



Implementation of Total Quality Management in Construction Industry: A Pakistan Perspective

Muhammad Asim *

Karachi University Business School, University of Karachi.

Sohaib uz Zaman *

Karachi University Business School, University of Karachi.

Tayyaba Zarif *

Newports Institute of Communication and Economics, Karachi

ABSTRACT

Purpose - The primary objective of this study is to evaluate the issue of suitability, acceptability and degree of implementation of Quality Management (QM) practices in the construction industry of Pakistan. Currently the status of adoption of QM principles particularly in this industry and more specifically in the prevailing culture and context of Pakistani environment is overwhelmingly poor which led the researcher to go for this study.

Methodology/sampling - The study entails questionnaire development and the analysis of its responses from seventeen leading construction organizations operating in Pakistan during year 2012. The study also incorporates data from various secondary sources. The analysis was carried out using basic statistical tools such as mean, median and standard deviation and bar chart was employed to represent the data.

Findings - The findings revealed that the concept and meaning of quality is not understood and interpreted in its true sense. The conformance to standard specifications (SOPs) is considered to be equivalent to implementation of Quality Management which is far from truth. It was also determined that general lack of awareness and untrained employees that are mostly uneducated labor is one of the major causes towards this dismal.

Practical Implications - It is hoped that the outcomes of this study may provide a guideline to the owners of the construction industry and help them understand the notion of Quality Management in its real term. It will also assist the monitoring and regulating agencies to devise policies accordingly catering to the need of the modern era that will help Pakistani construction industry to compete locally and globally.

Keywords : Total Quality Management, Quality Assurance, Quality Control, Critical Success Factors, Construction industry

Jel classification : M190

*The material presented by the author does not necessarily portray the viewpoint of the editors and the management of the Institute of Business & Technology (IBT) or Karachi University Business School University of Karachi, Newport Institute of Communication and Economics.

* Muhammad Asim : masimku@hotmail.com

* Sohaib uz Zaman : sohaibuzzaman@yahoo.com

* Tayyaba Zarif : dr.tayyabazarif@gmail.com

© JMSS is published by the Institute of Business and Technology (IBT).
Main Ibrahim Hydri Road, Korangi Creek, Karachi-75190, Pakistan.

1. INTRODUCTION & AIM OF STUDY

Quality in the construction industry has long been a problem in Pakistan. It has been reflected in certain serious accidents in the past like collapse of high rise building in Islamabad during an earthquake in 2008, collapse of a highway bridge in Karachi a few years ago, to name the few. Apart from these two cases of public importance, there are numerous accidents that had arisen out of poor quality in construction but could not be reported. The quality issue in Pakistan though exists generally, it is more prevalent in public sector projects than the private sector ones.

Quality, in, general, can be defined as meeting the legal, aesthetic and functional requirements of a project, whereas in construction industry, quality can be defined as meeting the requirements of the designer, constructor and regulatory agencies as well as the owner. Accordingly, Arditi and Gunaydin (1997), say that quality in construction can be characterized by meeting the requirements of the design as to provision of well-defined scope of work; meeting the requirements of the constructor as to provision of contract plans, trained staff and adequate building materials; meeting the requirements of the owner as to operation and maintenance; and meeting the requirements of regulatory agencies (the public) as to public safety and health; environmental considerations; protection of public property including utilities; and conformance with applicable laws, regulations, codes and policies et.

It means, quality control in the construction industry is has dissimilar characteristics to manufacturing industry like, almost all construction projects are unique; each construction production site always displays different conditions; life-cycle of a construction project is much longer than the life-cycle of most manufactured products; there is no clear and uniform standard in evaluating overall construction quality; and multiple partners in the projects like owner, designer, general contractor, subcontractor, material supplier, etc. These unique features of construction industry lead to the conclusion that failure in the matters of quality can result from malfunction on the part of constructor, designer, or even owner. In most cases however, it is the result of a combination of actions by several or all of these parties.

In developing countries, quality assurance in construction sector has been in practice for quite some time as they have been implementing TQM practices in the building and construction industry, mostly relying on the ISO 9000 and 14000 standards. However, no such mechanism exists for practical implementation of standards in developing countries especially in Pakistan. We find that great expenditures of time, money and resources, both human and material, are wasted each year because of inefficient or non-existent quality management procedures.

Accordingly, this research work is being undertaken to explore as to what formal measures are taken to ensure in construction works in Pakistan in general. For that purpose 30 contractor firms were chosen to work on. The key areas which were focused during the study were perception of quality, existing quality assurance policy in the organization, hiring of suitable employees and their training, quality related culture within the organization, quality assurance practices in the organization, feedback collection, partnering, and implementation of formal TQM standards.

Research Question

To what extent quality measures are formally practiced in the construction firms of Pakistan?

2. LITERATURE REVIEW

Total Quality Management, or TQM, is a concept of management that emerged in Japan in the 1950s and became popular in the west during the 1980s. Quality Management concentrates on the efficient production of the quality that the market expects. According

to Deming (1986), costs go down and productivity goes up as improvement of quality is accomplished by better management of design, engineering, testing and by improvement of processes. Quality combines people power and process power (Chowdhury, 2005). Quality in a product or service is not what the supplier puts in, it is what the customer gets out and willing to pay for; (Drucker, 1985).

It is strongly advocated that the distinct and most vital determinant of an organization's propensity towards quality is its aptitude to decode, amalgamate, and eventually formalized quality related behaviors. Quality assurance is a continuous process that enables regular organizational operations. (Motwani, 2001) observes that utilizing TQM is a foremost organizational change that demands an alteration in the culture, process, strategic priorities, and values of an organization. (Nesan and Holt, 1999) pointed out that the constituents in the construction industry have a propensity to be imprudent to changes being forced on them for instance economics, political, and technological pressures, which results insufficient performance in the industry.

TQM strongly advocates the fine co-ordination and constructive framework that is required between the organization, its employees, its suppliers & customers (Hunt and Daniel, 1993). A TQM-based organization fundamentally operates as a customer-based unit (Brown et al. 1993) and it is recommended for organizations to capitalize on customer satisfaction rather than in-house competence. Recently, efforts made to improve quality in construction are widely reflected in the relevant literature. The supply chain context is particularly important in the quality assertion of construction projects.

