



Motivational Factors for the Implementation of ISO-9001 in Construction Firms of Pakistan

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Abstract

Motivating public and private construction firms to implement various management systems in their firms is not a simple job. Especially in Pakistan, management system is a new practice, most of the construction firms are not aware about the benefits of management system and what will be achieved after the implementation of management system. The implementation of ISO 9001 Quality Management System (QMS) in the construction industry is a continuing development method, particularly in small construction firms. On the other hand, the awareness level and readiness level of construction industry firms in Pakistan is yet very low as associated to other countries of Asia and Europe where ISO 9001 initiated. The purpose current study is to determine most responsible factors which will motivate the public and private construction firms of Pakistan to adopt the QMS (ISO 9001). A questionnaire survey was conducted and a total of 337 out of 553 questionnaires were received from public and private construction firms of AZBAGIKHPUSI areas. The analysis results depict 3 significant factors, which will motivate construction firms of Pakistan to implement ISO 9001 are (1) to qualify for bidding (2) to improve quality management system of company (3) to reduce wastage. Hence, based on these results and findings, the construction companies require ISO 9001 certification system and registration with Pakistan Engineering Council (PEC) as a constitution passed for the construction firms then to qualify for the bidding.

Keywords: ISO 9001; Quality Management System (QMS); Motivational Factors; Construction firms and Pakistan.

1. Introduction

Throughout the world, construction projects are considered crucial in uplifting the social and economic development of the country. So, it is necessary to consider the importance of construction industry, for that purpose it is essential to determine the major causes affecting the productivity of the mentioned industry. The essential objects of any construction project are to complete it within aspects of iron-triangle [1]. To implement construction project effectively and competently, the construction firms need to adopt a management system that will guide them to achieve the planned objectives [2].

According to, Juran, J. and Godfrey, A.B., (1999), QMS is defined as a management system to direct and control an organization about quality issues [3]. QMS enables to achieve the goals and objectives set out in its policy and strategy. It provides consistency and satisfaction in terms of methods, materials, equipment, etc.; beginning with the identification of customer requirements and ending up by fulfilling their satisfaction [4]. ISO 9000 is a series of five international

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standards (ISO 9000-9004) on quality management and quality assurance; utilized for documentation, implementation, and demonstration of quality assurance system in any organization. Such an organization, claiming to be producing a quality product, or delivering quality service under proper environment, through consistent monitoring and controlling procedures and processes [5]. Some stakeholders relate ISO 9000 to various advantages with helpful changes in producing internal satisfaction of construction firms [6]. ISO 9000 certification has been accepted widely in construction industries of many countries of European region, Asia, Australia etc.

There are 6158 construction firms in Pakistan, out of which 3653 construction firms belong to the Category-5 and Category-6 as per the Pakistan Engineering Council (PEC) distribution [7]. As per the report of the Economic Survey of Pakistan, 2006-2007, these construction firms play a vital role in the development of country's economy. The year's real GDP growth has been powered by stellar growth in construction by 17.2 percent. Construction with many forward and backward linkages is also making an impact on the economic growth by contributing 5.2 percent or 0.4 percentage points to this year's GDP growth. These construction firms of Pakistan are the main core of construction industry development [8].

Success of a project is highly dependent upon quality of work. Both of these terms can be regarded as fulfilment of expectations and satisfaction of participants. Client has always concerns about cost, time and quality of the project. However, in most of the cases time and cost are the most exploited factors. [23] has linked the satisfaction of client with the quality and implementation of quality management system is found to be a prime tool by which quality is ensured and client's satisfaction is achieved. In this study quality of projects is considered and factors of motivation for constructors, to adopt certain code of conduct and specification to ensure and measure quality of the project, is studied for the construction sector of Pakistan.

The foremost objective of this research study is to determine significant factors that will motivate the construction firms (Category-5 and Category-6) in Pakistan to adopt ISO 9001 in their firms. Still, there is no exact information about the current situation of implementation of ISO 9001 in construction industry firms of Pakistan.

The scope of the research study was limited to C-5 and C-6 category construction firms registered with (PEC). According to the number of employees and size of assets; these companies are categorized as small constructor firms. The constructors in AZBAGIKHPUSI (Azad Jammu Kashmir (AJK), Balochistan (BL), Gilgit-Baltistan (GB), Khyber Pakhtoon Khwah (KPK), Punjab (PU) and Sindh (SI) were selected from total registered constructors, listed by the PEC.

