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Construction Quality Perception of Construction Professionals and Their Expectations from a Quality Improvement Technique in Pakistan

Muhammad Yousaf Sadiq Awan
College of Civil Engineering, Risalpur Campus,
National University of Science And Technology, Islamabad, 44000, Pakistan
Email: salar.sadiq@gmail.com

Dr Mazhar Iqbal Arshad
College of Civil Engineering, Risalpur Campus,
National University of Science And Technology, Islamabad, 44000, Pakistan
Email: miarshd@gmail.com

Dr Muhammad Maqbool Sadiq Awan
College of Civil Engineering, Risalpur Campus,
National University of Science And Technology, Islamabad, 44000, Pakistan
Email: maqmon7@gmail.com

Abstract
The complexity arises in defining the construction quality due to its perception, based on inherent market conditions and their requirements, the diversified stakeholders itself and their desired output. A quantitative survey based approach was adopted in this constructive study. A questionnaire based survey was conducted for the assessment of construction Quality perception and expectations in the context of quality improvement technique. The survey feedback of professionals of the leading construction organizations/companies of Pakistan construction industry were analyzed. The financial capacity, organizational structure, and construction experience of the construction firms formed basis for their selection. After statistical analysis of survey feedback it was found reliable and valid for the inferential purpose to the target population of construction professionals. The quality perception was found to be project scope oriented, considered as an excess cost for a construction project and keeping the rework minimum by qualifying the required quality tests, keeping the defects minimum by ensuring the specifications of supplied material. Any quality improvement technique was expected to address the financial aspects of the construction project for the employer and contractor, by increasing the profitability through reduction in overall cost, reduction in time, reduction in defects and improving the productivity in a construction project. The study is beneficial for the construction professionals to assess the prevailing construction quality perception and the expectations from implementation of any quality improvement technique in construction projects.
Keywords : Construction Quality, Perception, Expectations, Improvement Technique

1. Introduction

Defining the term “quality” is difficult (Chan et al. 2006). In case of building construction meaningful and precise elucidation is even more difficult (Pheng & Kwang 2005), meeting expectations of the customer(Chase et al. 2003). (Heravitorbati et al. 2011) articulated quality as accomplishment of expectations of all the stakeholders involved in and affected by the outcome of construction projects. (Kanji & Wong 1998; Yusoff et al. 2004) also interpret quality as achievement of customer’s expectations. Quality is also defined as conforming to the established requirements in time completion and within project cost (Wong 1999; Jaafari 1996). Juran (1988) defined quality as a defects free product or facility or service, reduced rework or defects (Atkinson et al. 2006 ; Love et al. 1999; Al-tmeemy et al. 2012).The American Society for Quality (www.asq.org) and Crosby (1992) also support this definition.

An increasing customer demand of quality due to prevailing increased business competition in the free market model (Pipino et al. 2002), quality perception becomes a critical matter for the construction industry(Chung & Huang 2007).This challenge becomes even more critical to stay in the competition for a developing construction industry like Pakistan. To meet this, achieving the quality improvement is perquisite. This excellence can only be achieved through an effective quality management(Lee 2004). The pursuance of sound quality management practices to achieve the perceived construction quality is now mandatory (Pipino et al. 2002). To become more competitive under these challenging environment of developing countries, Construction industry of Pakistan needs to cope with latest trends and demands, through quality excellence and enhanced performance byadopting a clear and market based perception and strategy of continuous improvement.

This paper describes a descriptive quantitative study in which, the sampling frame consists of construction professionals working on different projects spread all over the country under seven big construction organizations/companies. These companies were stratified on the basis of their financial capacity of undertaking mega project, adoptability for new quality improvement techniques, well established organizational structure, human resource capability and experience in construction. Out of these seven companies five are PEC registered CA-category(no limit) companies, and out of remaining two one is leading housing and real state developer in Pakistan and other is a Armed Forces organization having vast experience of developing housing colnies in all the major cities of Pakistan.

2. Objectives

The objectives of the study are to assess the current construction quality perception of construction professionals and their expectations from implementation of quality improvement technique at construction project level.

3. Methodology

3.1 Development of preliminary questionnaire

After an extensive literature review, a preliminary questionnaire was developed. The items of questionnaire were adopted from previous studies of (Nawaz & Ikram 2013) and (Hoonakker et al. 2010)

3.2 Pilot Survey

A pilot survey was conducted for the validation and reliability (authenticity and applicability) of preliminary questionnaire (Thompson 2010).The test sample for pilot survey consisted of 30 randomly selected respondents. According to (Dillman, 2007) the selected sample size was adequate for realistic and feasible pilot test sample (Advice & Checks 1999). These respondents were working on different projects in major cities including few respondents from academia. The observations, feedback and suggestions obtained from pilot survey served as guidelines for modification and formulation of the questionnaire design for final survey.