Arditi and Gunaydin (1997) say that while the evolution of quality control in the construction industry is parallel to that of the manufacturing industry, many dissimilar characteristics distinguish the two industries. The following differences, some of them significant, must be considered when applying a quality program to construction.

- Almost all construction projects are unique. They are single-order, single-production products.
- Unlike other industries, which usually have a fixed site with similar conditions for production, each construction production site always displays different conditions.
- The life-cycle of a construction project is much longer than the life-cycle of most manufactured products.
- There is no clear and uniform standard in evaluating overall construction quality as there is in manufactured items and materials; thus, construction projects usually are evaluated subjectively.
- Since construction projects are a single-order design project, the owner usually directly influences the production.
- The participants in the construction project--owner, designer, general contractor, subcontractor, material

Likewise, Sommerville & Robertson (2000) say that following elements prohibit introducing and practicing of TQM in construction companies. First, all construction-based products are customized in nature. These products are usually designed on the basis of different specifications and necessities of the customer with a sparking aim of making the customers satisfied. Second, construction industry has a lofty number of organizational collapses, principally during a recession in the economy. Consequently dedication for TQM strategies and policies may take quite a few years to provide "pay offs" and may be professed as pointless of resources. Baden-Hallard (1993) says that construction companies are different from the manufacturing companies in the way that these companies take cost as an additional expense, without being aware of the tremendous return of this intelligent investment. Costs in the construction industry are being accumulated by anticipation and assessment costs attached with nonconformance costs.

According to Arditi and Gunaydin (1997), because of these distinguishing characteristics, the construction industry has generally been considered to be quite different from manufacturing industries. That is why, quality control procedures that work effectively in a mass production industry have not been considered suitable for the construction industry. Consequently, quality control throughout the construction industry has not evolved to the level attained in manufacturing industries.

Burati et al. (2000) say that TQM can be a solution for the problems of costs, productivity, occupational safety and health the construction industry is facing. McKim et al. (1995a) say that by applying TQM better construction can be achieved. Kuprenas & Kenney, (1998) found that most firms believed that TQM is a good idea. The methods and effectiveness of implementing TQM, however, did vary substantially between companies over the three years. Some firms completely abandoned their TQM implementations while others achieved award-winning results. Torbica & Stroh (1999) say many companies are frustrated in their effort to improve quality through TQM because these companies have exclusively focused on financial measures instead of quality measures. Other studies, in the recent past had also observed the failure of TQM and these failures are due to unnecessary and extra efforts without proper foundation and focus (Culp et al. 1993). Construction firms, therefore, need to understand the TQM critical success factors CSFs for the successful implementation of TQM. Therefore, there is a pressing need to establish TQM CSFs for construction firms. This paper examines the TQM frameworks developed by scholars and businesses and develops the TQM CSFs for construction firms.

Jaafari (2001) says that the construction industry has inclined towards confound TQM and Quality Control (QC) and Quality Assurance (QA), holding believe that acquiescence with QA Standards is all that there is to the claim of TQM on construction projects. Low and Peh (1996) say that in establishing a total quality culture in construction, one crucial track is to expand construction team of the main contractor, subcontractors and suppliers who would ensure to the quality procedure and maintain an actual quality attitude.

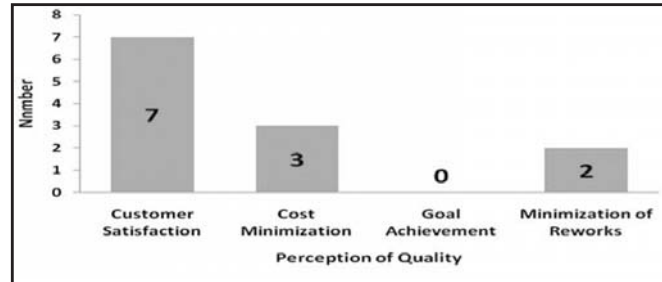
David & Gunaydin (1997) say that product quality in the construction industry may be thought of as a foremost factor essential to attaining quality in the materials, equipment and technology that is being utilized in building infrastructure, whereas 'process quality' may adduce to achieving quality in the course the project is methodized and handled in three crucial stages of planning and design, construction, and operation and maintenance. Having the multifaceted nature and ever-changing milieu of construction projects, Biggar (1990) recommended that the management system must be elastic, responsive to effective communication, and repeatedly improving. This can be experiential TQM objectives that are vibrant in their nature and demands continue updating.

3. METHODOLOGY

Data was collected through questionnaire with thirty (30) questions in eight key areas like perception of quality, existing quality assurance policy in the organization, hiring of suitable employees and their training, quality related culture within the organization, quality assurance practices in the organization, feedback collection, partnering, and implementation of formal TQM standards. Thirty contractor firms in construction industry were chosen randomly for this research and they were administered questionnaire personally. Response rate was 60%. Furthermore, all firms did not answer all questions so we had to improvise with the degree of response we got. Our results are integrated accordingly showing non-uniform response. The statistical analysis of questionnaires is further described by the following chart which describes the frequency of willingness percentages attained by the contractors.