2. Literature Review

Quality management system is a systematical strategy, developed by International Standards Organization (ISO) for those firms wanting to enhance their quality and completion of projects within available constraint range of time, cost and quality [2]. Quality management system provides a list of guiding principles for construction firms for achieving their goals and objectives. Besides that, it also gives some other recommendations related to the construction activities, construction materials, construction equipment etc. [5]. ISO is an independent, non-governmental international organization with the membership of 162 countries all over the world. Through its members, it brings together experts to share knowledge and develop voluntary, consensus-based, market relevant International Standards that support innovation and provide solutions for global challenges [9]. ISO 9000 series was established with help of British military during the World War-II, which finally commanded to the first civil quality management standard. Firstly, this system developed in 1987, and revised in 1994; after revising there was not major change in ISO 9000 standards. But a list of ISO 9000 standards was designed, these are following [6]:

- The first, ISO 9000, gives a general overview and instruction on how to select the appropriate standard for a given situation.
- ISO 9004 is a guide for the quality management system of any company and has a general discussion of many of the essential elements of a quality system.
- The heart of the ISO 9000 series of standards is the contractual standards, 9001, 9002 and 9003. These standards are intended to be used as part of a contractual document between supplier and buyer.
- ISO 9001 is the most comprehensive of the standards, and covers all phases of a product life cycle from design to installation and service.
- The clearly defined quality system requirements which can be checked by the supplier, the customer and any third party.

From the previous studies it observed that, the standards' long-term contribution to the certified companies may be positive, neutral or negative, depending on the way that companies choose to implement them. The success or failure of the standards does not depend on the adequacy of their requirements alone, but rather on the companies' ability and willingness to implement these correctly. Certification alone without the proper development and continuous

improvement of a dynamic quality assurance system, continuous adaptation to variable external requirements; cannot bring the positive results expected to provide the basis for future adoption of TQM [10- 12].

Similarly, from literature review, it is also concluded that there are number of motivational factors for the construction firms to obtain ISO 9000 certification. Jones et al. (1997) studied the reasons of certified Australian companies. They divided them into three categories: "developmental", "non-development" and "mixed". Companies, which belonged to the first category, were motivated by the internal benefits obtained from the certification process, like the improvement of the "company's internal processes" or "business performances". Whereas companies belonging to the "non-development" category were pushed towards certification by the market forces (explicit demand of important customers or necessary condition to bid for government tenders). The "mixed" category regrouped companies having both types of reasons. In fact, the developmental reasons are synonymous with the internal reasons, and the non-development reasons are synonymous with the external ones [13].

