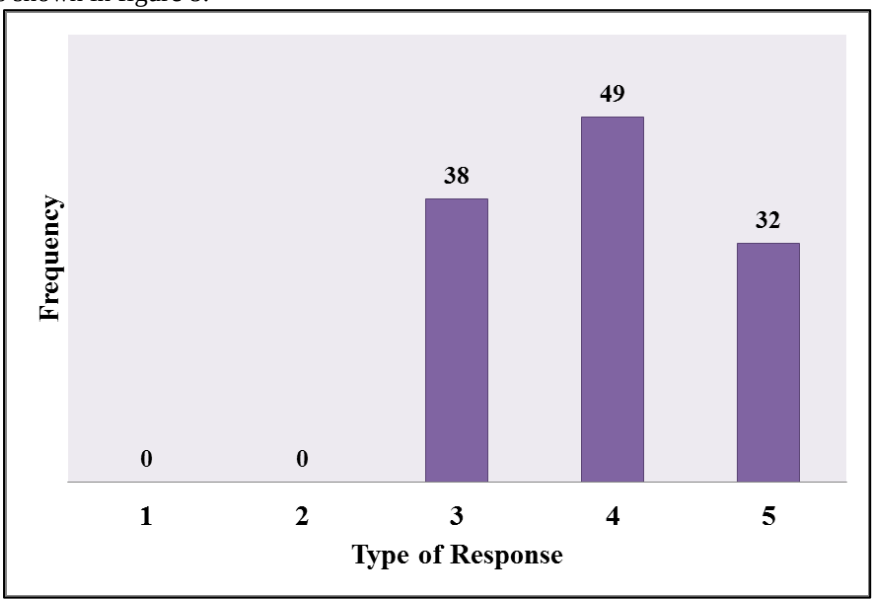

Figure 8: Quality control frequency distribution

In construction project design and construction stages have most quality issues (CIRIA). According Al-Zahrani and Emsley (2013) contractor has significant impact on the quality of project. Contractor affects the quality in terms of conformance to specification and standard of workmanship.

A survey was conducted within Member Association of QOC-FIDIC (2004), which proclaimed that, achieving appropriate Quality of Construction is a major problem all around the globe. It was found to be equally grave issue in both developed and developing worlds.

Khan et al. (2008) professed that construction industry of Pakistan is struggling to maintain the proper level of quality since many years. It can be achieved by introducing the concepts of quality assurance and control. Pakistan's most of the big firms are quality assured in terms of ISO 9000. Intentions of the certification are to get pre-qualified instead of maintaining or improving the quality standards.

Most of the countries follow flawed system of low-bid system. In such system lowest bid is accepted, and awarded the contract. Few of times quality issues and experience level are taken into account. United States is one of those countries, as reported by (Farooqui et al. 2008).

5.8. Management capability

Respondents put attribute Management capability (RII 0.787) eighth on the list of ranked attributes. Figure 9 shows the frequency distribution of responses. Importance reflected by the frequency distribution as none of the respondents rated in low on Likert scale.

Holt et al. (1994) classified contractor's competitiveness indicators in to five, among those one was management abilities. Similarly Hatush and Skitmore (1997) also classified the factors into five main classes with management capabilities of contractor one of those.

However most comprehensive work is carried out by Shen et al. (2003) contractor qualification factors are classified into six categories by Total Competitiveness Value (TCV) model. With financial ability and marketing ability, management skills are also termed as important factor.