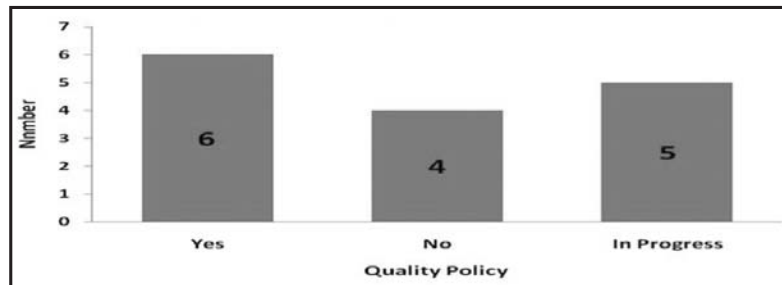
3.1 Data Analysis

1. What is your perception about quality?



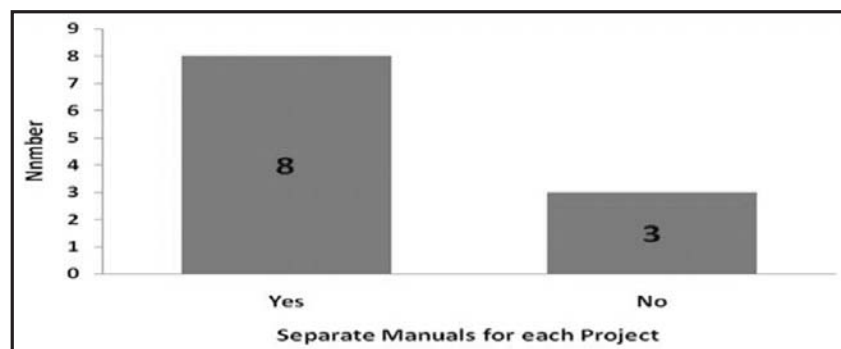
It is clear from the result that contracting firms have realized the importance of customer satisfaction and have kept customer satisfaction as their first priority. There was a mixed response regarding scope achievement and minimization of rework.

2. Has your organization developed a clear quality policy?



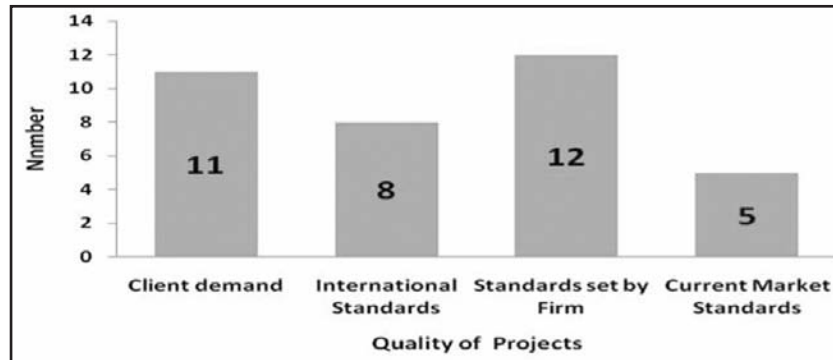
Results show that in order to work with major clients within the country and internationally, most contracting firms feel the need to have a clear quality policy. Some contractors are making their quality policies in current period.

3. Is a separate standard operating procedures manual prepared for each project before starting execution or handing it over to sub-contractor?



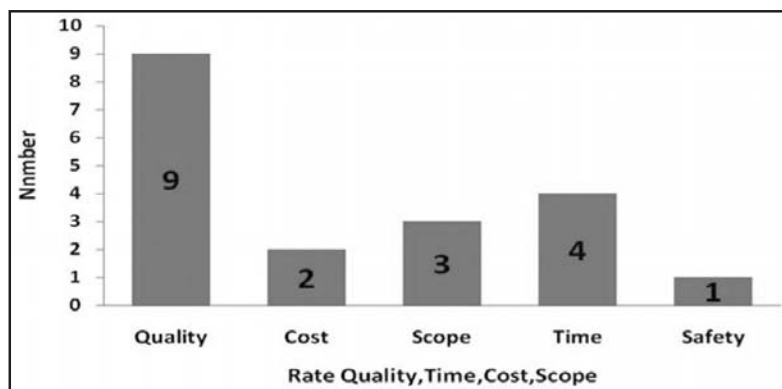
According to the findings, the contracting firms are presently in a practice of preparing a SOP manual for every project undertaken, before handing it on to the subcontracting firms. This process is project specific rather than a generalized system.

4. What determines the quality of your projects?



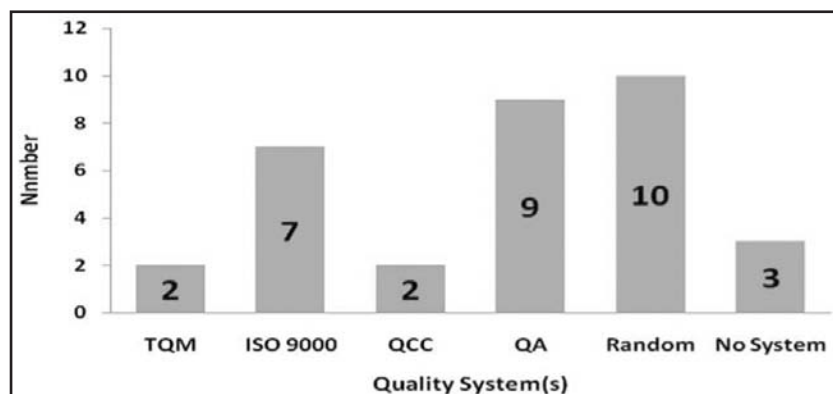
Data shows that quality of projects is gauged in terms of standards that are developed in house; client demands also dictated the quality assessment on projects. As for the market trends and international standards there is also some priority.

5. How would your organization rate quality, cost, scope, time required and safety?



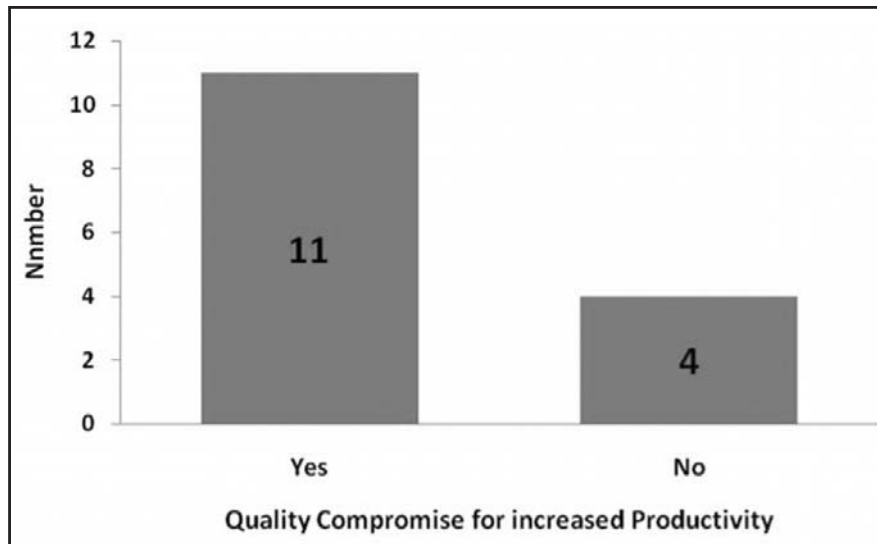
Graph shows that most of the contracting organizations view quality as their first priority. Contractors are willing to compromise safety, to some extent, and cost largely, in order to fulfill the client quality requirements.