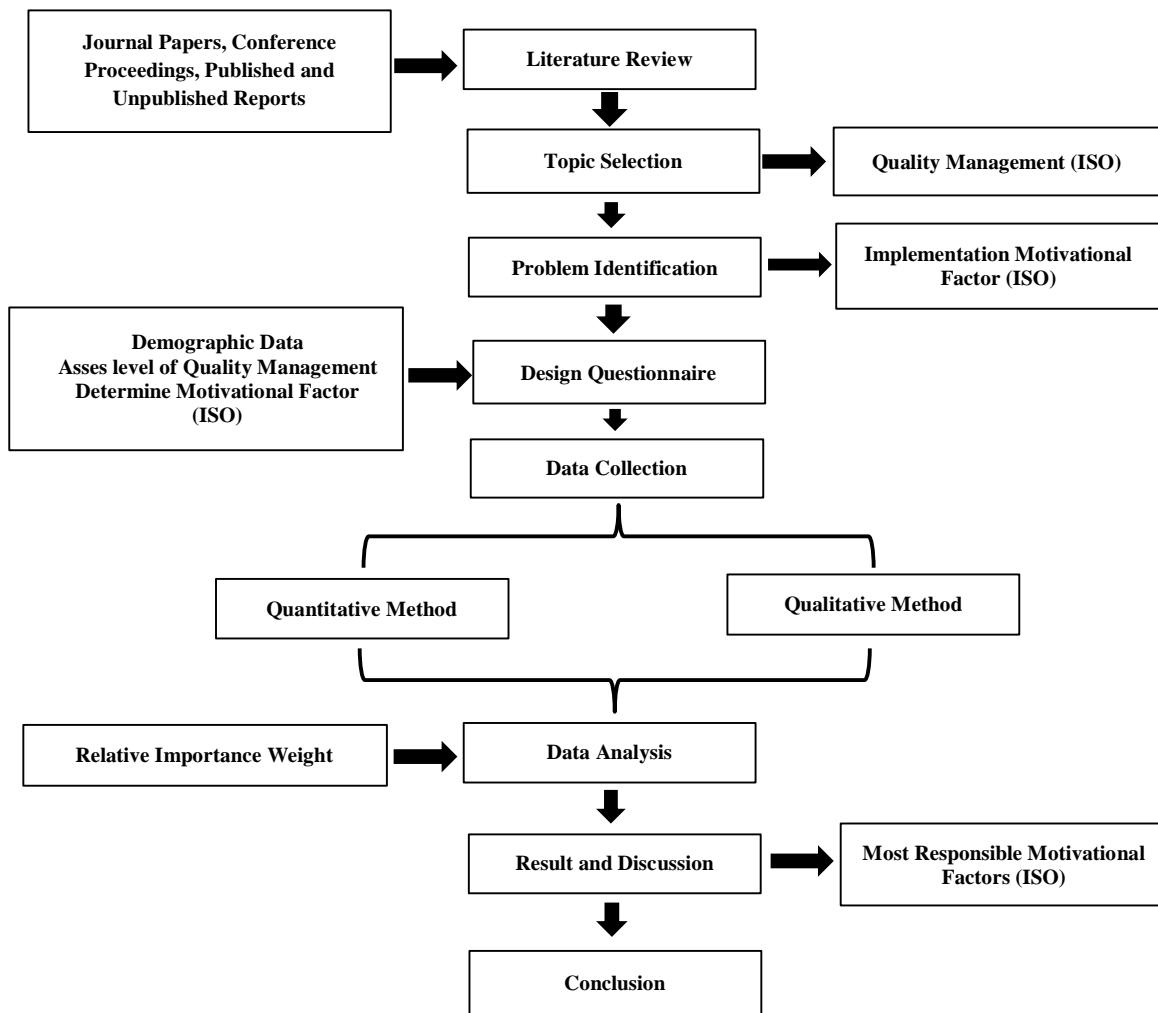
In the same way, [24] claims that external motivation is the leading factor of motivation for ISO 9001 certification in Bulgaria. It is found in the study that the Bulgarian construction industry is not externally driven. Internal as well as external motivational factors indicated positive correlation between factors and benefits of ISO 9001 certification.

Another research study by [25] emphasized internal aspects like improvement in organizational process and human resource management and external expects as the market position and reputation of the constructor, costumer satisfaction ratio, and resilience to commercial pressure are the motivations for adherence to ISO 9001 standards [26]. Has added an additional factor of government pressure besides the above-mentioned factors. On the other hand environmental constraints, organizational growth, and market competitions are the complementary factors for adopting ISO 9001 standards [27].

Many of the researchers reported the motivational factors are mainly related to achieving the firms' improvement. The main motivational factors for motivating the organizational firms for ISO certification are government requirements, customer requirements, being a competitive competitor in local and international market, improve internal quality management procedure, improve the image of construction firms and Government regulations will help in responding more positively to client's need [14-17]. According to the ISO 9001, ten motivational factors which develop courage amongst the small construction organizations for ISO 9001 certification. Those motivational factors improve the quality of service and goods, help the organization in cutting the prices, profit increasing and ambition growth, business at competitive edge, open door for new customers and strengthen their existing business, to help small construction firms to compete with large construction firms, open an export market for goods and services, to enhance securing customer confidence and its credibility, help fully with rules and regulation, support in the marketing field/area and develop sharp business procedures and increase its work efficiency [18]. Hence, the aim of this research is to identify most crucial factors of motivation in small construction firms of Pakistan region for adopting ISO certification.

3. Research Methodology

A qualitative and quantitative method was used in this research study for data collection purpose. schematic Diagram for research methodology is presented as Figure 1. The data was collected from an enormous number of construction firms located in the region of AZBAGIKHPUSI, according to the public and private construction firms registered with PEC. Hence, it was decided by the author to limit this research study to small construction firms C-5 and C-6 in the AZBAGIKHPUSI areas. The construction practitioners/respondents involved in this research study were the company owners, project managers, project supervisors and other stakeholders of small construction firms, as presented in Table 1. A total of 553 C-5 and C-6 category construction firms of AZBAGIKHPUSI were extracted from the 6158 registered constructors listed by the Pakistan Engineering Council (PEC).