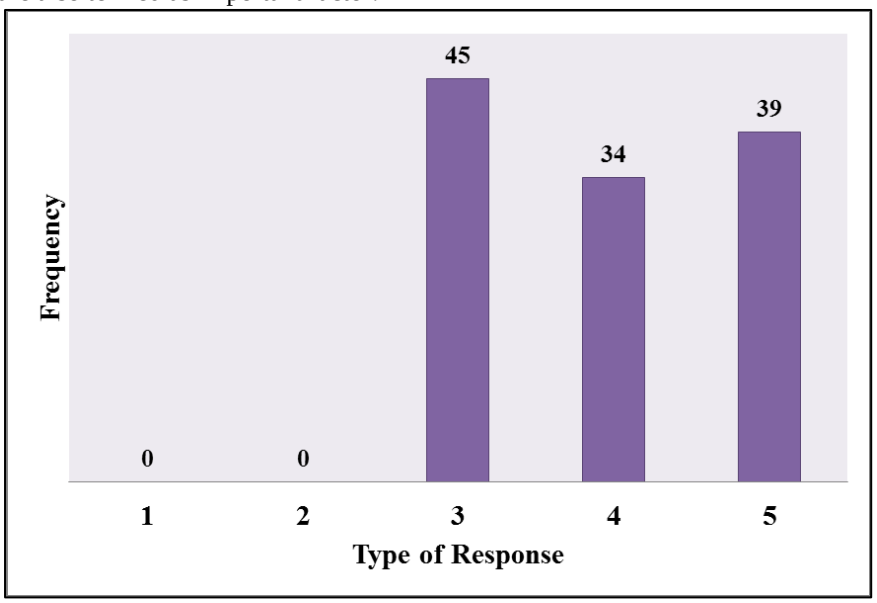

Figure 9: Management capability frequency distribution

5.9. Cash flow forecast

Cash flow forecast or turn over history is the ninth most highly rated factor, with RII value of 0.783. Most of the respondents gave the Cash flow forecast attribute of contractor high rating as show in figure 10, which reflects its importance.

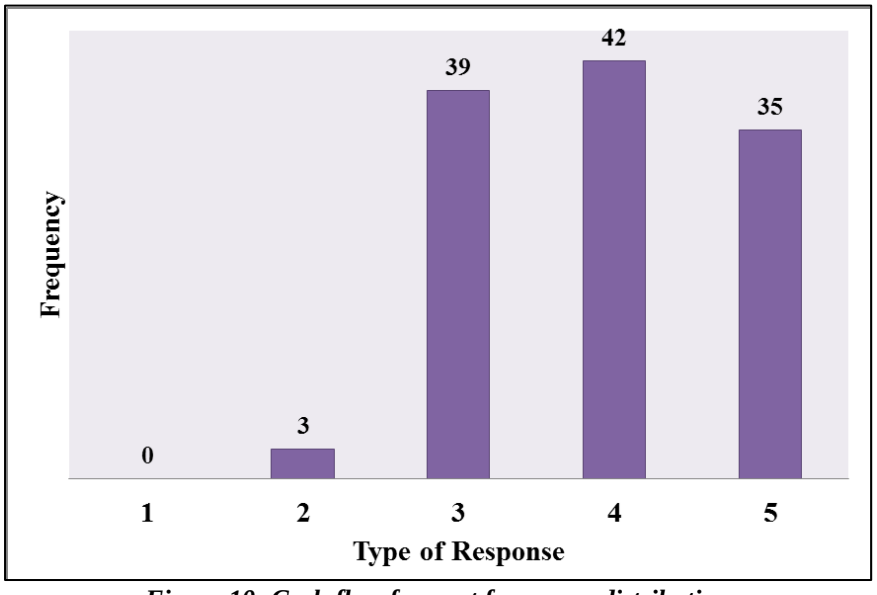

Figure 10: Cash flow forecast frequency distribution

Construction industry is among the country's leading industries, but still frequently faces bankruptcy problems due to the lack of adequate cash flows (Ibukun, 2010).
Cash flows reflect the company's strength at a given point of time to complete project took by the firm (Isik et al. 2009). Increase in income represents growth of firm, and is best indicator to judge a firm's financial strength at given period of time (Holt et al. 1994).
Lack of awareness of cash flow makes evaluation process of contractor a laborious task to do. Judging the importance of cash flows various linear programming models have been developed. These cover the cash/wire transfers, delays in payment of liabilities, precise use of credit and change in interest etc. It presents a better view of whole cash flow process.

5.10. Size of Past Projects Completed

With most of the responses above "2" and RII value of 0.782 put Size of the past projects completed of the contractor 10th on the list of top ten contractor's attributes affecting construction projects.
Holt et al. (1994) performed study similar to this in UK, proposed top five attributes of contractors. Among the top five one is size of the projects took by contractor. Several key attributes are identified by different researchers. These attributes are called Soundness of business and workforce. In those attributes past projects occupies the central position.