6. What type of quality improvement system(s) do you have?



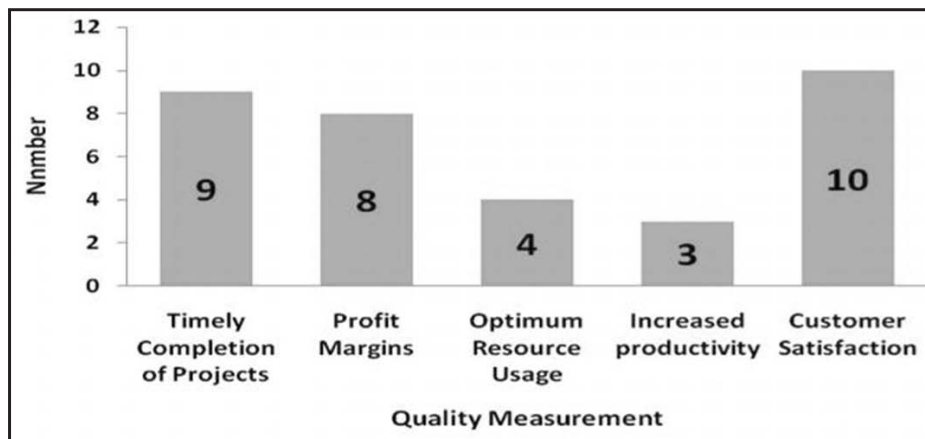
According to the result, majority of the contracting firms claim to have Random Quality System (as per Project requirements). Most of the firms however focus on ISO 9000/ Quality Assurance.

7. To increase productivity would you compromise quality?



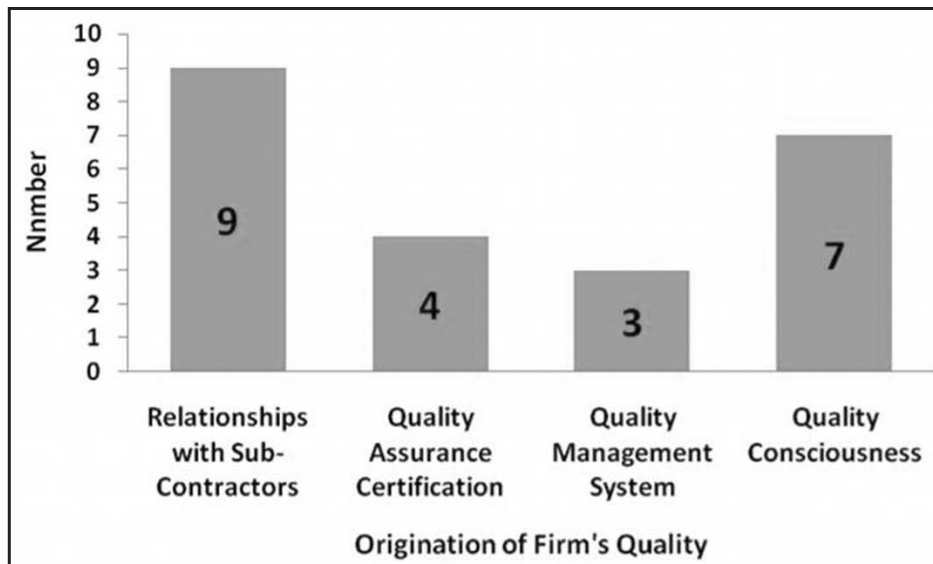
There is a great deal of contingency involved with the timely completion of projects. If there is a quality and productivity trade off, most contractors are likely to choose productivity in order to complete the project of time.

8. How does your organization measure quality?



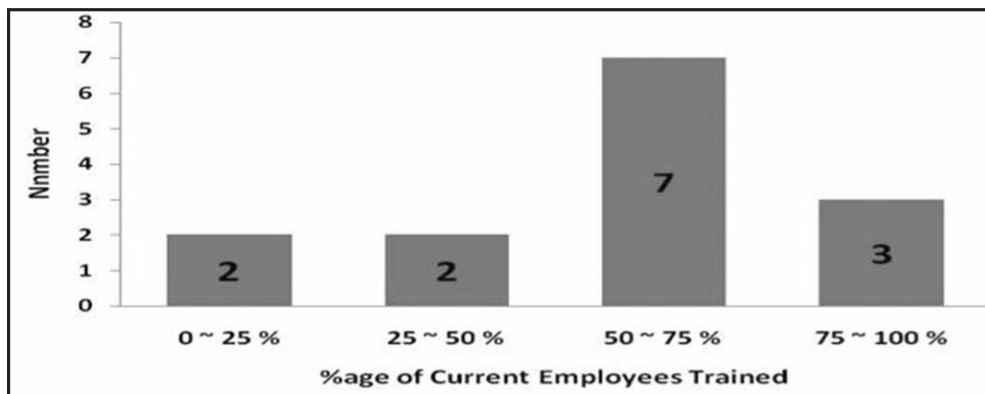
According to the findings, timely completion of projects, profit margins and customer satisfaction are rated as the most popular means of gauging an organizations quality measure.

9. Your organization's quality performance has originated from:



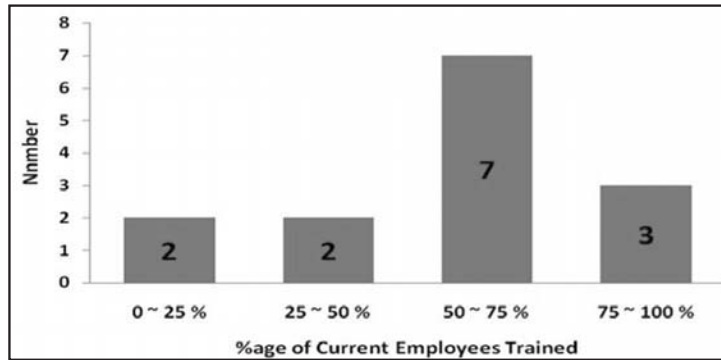
Results show that there is a difference in opinion regarding the origins of organizational quality performance among contractors. Most of the firms have cordial relationships with subcontractors as the main reason for organizational quality performance.