3.3 Sampling frame and Sampling unit

For the study a sampling frame of construction professionals registered with Pakistan Engineering Council (PEC) were chosen. Each respondent was taken as a sampling unit.

3.4 Sample Size

Complete sample consisted of unit participated in questionnaire survey (Dillman 2007).The optimum sample size was found to be 96, using guidelines as suggested by (Dillman 2007):-

$$Ns = \frac{(Np)\,(P)\,(1-P)}{(Np-1)(B/C)^2 + (P)(1-P)}$$

Where:
Ns: sample size for the desired level of precision;
Np: Population size of 40000, was selected based on estimated civil engineers (according to PEC magazine 2013 the number of registered civil engineers are around 32184);
P: Proportion of the population that is accepted to choose one of the response categories
B: acceptable sampling error of ±10%; and
C: Z statistic of 1.96 associated with 95%confidence level.

3.5 Sampling Technique

For the study multiple probability technique was adopted by carrying out stratified random sampling. First sample population was stratified on the criteria as mentioned in scope of the study, and then random sampling was done within the sampling frame.

3.6 Questionnaire Design

The survey questionnaire had three Parts. The first part in the finalized questionnaire after pilot survey was regarding respondent attributes, consisting of information mainly regarding the name of respondent, name of organization in which respondent is working, designation, qualification, location and experience of the respondents.
The second part was regarding quality perception attributes, formulated to assess the quality perception of respondents. This part was containing ten(10) statements, and respondents were asked to choose their level of agreement to each of the statement on a five point likert scale showing the extent to which each statement defines his perception of construction Quality. The choices were from strongly agreed to strongly not agreed. A

sample question is presented in Table **2**:-

Table 2 Sample Question

1	Excessive cost	Strongly Agreed	Agreed	Neutral	Disagreed	Strongly Disagreed

The third part of questionnaire was regarding expectation attributes, framed to identify the expectations of the respondents from a quality improvement technique. In this part also respondents were asked to choose their level of agreement to each of the statement on a five point likert scale. This part was further divided into three sub parts under the headings of *General expectations*, *Expectations in terms of stake holders,Expectations in terms of cost, time, scope, productivity* and a total of eighteen items.

3.7 Conduct of Survey

The developed 200 questionnaire were then sent to main offices, regional offices and to 30 different project sites of companies/organizations under study covering the major cities of Pakistan. Multiple sources were used for conduct of survey. Figure 1 shows the source and response distributions for this survey. Out of 200 questionnaires, 112 were returned which makes a response rate of 56%. After scrutiny 14 questionnaires were discarded as they were either wrongly filled or incomplete. So, 98 questionnaires were used for data analysis purpose which is more than the desirable sample size..

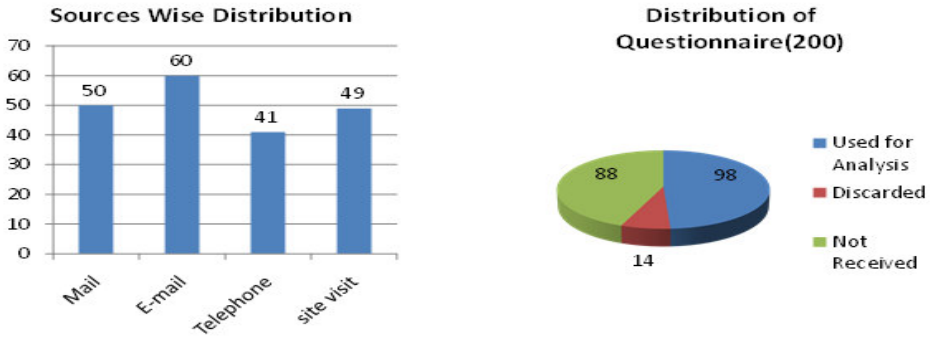

Figure 1 Source and Response Distribution of Survey

Owing to difference in perception on the basis of their level of management designation, experience and qualification, the chosen respondents were project managers, site engineers, planning engineers, quality control staff and field staff (Quantity Surveyors). Every respondent was considered as one sampling unit. Figure 2 shows the respondents designation wise distribution and their qualification.

