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# TQM in Construction and Manufacturing Companies of Pakistan: A Case Study

NAFEES AHMED MEMON\*, KANYA LAL KHATRI\*\*, AND ALLAH BUX MEMON\*\*\*

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## ABSTRACT

The role of construction quality and continuous improvement is vital in the development of construction industry of developing countries. Construction quality and continuous improvement is linked with the adoption of quality management systems in construction companies. This paper highlights the importance of TQM (Total Quality Management) and presents the benefits of TQM gained by construction organizations in worldwide construction sector. It examines and contrasts the level of acceptance and execution of TQM in construction and manufacturing sector of Pakistan. The paper also identifies the barriers in adoption of TQM and advantages of implementing TQM in construction sector of Pakistan. In the end, the paper presents some suggestions and steps for the implementation of TQM in construction companies of Pakistan. The findings and recommendations of the study are not only beneficial for the construction sector of Pakistan but also these will be helpful to other developing countries having similar scenarios.

**Key Words:** Total Quality Management, Construction Companies, Continuous Improvement.

## 1. INTRODUCTION

Quality is an essential aspect for sustainability and client contentment [1]. In Construction perspective, quality can be defined as meeting the functional, legal and aesthetic needs of a construction project [2]. In the past few decades TQM has been successfully implemented in manufacturing sector of some developed countries, however the pace of acceptance and execution has remained slow in

construction. Manufacturing and construction sectors are different in nature. In manufacturing mostly processes are repeated, where as construction usually takes place in the form of projects i.e. buildings, bridge, etc. Many basic activities are repetitive from job to job in construction but the specifics of function are mostly different. But this justification is not enough to say that quality management approaches which have shown good results in

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\* Professor, Department of Civil Engineering, Mehran University of Engineering & Technology, Jamshoro.

\*\* Associate Professor, Department of Civil Engineering, Mehran University of Engineering & Technology, Khairpur Mirs Campus.

\*\*\* Associate Professor, Department of Civil Engineering, Mehran University of Engineering & Technology, Jamshoro.

manufacturing sector cannot be applied to construction [3]. Due to the disinclination towards adoption of latest technology and modern management systems; construction industry of Pakistan is rearward as compared to developed countries [4]. TQM is a management approach which has been widely adopted by many manufacturing and construction companies in developed countries. The literature also supports the fact that both manufacturing and construction sector around the globe have benefited from the adoption and execution of TQM. This paper therefore is aimed to identify the level of acceptance and execution of TQM in manufacturing and construction organizations of Pakistan. The paper identifies the benefits and obstacles faced by construction sector in some developed and rapidly developing countries. It differentiates between the level of quality management and TQM adoption in construction and manufacturing sector of Pakistan. Finally, it presents some suggestions and steps for the implementation of TQM in construction sector of Pakistan.

## 2. TQM IN GLOBAL CONSTRUCTION INDUSTRY

The literature indicates that many construction organizations of developed countries have benefited

from the execution of TQM. A study carried out on the evaluation of quality of different contractors in some developed countries concludes that: the superiority of Japanese contractors in quality performance is mainly due to their deep-rooted quality awareness, better working relationships with their subcontractors, and fully developed quality assurance and TQM system [5]. The comparison of level of adoption of quality managements systems among Japanese, UK and USA contractors worked out in the same study is shown in Table 1.

Table 1 clearly indicates that the percentage of Japanese contractors having TQM is comparatively more than the UK and USA contractors. High quality performance of Japanese contractors is therefore linked with better adoption of TQM. The major benefits of TQM in construction organizations as reported in the literature [2-3,5-11] include:

- Better focus by higher management on the activities and needs at lower level.
- Good project performance.
- Better client contentment.
- Improved market share.