10. Percentage of current employees trained for quality.



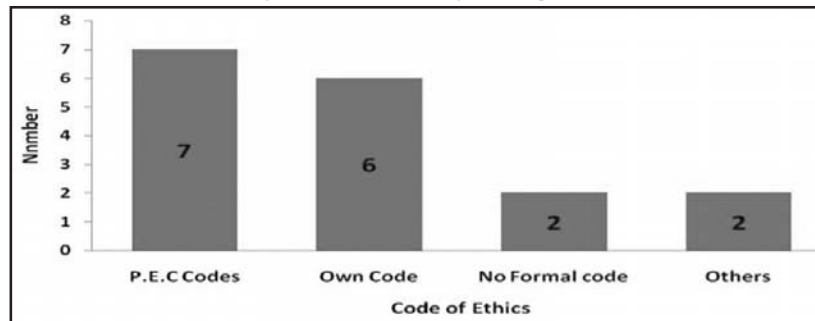
Results reveal that employee training plays a vital role in any organization/company's quality building efforts. The current trend in the industry leans toward maximized training of employees especially those related with technical/ specialized works.

11. How do you train your employees for quality?



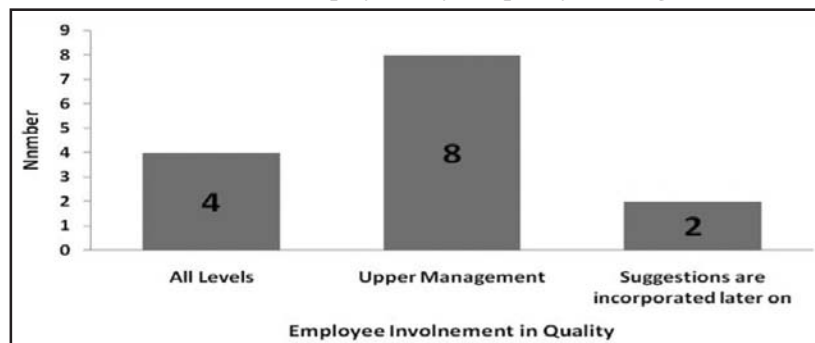
It shows that an overwhelming majority, of those surveyed, believes in on-job training so that the employees can gain firsthand experience of the technicalities involved in the construction process.

12. Which code of ethics do you follow within your organization?



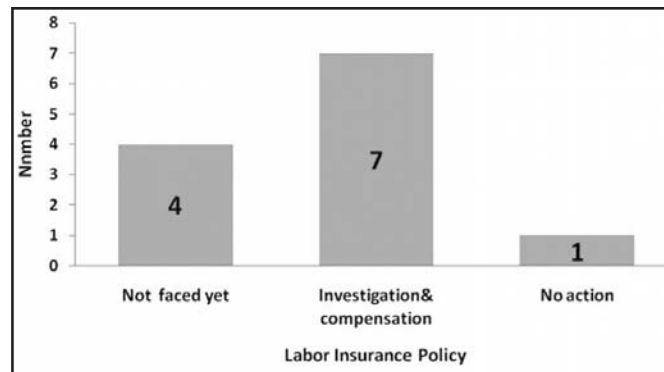
According to the result, majorities of contractors either use the P.E.C. code of ethics in their organizational dealings or prefer to modify the P.E.C. code of ethics (or any other applicable code of ethics) according to their own needs.

13. What is the involvement of employees in your quality building effort?



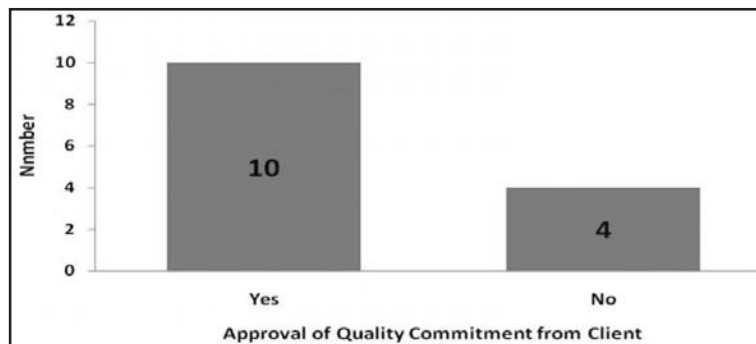
Graph shows there exists a difference in opinion among contractors regarding involvement of employees in company policy. Most of the firms consider the top management involvement as the key factor in their success. Some firms also give priority to their employees in Quality building.

14. What is your labor insurance policy in case of a fatal accident or severe injury to a laborer?



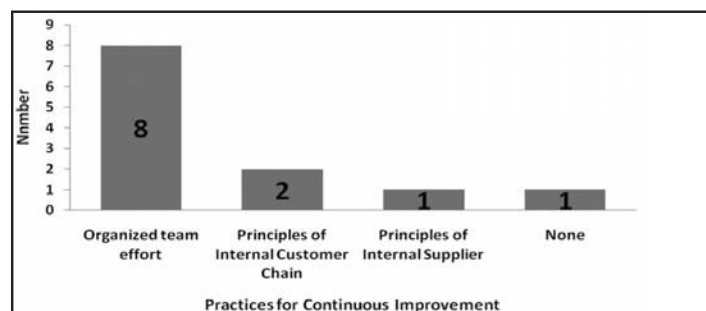
The graph clearly shows that majority of the contractors either insure their labors or provide compensation in case of fatal accidents to employees.

15. Before the start of the project, do you obtain client commitment to quality?



It is transpired that commitment to quality agreement by the client ensures the contractor that the client will not try to force the contractor to use substandard material and practices. The industry response in this regard comes out to be highly positive as shown in the graph.