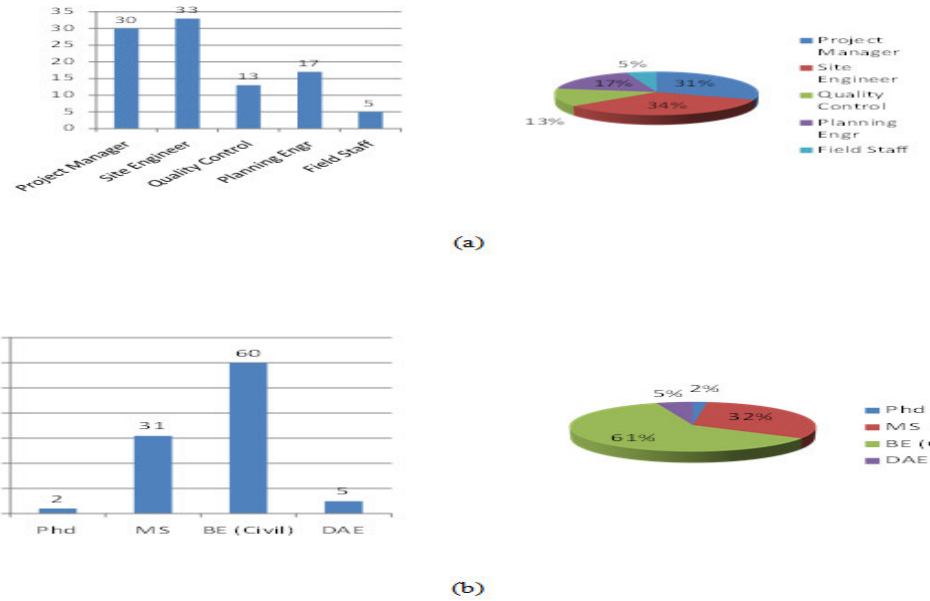

Figure 2 Distribution of Respondents: (a) Designation Wise, and(b) Qualification Wise

4. Analysis and results

4.1 Organizing the Data

MS Excel was used to organize the received data and PASW-18 was used for statistical analysis. The raw data was organized in the form of frequency distribution for part-2 and part-3 of questionnaireand then it was assigned numeric values from 4 to 0 on the basis of likert scale for each response of strongly agreed to strongly disagree.

4.2 Frequency Score for each Item-Construction Quality Perception

To assess the quality perception of construction professionals , a total of ten(10) statements defining the construction quality were formulated by incorporating the feed back of pilot survey. Total no of responses were 98. Thus total no of answers were 98x10 = 980. The frequencies of answers are tabulated below in Table 2 and summarized in Figure 3.

Table 3 Construction Quality Perception

S/ NO	Items	Answers Frequency				
		4	3	2	1	0
1	Achieving the scope of project	71	19	8	0	0
2	Qualifying the required tests	61	24	13	0	0
3	Keeping the defects minimum	55	17	16	10	0
4	Profitability of tasks completed	19	26	17	10	26
5	Minimum rework	63	20	9	6	0
6	Minimum variation(schedule, cost, time)	31	33	23	9	2
7	Aesthetics (Good looks)	13	14	29	14	28
8	Excessive cost	68	19	9	2	0
9	Customer satisfaction	22	35	27	10	4
10	Ensuring specification of materials and workmanship	54	21	18	5	0
	Total	457	228	169	66	58
	Percentage	47%	23%	17%	7%	6%

While analyzing the individual items on the basis of frequency of choice in

Table 3, it is observed that achieving the scope and excess cost appears to be at the top while customer satisfaction and aesthetics (Good looks) at the bottom.

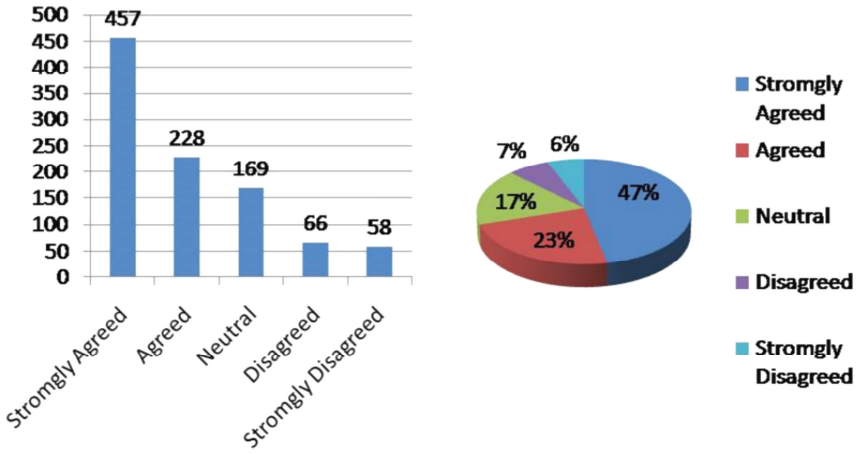

Figure 3 Summary of Frequencies of Answers- Construction Quality Perception

The summary of frequencies in Figure 3 show that about 47% respondents chose the option of strongly agreed, 23% chose agreed, 17% chose neutral, 7% chose disagreed and 6% chose strongly disagreed to express their views about the construction quality perception.