**Figure 1. Flow Chart of Research Methodology****Table 1. Responses of Respondents and its Current Position in Construction Firm**

Position	Number of Construction Experts (Respondents)
Owners	133
Project Managers	72
Operation Manager	34
Project Supervisor	36
Office Manager	11
Admin Manager	9
Project Engineer	36
Office Engineer	6
Total	337

In this research study proportion of construction personnel was found out with help of applying a precision approach, supposing n = Number of respondents responded, N = Total Number of respondents targeted for data collection, Q = Number of constructor having no knowledge about the ISO-9001, P = Number of constructors who have knowledge about the ISO-9001, and C = It is targeting estimated value as 7.5% the number of respondents' size was calculated by following Formula [19-20].

$$n = \frac{N \times Q}{P \times C \times C(N - 1) + Q} \quad (1)$$

Where $N= 553$, $Q= 0.50$, $P= 0.5$ and $C= 0.075$, resulting $n= 337$ or respondents sampling rate equivalent approximately 60.94 percent. The Table 2 presents proportion of small construction firms from each province.

Table 2. Responses of Respondents and its Current Position in Construction Firm

Position	N	n
Azad Jammu Kashmir	31	27
Baluchistan	70	50
Gilgit Baltistan	42	34
Khyber Pakhtoon Khuwah	80	55
Punjab	172	87
Sindh	158	84
Total	553	337

Data collection was conducted in this research study with help of questionnaire survey method. The finalized questionnaire distributed in different regions of Pakistan (sample is attached as appendix). Table 3 presents a part of questionnaire survey which consists of a list of 12 motivational factors to motivate the construction firms for ISO certification. These motivational factors were extracted out from the ISO 9001 guide, for the respondents, to choose an appropriate value for these motivational factors.

Table 3. Motivational factors to motivate construction firms for ISO certification about

No.	Motivational Factors
01	To improve quality management system of the company
02	To access the global and local market
03	To increase customer satisfaction and its demand
04	To reduce rework and lower the cost of operational work
05	To qualify for the bidding
06	To reduce customer complaints
07	To deliver the project on time without any schedule delay
08	To reduce wastage
09	To use more resources efficiently to show good quality work
10	Construction firms that not implement ISO 9001
11	To increase the profit margin
12	Other (Specify)

A 5-point Likert scale was designed for measuring the level of importance for the C-5 and C-6 category construction firms to implement ISO 9001 as shown in Table 4. The collected data was analyzed using the SPSS version 24 and with relative importance weight (RIW) analysis technique.

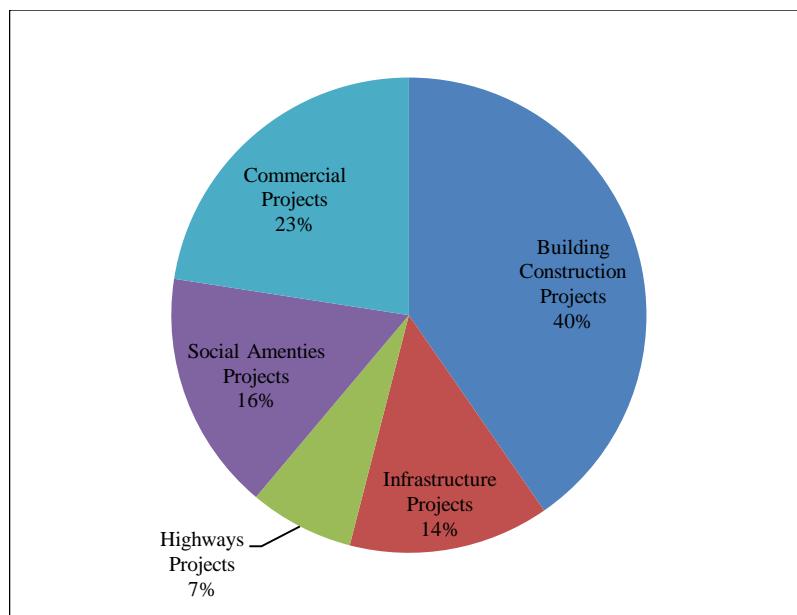
Table 4. Measuring rating level for Motivational Factors to implement ISO 9001 in Construction Firms