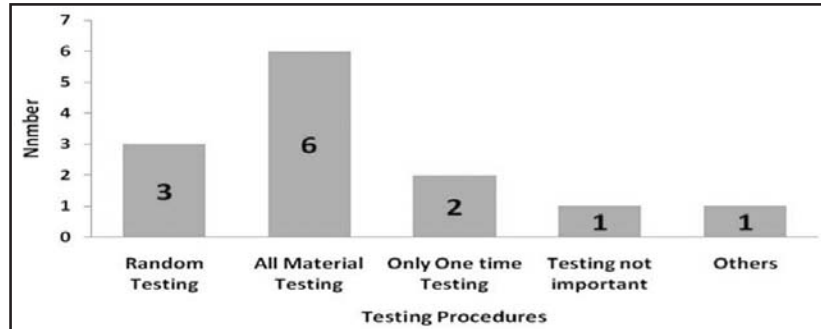
16. For continuous improvement in the construction process, what practice(s) have you adopted in your organization.



According to the results above, most of the firms believe in organized team effort to bring about continuous improvement in the construction processes. A team with similar quality

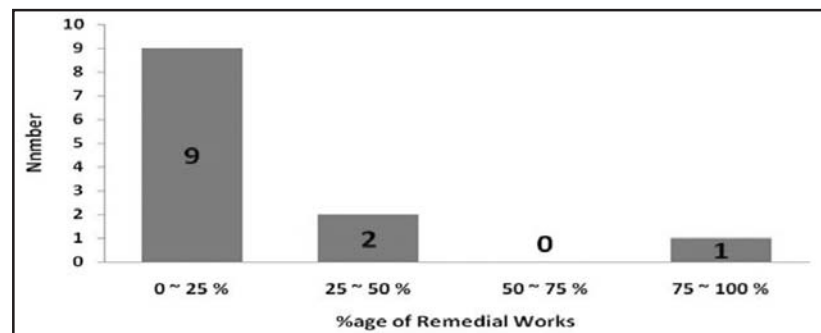
perceptions is likely to achieve their quality goals more efficiently.

17. What testing procedures do you follow?



Results reveal that all material testing is prevalent among contractors to ensure high quality standards of construction. Substandard material can lead to reworks and an unsatisfied end user, resulting in project failure.

18. What percent of your projects done so far you found large amount of remedial work to do?



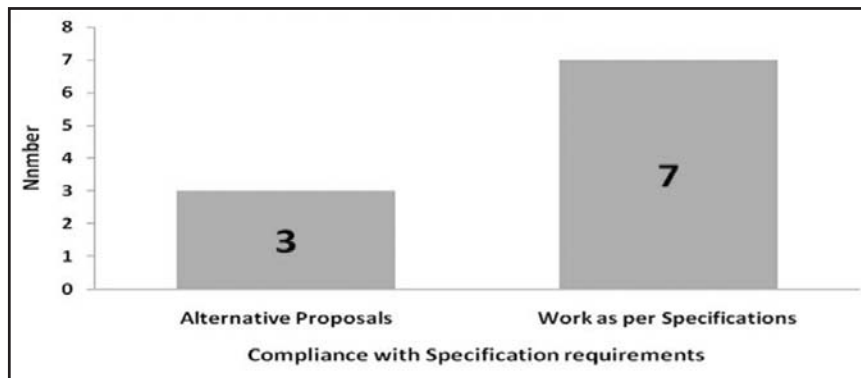
Almost all of the sample population show minimal amount of remedial work on their projects. Minimum reworks in most cases suggest that project under consideration passed quality checks. Since most contractors surveyed had a minimum quality benchmark, minimal rework means that material and labor effort put in during the time of construction abides with standards.

19. Do you ask for a change order if the client objects about the quality of work?



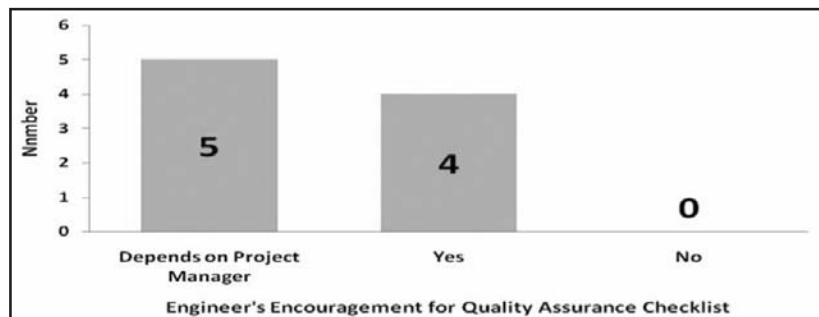
This shows that most contractors are working for client satisfaction while following the proper procedures. This also shows that contractors do not take lightly to objections regarding their quality of work.

20. How do you comply with Specification requirements?



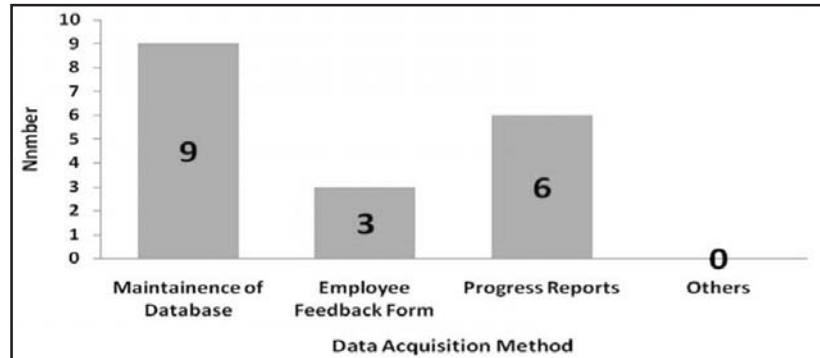
Result reveals that most Contractors believe that by performing work as per specifications, they are providing the best quality to the clients. Few, however, recognize their responsibility to forward better suggestions to the clients. This shows that majority of the contractors are not motivated enough to propose better alternatives and thus settle for following specifications.