4.3 Frequency of Score for each Item-Expectation from improvement

Technique. To assess the expectations of construction professionals from a quality improvement technique .A total of ten(18) items were formulated under the headings of General expectations, Expectations in terms of stake holders, Expectations in terms of cost, time, scope and productivity by incorporating the feedback of pilot survey. Total no of responses were 98. Thus total no of answers were 98x18 = 1764.The frequencies of answers are tabulated below in the Table 3.

Table 4 Expectation from improvement technique

General expectations					
Items/Question Type	Answers Frequency				
	4	3	2	1	0
Financial aspects	76	15	7	0	0
Quality aspects	44	24	19	11	0
Customer satisfaction	27	25	18	28	0
Technical aspects	33	31	22	12	0
Expectations in terms of stake holders					
Items/Question Type	Answers Frequency				
	4	3	2	1	0
Benefits for employer	51	18	12	7	10
Benefits for contractor	67	22	7	2	0
Benefits for employer and contractor	89	7	2	0	0
Benefits for sub contractor	26	13	3	19	37
Expectations in terms of cost, time, scope and productivity					
Items/Question Type	Answers Frequency				
	4	3	2	1	0
Increased business	27	21	13	37	0
Increased credibility	29	18	16	16	19
Increased profits	78	14	6	0	0
Improved safety	17	7	33	41	0
Reduction in time	44	10	21	23	0
Reduction in cost of poor quality(COPQ)	47	18	19	14	0
Improved schedule performance (Productivity)	59	11	12	16	0
Overall reduction in cost	69	13	6	10	0
Facilitates in achieving scope	63	14	7	`14	0
Facilitates in defect reduction	73	11	7	7	0
Total	919	292	230	257	66
Percentage	52%	16%	13%	15%	4%

While analyzing the individual items on the basis of frequency of choice in Table **4**, it was observed that financial aspect in general expectations, benefit to employer and contractor in terms of stake holders and increased profits appears to be at the top while customer satisfaction, benefits for subcontractor and improved safety were at the bottom.

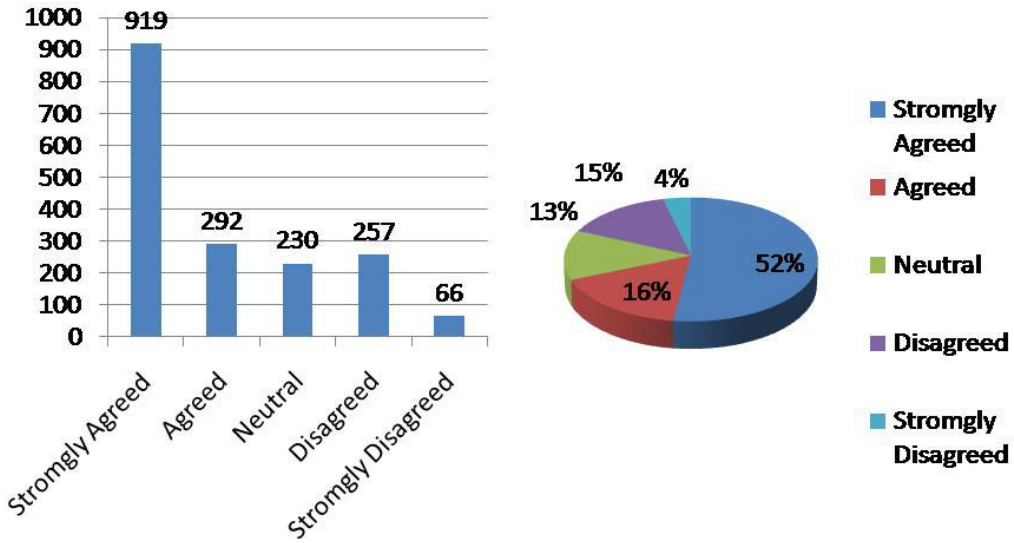

Figure 4 Summary of Frequencies of Answers-Expectation from Improvement Technique

The summary of frequencies in Figure 4, show that about 52% respondents chose the option of strongly agreed, 16% chose agreed, 13% chose neutral, 15% chose disagreed and 4% chose strongly disagreed to express their views about expectations from improvement technique.