	Rating	Explanation
	Below 50%	Not Important
Rating scale level of important factor to implement ISO 9001	50% and above but below 60%	Some What Important
	60% and above but below 70%	Neither Important Nor Important
	70% and above but below 80%	Very Important
	80% and Above	Extremely Important

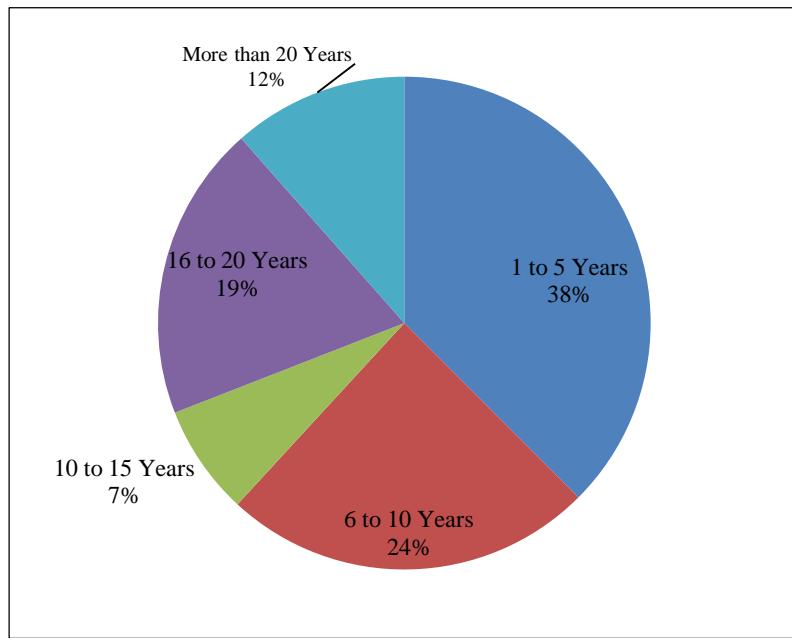
4. Results and Discussion

4.1. Respondent's Profile of Small Construction Companies

The respondent's profile was classified according to PEC category, 156 respondents from category (C-5) and 186 respondents from category (C-6). Among these categories of respondents, 136 (40%) are from building sector construction projects, 46 (14%) from infrastructure projects, 24 (7%) of projects from highways sector, 55 (16%) are from social amenities projects and other 76 (23%) are from commercial sectors projects as shown in Figure 1.

**Figure 2. Projects currently taken by the Construction Companies**

With regard to the number of years' experiences of respondents in leading construction companies, there are 114 respondents having experience 0 to 5 years, 74 with 6 to 10 years, 55 with 11-15 years, 59 with 16 to 20 years and 35 with more than 20 years construction experience as presented in Figure 2.

**Figure 3. Working Experience of Respondents in their firms**

4.2. Important Factors to Motivate Small Construction Firms (C-5 and C-6) to Implement ISO 9001

The analyzed results of collected data from the areas of AZBAGIKHPUSI show that there are five important motivational factors that lay in the extremely important group. To qualify for the bidding is the topmost motivational factor with a mean average value of 0.85. The second-ranked important motivating factors for the construction firms (C-5 and C-6) for implementing ISO 9001 in their companies are: to improve quality management system of the company, to reduce wastage and construction firms that not implement ISO 9001 with a mean value of 0.83. The third most crucial factor laying in the same group but with 0.81 mean average is the access to the global and local market, whereas other motivational factors fall under the very important category as shown in Table 5.

Table 5. Level of Importance of Motivational Factors for Implementing ISO 9001

S.No.	Factors	Explanation
1	To improve quality management system of the company	Extremely Important
2	To access the global and local market	Extremely Important
3	To increase customer satisfaction and its demand	Very Important
4	To reduce rework and lower the cost of operational work	Very Important
5	To qualify for the bidding	Extremely Important
6	To reduce customer complaints	Very Important
7	To deliver the project on time without any schedule delay	Very Important
8	To reduce wastage	Extremely Important
9	To use more resources efficiently to show good quality work	Very Important
10	Construction firms that not implement ISO 9001	Extremely Important
11	To increase the profit margin	Very Important
12	Other (Specify)	