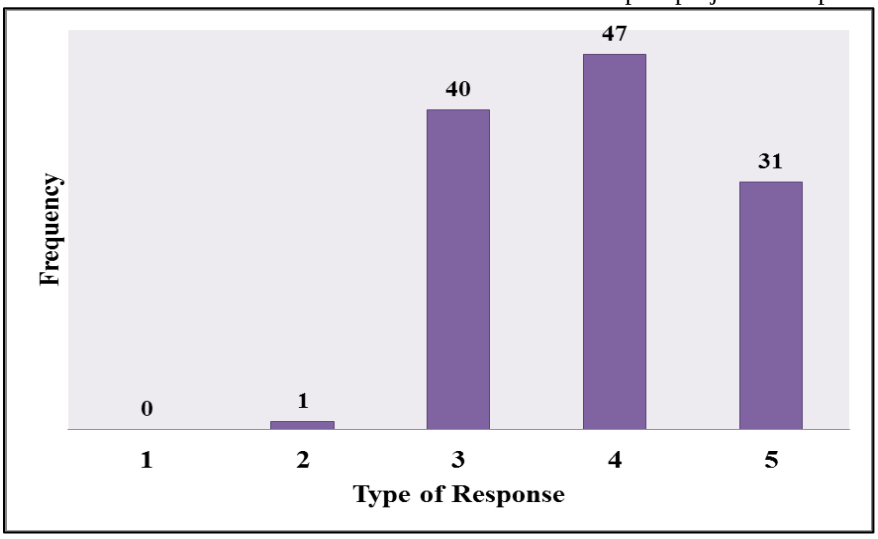

Figure 11: Size of past projects completed frequency distribution

Estimation of project time is best calculated by knowing the scope of work. Scope of work is measured by different attributes like nature of project and complexity while one is size of project.

6. Conclusion

In this section inference from the findings is concisely stated and presents a way forward to the industrial sector, to capitalize on these findings.
This study finds project success to be a subjective phenomenon. Traditionally project success is defined by iron triangle of time, cost and quality. However due to changing environmental conditions, advancement in technologies, opening of new sectors/fields and rapid urbanization the classical project success definition have somewhat lost its status.
Review reveals that people's perception can play important role in defining project success, which is generally manifested by the outcome of the project. It is expectation versus achievement. If results are better than the expected then most of the time project is considered a success. Study finds that time at which project success is appraised, has prominent effects on its success or failure declaration. Government policies, cultural beliefs, technology, norms of society, environmental factors and financial conditions delimit the construction project success. Subjective study performed during the review process affirmed that with few of local elements, Pakistan industrial sector sees identified success criteria as an acceptable gauge to measure the project success.
This study reveals that construction project success is highly related to the contractor performance. Based upon the findings, following can be concluded:

- Project cannot succeed when it is short of technical staff. Projects are run by people however required knowledge is also important, which comes with experience. Bearing in mind the experience of technical staff owner can judge the contractor,
- Qualification of staff is as important as its numbers. Without qualification workers do not have required skills to achieve the goals of project. It is necessary for clients that it do consider the qualification of employees of the contracting firm.
- Managing project requires proper communication system at the site. Construction projects should only be awarded to the firms with proper site organization.

- Being financer there is always great risk at the client side, to reduce that it is necessary that contractor selected for the project have experience in similar nature projects.
- Due to poor site management and improper and inefficient planning abilities – most of the time contract costs are overrun. Cost overruns can also great impact on project success. Contractor selecting team needs to consider past history of contractors in cost overruns.
- Progress of project is directly linked to the optimum number of labor. Time, cost and quality are can be linked to the labor availability. Client needs to consider this attribute while prequalifying a contractor.
- Quality control procedures enable contractors to achieve the targeted goals in finish product. Contractors with excellent quality control procedures are desired in construction industry.
- Contractor's management abilities are very important while considering construction project success. From processes of procurement to the labor management all needs proper management team whom can handle the issues effectively.
- Cash flow forecast indicates the financial strength of contractor, by securitizing this client/owner can get insight of contractor's financial standing which is required for timely completion of project.

Size of past projects completed by contractors can give useful information to the tendering party. By having experience in big projects, contractor acquires the skill necessary for completion of different kinds of projects.

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