4.4 Reliability and validity analysis of data

The reliability and validity of data was determined using Cronbach's Coefficient Alpha for all the 28 items (Brazier et al. 1992) and Cronbach's coefficient half split method by splitting the items in two halves of 14 items each(Pallant 2007). The test results are tabulate in Table 5.

Table 5 Reliability and validity analysis results

Test Type	**Case Processing Summary**					
Cronbach's Coefficient Alpha			N	%	Cronbach's Alpha	.878
	Cases	Valid	98	100		
		Excluded	0	0	Number of Items	28
		Total	98	100		
	a. Listwise deletion based on all variables in the procedure					
Cronbach's Coefficient Alpha split Half	Part 1				Value	0.843
					No of items	14
	Part 2				Value	0.856
					No of items	14
	Total No Of Items					28

In this case the value of cronbach's alpha for 28 item was found to be 0.887, which is greater than 0.75 for reliability of 95% confidence interval (Brazier et al, 1992;Chung et al, 1998). The test indicates that the data under study is reliable for analysis. The value of Cronbach's Coefficient Alpha using half split method were also found to be 0.835 and 0.826 for 1st and second half respectively, which reconfirms the reliability of data.

4.5 Normality analysis of data

An evaluation of data for normality is precondition for many statistical Tests. It is performed to check whether the collected data is normally distributed or otherwise i.e. the data is parametric or non parametric.For the data set of more than 2000 elements/values Kolmogrove-Smirnove also known as K-S Lillifors is suitable. A more thorough test for normality, suitable for a data set of less than two thousand (2000) elements or less is presented by Shapiro-wilk test (Park 2008). To count as sufficiently normal, the significance(Sig) value should be non significant (i.e. it should be larger than 0.05).Owing to the limitation of sample size the Shapiro wilk test was applied on the data in PASW-18.

Table 6 Construction Quality Perception-Test results for Normality

Items	**Kolmogrove-Smirnove**[a]			**Shapiro-wilk**		
	Statistics	df	Sig	Statistics	Df	Sig
Achieving the scope of project	.431	98	.000	.612	98	.000
Qualifying the required tests	.369	98	.000	.708	98	.000
Keeping the defects minimum	.333	98	.000	.745	98	.000
Profitability of tasks completed	.201	98	.000	.856	98	.000
Minimum rework	.373	98	.000	.678	98	.000
Minimum variation(schedule, cost, time)	.219	98	.000	.867	98	.000
Aesthetics (Good looks)	.186	98	.000	.875	98	.000
Excessive cost	.404	98	.000	.642	98	.000
Customer satisfaction	.219	98	.000	.888	98	.000
Ensuring specification of materials and workmanship	.327	98	.000	.757	98	.000

a. Lillifores Significance Correction

Table 7 Expectation from improvement Technique-Tests for Normality

Items	**Kolmogrove-Smirnove**[a]			**Shapiro-wilk**		
	Statistics	df	Sig	Statistics	Df	Sig
Financial aspects	.458	98	.000	.558	98	.000
Quality aspects	.266	98	.000	.807	98	.000
Customer satisfaction	.196	98	.000	.834	98	.000
Technical aspects	.205	98	.000	.850	98	.000
Benefits for employer	.297	98	.000	.755	98	.000
Benefits for contractor	.396	98	.000	.644	98	.000
Benefits for employer and contractor	.518	98	.000	.363	98	.000
Benefits for sub contractor	.237	98	.000	.780	98	.000
Increased business	.251	98	.000	.798	98	.000
Increased credibility	.174	98	.000	.856	98	.000
Increased profits	.468	98	.000	.535	98	.000
Improved safety	.249	98	.000	.780	98	.000
Reduction in time	.294	98	.000	.775	98	.000
Reduction in cost of poor quality(COPQ)	.288	98	.000	.788	98	.000
Improved schedule performance (Productivity)	.365	98	.000	.721	98	.000
Overall reduction in cost	.411	98	.000	.616	98	.000
Facilitates in achieving scope	.378	98	.000	.666	98	.000
Facilitates in defect reduction	.434	98	.000	.583	98	.000

a. Lillifores Significance Correction

The results show that the significance for all the items are non significant (less than 0.05), so the data under study is not normally distributed and non parametric as shown in and. So for further analysis in PASW only non parametric tests will be used.