These results were confirmed from previous conducted research studies in the United Kingdom (UK), the clients of construction companies decided that it is necessary for constructor to implement ISO 9001 QMS system in their firms to qualify for joining in the bid tendering [21]. Similarly, it is necessary for improving quality of work and requirements of stakeholders within the constraints [19]. After the implementation of these motivational factors in firms then it easy for the construction organizations to interact with global market and local market. Besides that, the findings of [20] mentioned that QMS benefits improve the administration process with constant change, ultimately the customer satisfactions increase along with their profit margin. Similarly, various researchers in the field of QMS described benefits of implementing motivational factors; those factors are to reduce rework and lower the cost of operational work, to reduced customer complaints, to deliver project on time without any schedule delay and to use resources efficiently to show excellent quality, by the applying these factors it will help in reducing time, cost, wastage, rework and decrease customer complaints [19, 22].

In all six (6) regions of data collection i.e., (Azad Jammu Kashmir (AJK), Balochistan (BL), Gilgit Baltistan (GB), Khyber Pakhtoon Kuwah (KPK), Punjab (PU) and Sindh (SI), the top most crucial factor for motivating the construction companies' stakeholders to implement to ISO 9001 is to qualify for the bidding. Table 6 presents a deep analysis of other motivational factors with their average means values respectively.

Table 6. Important motivational factors to motivate construction companies to implement ISO 9001 in their provinces

S.No.	Factors	AJK	BAL	GB	KPK	PU	SI
1	To improve quality management system of the company	0.84	0.89	0.74	0.85	0.83	0.83
2	To access the global and local market	0.79	0.85	0.76	0.83	0.81	0.84
3	To increase customer satisfaction and its demand	0.78	0.75	0.82	0.83	0.78	0.78
4	To reduce rework and lower the cost of operational work	0.76	0.76	0.78	0.72	0.83	0.82
5	To qualify for the bidding	0.85	0.92	0.84	0.83	0.85	0.84
6	To reduce customer complaints	0.76	0.75	0.76	0.74	0.76	0.77
7	To deliver the project on time without any schedule delay	0.73	0.80	0.76	0.73	0.77	0.76
8	To reduce wastage	0.88	0.84	0.79	0.82	0.81	0.85
9	To use more resources efficiently to show good quality work	0.76	0.77	0.78	0.77	0.78	0.73
10	Construction firms that not implement ISO 9001	0.90	0.84	0.78	0.84	0.83	0.82
11	To increase the profit margin	0.81	0.78	0.84	0.77	0.80	0.79
12	Other (Specify)	0.84	0.89	0.74	0.85	0.83	0.83

5. Conclusion

C-5 and C-6 construction organizations are characterized according to their company profile factors, such as PEC registration, type of construction projects and experience of respondents in their firms in this research study. There are five extremely crucial factors that will motivate C-5 and C-6 construction companies to adopt the ISO 9001. These motivating factors are to qualify for the bidding, to improve quality management system of the company, to reduce wastage, construction firms that not implement ISO 9001 and to access the global and local market. Remaining another motivational factor laying under the group of very significant.

The finding of this research study depicts that Quality Management System (ISO 9001) is an effective application. With the implementation of this management system in developing countries, like Pakistan, many issues may decrease such as inadequate supervision, communication barriers among the administration members, lack of understanding and standardization of construction activities.

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8. Appendix (Questionnaire)

Dear Respondent (Sir/Madam).

The questionnaire attached with this letter is the part of my research work titled "**ISO Quality Standards in Construction Industry of Pakistan**" The questions are asked in order to assess the present level of QM standard in construction industry of Pakistan and to determine the responsible factors of ISO which motivate construction practitioner of public and private construction firms of Pakistan.

Part One: Demographics (Please fill in the blanks or appropriate check box)

1. Organization Name: _____
2. Organization Address: _____
3. Type of your current organization:

<input type="checkbox"/> Consultant	<input type="checkbox"/> Constructor (Category: _____)
<input type="checkbox"/> Client	<input type="checkbox"/> Others, Please specify, _____

4. Type of projects currently under taken by your organization:

<input type="checkbox"/> Commercial Projects	<input type="checkbox"/> Roads Projects
<input type="checkbox"/> Residential Projects	<input type="checkbox"/> Social Amenities Projects
<input type="checkbox"/> Bridges Projects	<input type="checkbox"/> Others, please specify, _____