21. Do you encourage your engineer/ project manager to keep a checklist for better quality assurance?



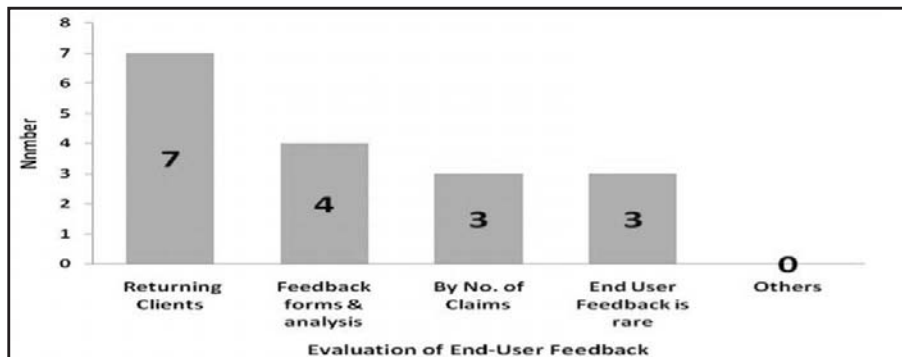
Graph tells that majority of the contractors make it compulsory for their project managers to keep checklists so that quality assurance is better implemented. This shows the commitment to quality of such contractors.

22. What data acquisition methodology do you follow within your organization?



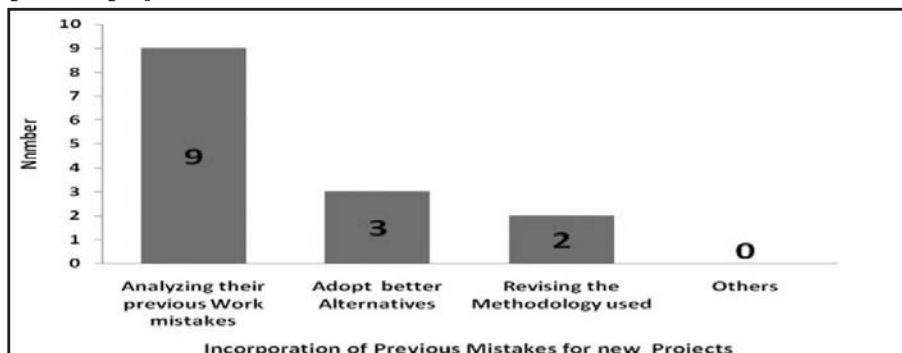
The graph shows that contracting firms generally maintain a database for continuous monitoring and improvement of the organization. Progress reports are another popular means of assessing project status as well as organizational status.

23. How do you evaluate end user feedback?



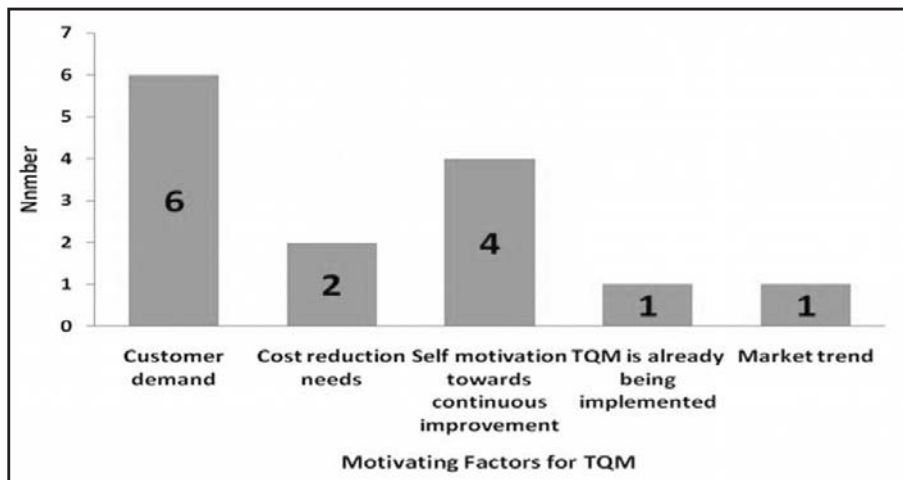
Contractors usually measure end user feedback in terms of returning clients because they want to stay in business, but a few firms also consider feedback forms in order to maintain database and evaluate their business strategies.

24. When working on a new project how do you incorporate learning from your previous projects?



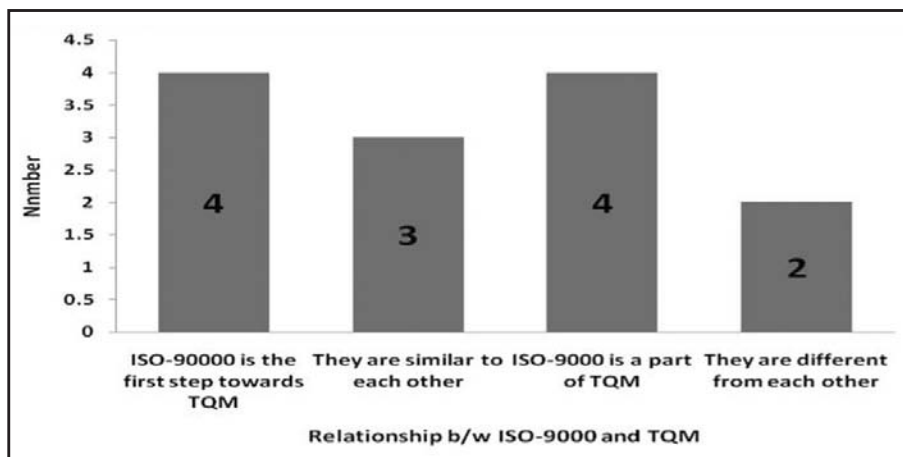
While undertaking new projects, contractors do not usually revise their adopted methodology before analyzing their previous works for mistakes and implementing their learning from them. They prefer to find solutions by learning from their mistakes.