4.6 Descriptive statistics, Relative Importance Index(RII) and Fried man Rank Test

In descriptive statistics standard deviation, skewness, kurtosis and mean for all the items in part-2 and part-3 of the questionnaire were calculated. These statistics were used to confirm the distribution of data and establish ranking among the items understudy. Relative importance index (RII) was calculated for each item to rank them on the basis of their relative importance.The ranking of all items in questionnaire was further confirmed usingnon- parametric statistical tests (Kanji 2006). In that the Friedman rank test (PASW-18), also known as ranking of means test , was conducted for further analysis, and confirmation of the ranking among the items in part-2 and part-3 of the questionnaire.The test was conducted with the assumption that data is not normally-distributed. Table 7 shows the test results of all statistical tests performed and established overall rank for all items of part 2 of the questionnaire regarding construction quality perception prevailing in construction industry of Pakistan.

Table 8 Construction quality perception

Items	Std.dev	Skewness	Kurtosis	Mean	RII	Friedman Ranks	Overall Rank
Achieving the scope of project	.63	-1.569	1.268	3.64	0.91	7.69	1
Qualifying the required tests	.72	-1.057	-.280	3.48	0.87	7.22	3
Keeping the defects minimum	1.05	-.942	-.520	3.19	0.79	6.10	6
Profitability of tasks completed	1.49	-.169	-1.414	2.02	0.51	2.68	9
Minimum rework	.89	-1.489	1.206	3.42	0.85	7.00	4
Minimum variation(schedule, cost, time)	1.04	-.613	-.308	2.83	0.71	4.66	7
Aesthetics (Good looks)	1.37	.206	-1.112	1.69	0.43	1.92	10
Excessive cost	.74	-1.653	1.974	3.56	0.89	7.46	2
Customersatisfaction	1.06	-.533	-.228	2.62	0.66	3.88	8
Ensuring specification of materials and workmanship	.93	-.942	-.336	3.26	0.82	6.38	5

Table 9 shows the test results of all statistical tests performed and established overall rank for all items of part 3 of the questionnaire, concerning expectations from use of improvements techniques. As the statistical analysis result shows that the value of skewness and Kurtosis not equal to zero indicating the lack of normality in the data (Kanji 2006; Pallant 2007). The negative values of the Kurtosis in Table **8** and Table 9,also show the flatness of the distribution curve of data under study which further confirms that the data is not normal and is

non-parametric.The Ranking was done on the basis of mean score, RII and Friedman rank test (PASW-18) and all tests established similar ranking for items mentioned in the survey.

Table 9 Expectation from improvement Techniques

General expectations							
Items	Std.dev	Skewness	Kurtosis	Mean	RII	Freidman Ranks	Overall Ranks
Financial aspects	.641	-1.715	1.622	3.663	0.93	3.47	1
Quality aspects	1.088	-.615	-1.005	2.989	0.76	2.56	2
Customer satisfaction	1.194	-.006	-1.530	2.479	0.63	1.71	4
Technical aspects	1.055	-.396	-1.074	2.826	0.71	2.26	3
Expectations in terms of stake holders							
Items	Std.dev	Skewness	Kurtosis	Mean	RII	Freidman Ranks	Overall Ranks
Benefits for employer	1.427	-.991	-.433	2.887	0.73	2.40	3
Benefits for contractor	.802	-1.682	2.202	3.510	0.89	2.78	2
Benefits for employer and contractor	.462	-3.110	8.988	3.846	0.98	3.23	1
Benefits for sub contractor	1.407	.400	-1.576	1.632	0.43	1.59	4
Expectations in terms of cost, time, scope and productivity							
Items	Std.dev	Skewness	Kurtosis	Mean	RII	Freidman Ranks	Overall Ranks
Increased business	1.248	.099	-1.639	2.387	0.60	3.64	8
Increased credibility	1.509	-.208	-1.414	2.224	0.55	3.10	9
Increased profits	.566	-2.053	3.177	3.734	0.95	7.76	1
Improved safety	1.079	.824	-.598	1.989	0.51	2.67	10
Reduction in time	1.235	-.365	-1.538	2.826	0.71	5.14	7
Reduction in cost of poor quality(COPQ)	1.121	-.627	-1.085	3.000	0.75	5.62	6
Improved schedule performance (Productivity)	1.008	-.904	-.676	3.255	0.78	6.46	5
Overall reduction in cost	.995	-1.619	1.224	3.438	0.85	6.94	3
Facilitates in achieving scope	1.102	-1.251	.001	3.285	0.82	6.49	4
Facilitates in defect reduction	.910	-1.850	2.170	3.530	0.89	7.21	2