5. State the number of years you have practiced the working in construction industry:

<input type="checkbox"/> 0-05 years	<input type="checkbox"/> 06-10 years
<input type="checkbox"/> 11-15 years	<input type="checkbox"/> 15 years above

6. State the number of years you have practiced the working in current organization:

<input type="checkbox"/> 0-05 years	<input type="checkbox"/> 06-10 years
<input type="checkbox"/> 11-15 years	<input type="checkbox"/> 15 years above

7. State the cost of the project in Million Rupees, where you are presently working:

<input type="checkbox"/> Less than RS 20 M	<input type="checkbox"/> RS 20 M – RS 50 M	<input type="checkbox"/> RS 50 M – RS 150 M
<input type="checkbox"/> RS 150 M – RS 400 M	<input type="checkbox"/> RS 800 M - 1800 M	<input type="checkbox"/> RS 1800 M – RS 3000 M
<input type="checkbox"/> Above Rs 3000 M	<input type="checkbox"/> Others, Please Specify, _____.	

8. State your position in the organization:

Chief Engineer Superintendent
 Executive Engineer Resident Engineer
 Others, Please Specify, _____

Const: Project Manager
Director

Name: _____ Date: _____

E-mail address: _____ Signature: _____

Part Two: Following Questions are made to assess the Level of Quality Management in Pakistan Construction Industry.

2.1. (Please answer the following asked questions according to their format based on your experiences).

- | | | | |
|---|-----|----|----|
| 1. Is your company ISO certified? | Yes | or | No |
| 2. How does your organization solve quality related problems?
a) Assign individual to solve
b) Setup a multidisciplinary team for each problem
c) A permanent quality management team is available
d) Others _____. | | | |
| 3. Rank the following in order of importance. Rank(1-4, 1=highest superiority, 4=least superiority)
a) Safety _____.
b) Time _____.
c) Cost _____.
d) Quality _____. | | | |
| 4. Before the start of the project, do you obtain client commitment to quality? | Yes | or | No |
| 5. Do clients ask for the better quality performance while giving his project to you? | Yes | or | No |
| 6. In your opinion which word defines the quality best?
a) Customer satisfaction
b) Team work
c) Product fitness for use
d) Cost Minimization | | | |
| 7. Do you encourage your engineer/ project manager to keep a checklist for better quality assurance? | Yes | or | No |
| 8. Does your company organize seminars for the awareness of staff regarding quality?
a) Yes, more than once a year
b) Yes, once a year
c) Such a plan is under consideration | | | |
| 9. What determines the quality of your projects?
a) Client demand
b) international standards
c) standards set by firm
d) current market standards | | | |
| 10. To increase productivity would you compromise quality? | Yes | or | No |
| 11. What is the involvement of employees in your quality building effort?
a) All levels
b) Upper Management
c) Suggestion are incorporated later on | | | |
| 12. What per cent of your projects done so far you found large amount of remedial work to do?
a) 0 – 25
b) 25 – 50
c) 50 – 75
d) 75 – 100 | | | |

Part Three: To determine the responsible factors of ISO which motivate construction practitioner of public and private construction firms of Pakistan.

This table shows the related scale of level of Importance for determining most responsible factors of ISO standards which motivate construction practitioner of public and private construction firms of Pakistan.

Description	Scale
Significant Level	
Extremely Important	1
Very Important	2
Moderately Important	3
Slightly Important	4
Not Important	5

Please select the level of importance for determining most responsible factors of ISO standards which motivate construction practitioner of public and private construction firms of Pakistan.

No.	Motivational Factors	Level of Importance				
		1	2	3	4	5
1	To improve quality management system of the company	1	2	3	4	5
2	To access the global and local market	1	2	3	4	5
3	To increase customer satisfaction and its demand	1	2	3	4	5
4	To reduce rework and lower the cost of operational work	1	2	3	4	5
5	To qualify for the bidding	1	2	3	4	5
6	To reduce customer complaints	1	2	3	4	5
7	To deliver the project on time without any schedule delay	1	2	3	4	5
8	To reduce wastage	1	2	3	4	5
9	To use more resources efficiently to show good quality work	1	2	3	4	5
10	Construction firms that not implement ISO 9001	1	2	3	4	5
11	To increase the profit margin	1	2	3	4	5
12	Others	1	2	3	4	5