25. Which of the following factors might motivate you to implement TQM?



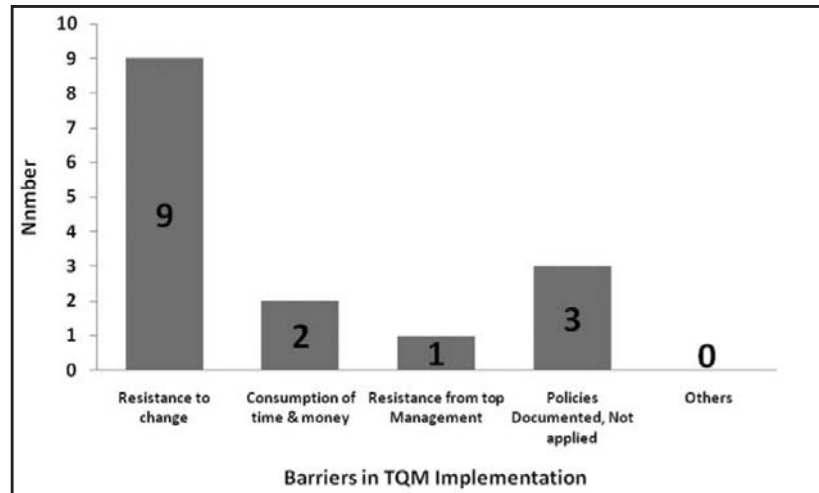
Self-motivation for improvement (to make clients delighted) and customer demands are the major reasons cited by contractors for implementation of TQM in their organizations. TQM philosophy has many facets; generally it has been observed that most contractors are implementing some elements of TQM if not all.

26. Are you aware of the relationship between ISO-9000 and TQM?



Result shows that the construction industry, contractors in particular, are not aware of the true relationship between ISO and TQM. ISO and TQM both direct an organization towards improved quality but their approaches are very different.

27. What obstacles do you foresee in the implementation of TQM?



Result shows that contractors' attitude of unwillingness to change and implementation of quality policies are the major hurdles in the path of TQM implementation to Pakistan's construction industry.

4. CONCLUSIONS AND RECOMMENDATIONS

It is evident from the study that construction contractors dominate the construction industry and are the major players and decision makers in this industry. The practices adopted by them determine the direction and trends in the construction industry. 'Resistance to change' shown by most of the contractors reflects their lack of interest in adopting new technologies as they do not want to break away from the established norms.

It can be summarized from the study that majority of the contractors are unsure as to why they would implement TQM. Practices in an organization reflect the true factual happenings that take place on projects. What is meant by quality in the organization portrays the in-house quality setup which is reflected in the projects undertaken by the organization. The study also revealed the importance given by the contractors to employee training that is reflected in the technical and productivity capability of the organization. Contractors give only peripheral importance to important issues related to TQM such as quality in the organization and organizational practices. As a result, there remains conflict between personal perception of quality and organizational perception of quality. Contractors personally prefer client satisfaction while project organization goes for satisfaction at all ends of the projects, as a result quality practices are affected on projects. Although contractors' focus on the common themes of organizational practices and quality however, these do not tend to reflect in their efforts as they do not have a concise and exact definition of quality.

Employees should be empowered to make decisions on the matters of quality and encouraged to propose solutions related to their work problems. It is suggested that through effective communication and improved project coordination, workers must be motivated to improve their work performance. Contractors must move away from their obsession with the bottom line. They need to define their objectives by creating a harmony through mutual co-ordination among all parties including subcontractors and suppliers simultaneously defining their objectives with clarity. This may prove to be instrumental in minimizing costs as well as improvement of the overall process and achievement of desired quality.

5. REFERENCES

1. Arditi, D. and Gunayadin, M. H. (1998), Total quality management in the construction process, *International Journal of Project Management* Vol. 15, No. 4, pp. 235-243
2. Baden-Hallard, R. (1993), *Total quality in construction projects*, Thomas Telford: London
3. Brown, T.J., Churchill, G.A. Jr and Peter, J.P. (1992), *Improving the measurement of service quality*, A.C. Nielsen working paper, No. 91-4, University of Wisconsin Madison, Madison, WI.
4. Burati, J. L. *et al.* (1992) Quality management organizations and techniques. *Journal of Construction Engineering and Management*, 118(1), 112-128.
5. Chowdhury, S. (2005). *The Ice Cream Maker: An Inspiring Tale About Making Quality The Key Ingredient in Everything You Do*. New York: Doubleday, Random House.
6. Culp, G., Smith, A., and Abbott, J. (1993). Implementing TQM in consulting engineering firm, *J. Management in Engineering*, Vol.9, No. 4, pp. 340-356
7. David, A. and Gunaydin, H.M. (1997). Total quality management in the construction process. *International Journal of Project Management*, 8
8. Deming, W.E. (1986). *Out of the Crisis*. Cambridge, MA. : Massachusetts Institute of Technology.
9. Drucker, P. (1985). *Innovation and Entrepreneurship*. New York: Harper & Row.
10. Hunt, V., and Daniel, G. (1993). *Managing for quality. Integrating quality and business process*, Irwin, Burr Ridge, Ill.
11. Jaafari, A. (2001), Management of risks, uncertainties and opportunities on projects: time for a fundamental shift, *International Journal of Project Management*, Vol. 19 No.2, pp.89-101.
12. Kuprenas, J. A., & Kenney, M. D. (1998). Total quality management implementations and results: Progress update. *Practice Periodical on Structural Design and Construction*, 3(1), 34-39.
13. Low, S. P., and Peh, K. W. (1996) A framework for implementing total quality management in construction. *The TQM Magazine*, 8(5), 39-46.
14. McKim, R. A., & Kiani, H. (1995a). Applying total quality management to the North American construction. *Cost Engineering*, 37(3), 24-28.
15. Motwani, J. (2001). Critical factors and performance measures of total quality management. *The TQM Magazine*, 13-4!, 292-300.
16. Nesan, L. J., & Holt, G. D. (1999). *Empowerment in construction: the way forward for performance improvement*. Hertfordshire, England: Research Studies Press LTD.
17. Sommerville, J., and Robertson, H. W. (2000). A scorecard approach to benchmarking for total quality construction. *International. Journal of Quality Reliability Management*, 17(4/5), 453-466.
18. Torbica, Z. M. & Stroh, R. C. (1999). Impact of total quality management on homebuyer satisfaction. *Journal of Construction Engineering and Management*, 12, 198.