It was observed that from descriptive statistical analysis that difference between 5% trimmed means and original means, was negligible therefore outliers were not removed(Pallant 2007)

4.7 Kruskal Wallis test

The Kruskal Wallis test was performed to identify that all independent sample population groups under studyare identical or diverse response on the variable of their interest. The test resultswere tested against the hurdle of significance of 0.05. If the significance value is more than 0.05 it means that the perception is similar among the groups and vice versa(Marques de Sa 2007).Table 9 shows the Kruskal Wallis test results for all the items of part 2 of questionnaire, regarding construction quality perception, while the Table 11 shows the the Kruskal Wallis test results for all the items of part 3 of the survey questionnaire, concerning expectations from quality improvement technique.As it can be observed that all the values of Significance in Table 10 and Table 11 are greater than 0.05, indicating that the perception is similar among the all sample population groups, consisting of project managers, site engineers, planning engineers, quality control staff and the field staff..

Table 10 Test statistics for construction quality perception

S/NO	Items	Chi-square	df	Asymp.Sig
1	Achieving the scope of project	8.842	4	0.065
2	Qualifying the required tests	6.174	4	0.187
3	Keeping the defects minimum	5.592	4	0.232
4	Profitability of tasks completed	4.349	4	0.361
5	Minimum rework	6.699	4	0.153
6	Minimum variation(schedule, cost, time)	4.750	4	0.314
7	Aesthetics (Good looks)	4.993	4	0.288
8	Excessive cost	7.164	4	0.127
9	Customer satisfaction	5.141	4	0.273
10	Ensuring specification of materials and workmanship	5.053	4	0.282

a. Kruskal Wallis Test
b.Grouping Variable: Designation

Table 11 Test Statistics for Expectation from improvement Techniques

	Items	Chi-square	df	Asymp.Sig
1	Financial aspects	1.167	4	0.883
2	Quality aspects	0.611	4	0.962
3	Customer satisfaction	0.202	4	0.995
4	Technical aspects	0.391	4	0.983
5	Benefits for employer	6.312	4	0.177
6	Benefits for contractor	6.228	4	0.183
7	Benefits for employer and contractor	6.665	4	0.155
8	Benefits for sub contractor	3.827	4	0.430
9	Increased business	4.822	4	0.306
10	Increased credibility	4.433	4	0.351
11	Increased profits	6.383	4	0.174
12	Improved safety	4.903	4	0.297
13	Reduction in time	6.499	4	0.165
14	Reduction in cost of poor quality(COPQ)	5.375	4	0.251
15	Improved schedule performance (Productivity)	5.432	4	0.243
16	Overall reduction in cost	6.588	4	0.159
17	Facilitates in achieving scope	6.338	4	0.175
18	Facilitates in defect reduction	8.599	4	0.071

a. Kruskal Wallis Test
b.Grouping Variable: Designation

5. Discussion

5.1 Observations on survey data

During the analysis of data gathered from the questionnaire survey for reliability, normality, descriptive statistics, ranking through relative importance index (RII) and Friedman rank test following was observed :-

1) The data was fed in PASW-18 for reliability and validity check. The results of reliability and validity analysis by Cronbach's Alpha and Cronbach's Alpha split half method (PASW-18) proved that data obtained through survey was considerably reliable. and valid as the values in both the cases were > 0.75.
2) To check the normality of data i.e whether the data is normally distributed or otherwise normality analysis was carried out in PASW-18 , applying Shapiro-wilk test and the results show that the data is is not normally distributed and hence only Non parametric tests will be used for further analysis.
3) Descriptive statistical analysis in PASW-18 was applied to reconfirm that if the data under study is normal or not. The values of kurtosis and skewness reconfirmed that data is not normally distributed.
4) Mean Scores for all the attributes under study/discussion were also calculated through descriptive statistical analysis in PASW-18 for assessing the ranking subsequently.
5) To assess the data for ranking of attributes in construction quality perception, expectations from an improvement technique and barriers for implementation of six sigma in construction industry relative importance index (RII) was calculated and ranks were assigned. The detailed results are discussed in subsequent paragraphs.
6) Friedman's mean rank test was applied on the data in PASW-18 which reconfirmed the ranking

already assigned through RII.

5.2 Observations regarding assessment of construction quality perception of construction professionals as a objective of the study

On the basis of analysis of survey data and the results following are few observations in the context of construction quality perception of construction professionals :-

1) The overall ranking for construction quality perception, as the result of survey data analysis, based on respondents choices, interpreted in terms of numerical values assigned, mean score, RII and Friedman Mean rank test is as under :-
   a) Achieving the scope of project
   b) Excessive cost
   c) Qualifying the required tests
   d) Minimum rework
   e) Ensuring specification of materials and workmanship
   f) Keeping the defects minimum
   g) Minimum variation(schedule, cost, time)
   h) Customer satisfaction
   i) Profitability of tasks completed
   j) Aesthetics (Good looks)
2) The analysis and results indicate that, for most of the construction professionals the perception of construction quality mainly revolves around :-
   a) Achieving the scope of project,
   b) Excessive cost,
   c) Qualifying the required tests,
   d) Minimum rework,
   e) Ensuring specification of materials and workmanship

This means that perception of construction quality for construction professionals is limited within the boundaries of project scope, so achieving the scope means achieving the quality.

3) The results also indicate that considering, minimum rework and Keeping the defects minimum both as construction quality are perceived to be inter related and are ranked at number 4 and 6 respectively.
4) Minimum variation(schedule, cost, time) was perceived as achieving the scope By the professionals, as it facilitates in achieving scope of work within time, cost and schedule..
5) Customer satisfaction was also perceived to be achieved as the scope of the project is achieved, As it is believed that the requirement and satisfaction of the customer in the developing markets like Pakistan is achieved by achieving the project scope in any construction project. So, due to this perception Customer satisfaction is ranked low.
6) Defining the construction quality by profitability of tasks completed is ranked low because it is currently believed that superior construction quality comes with an attached cost
7) Aesthetics is not considered as definition of construction quality as it is considered far more than apparent Good looks.

5.3 *Observations regarding identifying the expectations of construction professionals from an improvement technique as a objective of the study :-*

On the basis of analysis of survey data and the results following are few observations in the context of expectations of construction professionals from an improvement technique :-

1) Generally it is expected that an improvement method will target the Financial Aspect and the perceived Quality Aspects (required to achieve scope or dictated by the scope) of the construction project..The technical aspects and the customer satisfaction are considered relatively less important as they are assumed as byproduct.
2) When talking about the expectations in terms of the Stakeholders. It is expected that by the construction professionals that the improvement technique must benefit both employer and the contractor
3) The overall ranking for expectations from an improvement technique, as the result of survey data analysis, based on respondents choices, interpreted in terms of numerical values assigned, mean score, RII and Friedman Mean rank test is as under
   a) Increased profits
   b) Facilitates in defect reduction
   c) Overall reduction in cost
   d) Facilitates in achieving scope

e) Improved schedule performance (Productivity)
f) Reduction in cost of poor quality (COPQ)
g) Reduction in time
h) Increased business
i) Increased credibility
j) Improved safety

4) From Project cost, time, scope and productivity point of view, the expectations from an improvement technique mainly revolve around :-
   a) Increase in profits
   b) Reducing the defects
   c) Reduction in overall cost
   d) Achieving the scope of project by
   e) Improved productivity

A detailed study of aforementioned aspects reveal that these all aspects are inter related as increase in profit on any construction project is linked with reduction in defects which reduces the over all cost of the project and achieving of scope in time depends on improved productivity.

6. Conclusion

In developing countries like Pakistan construction quality must be perceived realistically, implemented and managed through proactive and long lasting approach to achieve the quality excellence in a progressive, highly competitive and volatilemarket by identifying sources of defects and variations which are crucial to construction cost and construction quality, rather than relying only on scope restricted reactive measures.Perception and assumption of construction quality in its tailored form may allow the organizations and project teams to get the limited short term benefits in restricted field of its application, but long term or long lasting benefits can not be achieved without understanding and managing it realistically, in its totality.To achieve this, the present perception of construction quality by the construction professionals needs to be refined, redefined andbroadened.This can be done by highlighting and redefining the misconceived aspect of construction quality by creating the realization of benefits ofits broader perspective and the focused scope oriented perception needs a zoom out to cover the relatively neglected areas of construction quality.Expectations from process improvement technique require a partial shift of bias from financial aspects towards customer satisfaction and increased business through increased credibility by reduction in rework ,time and improved safety which otherwise has a ultimate result of increased profits.To achieve this, construction professionals need to improve the awareness level, usage level and keep a pace with constantly advancing quality improvement and management techniques/tools being developed and used worldwide.

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