TABLE 1. COMPARISON OF LEVEL OF ADOPTION OF QUALITY MANAGEMENT SYSTEMS AMONG JAPANESE, UK AND USA CONTRACTORS [5]

	Japan		UK		USA		Total	
	<i>n</i>	(%)	<i>n</i>	(%)	<i>n</i>	(%)	<i>n</i>	(%)
TQM	20	90.9	17	53.1	13	40.6	50	58.1
Quality Assurance Certificate								
ISO-9001 and ISO-9002	10	45.5	16	50.0	02	06.7	28	33.3
ISO-9001	12	54.5	08	25.0	01	03.3	21	25.0
ISO-9002	00	00.0	02	06.3	00	00.0	02	02.4
None	00	00.0	06	18.8	27	90.0	33	39.3

- ❑ Better relations with suppliers and customers.
- ❑ Superior staff morale.
- ❑ Enhanced measurement of performance.
- ❑ Better organizational competitiveness.
- ❑ Improved contractor and sub contractor relations.
- ❑ Superior construction quality.

Construction organizations have also faced some barriers while implementing TQM. The main barriers in implementing TQM as reported in literature [2-3, 5-11] are:

- ◆ Lack of acceptance of TQM particularly on construction site level.
- ◆ Wrong perception about TQM that it is not advantageous to the roles of project manager and foreman.
- ◆ Construction site vary from place to place.
- ◆ Perception of job loss.
- ◆ Lack of training.
- ◆ Unclear plan.
- ◆ Obstructions in feedback.

### 3. TQM IN CONSTRUCTION AND MANUFACTURING COMPANIES OF PAKISTAN

A questionnaire survey was carried out to identify the level of acceptance of TQM in construction and manufacturing sector [12]. Construction and manufacturing companies of Karachi & Hyderabad were chosen for this study. In construction, design consultants and contractor based organizations were chosen; whereas in manufacturing sector, some steel and cement manufacturing companies were selected. Overall 80

questionnaires were distributed. 51 companies responded and the response rate was 64%. Out of 51 respondents, 28 were contractors, 15 were consultants and 08 were manufacturing companies. The statistics of respondents is shown in Fig. 1.

### 4. COMPARISON OF SURVEY RESULTS

Some results of questionnaire survey are depicted in Figs. 2-3. The detailed comparison of survey results is also given in Table 2.

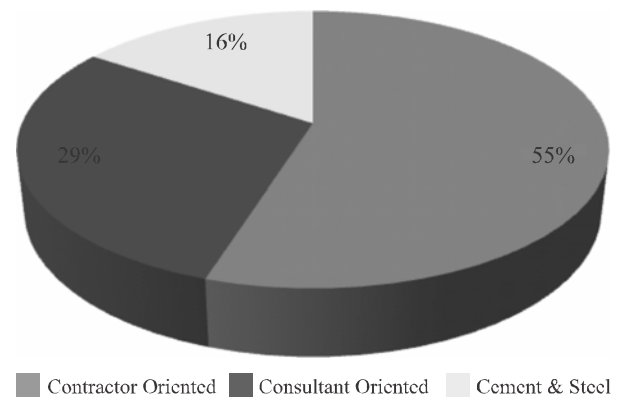


FIG. 1. STATISTICS OF RESPONDENTS

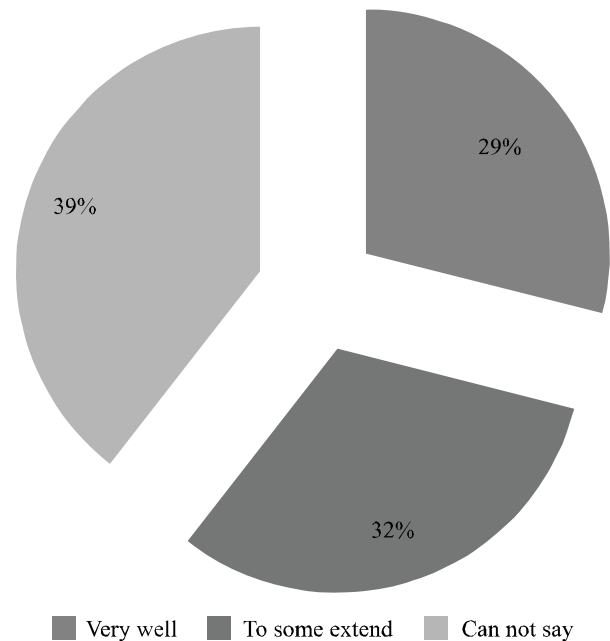


FIG. 2(a). CONSTRUCTION COMPANIES' RESPONSE WHETHER TQM WILL WORK IN THEIR COMPANIES

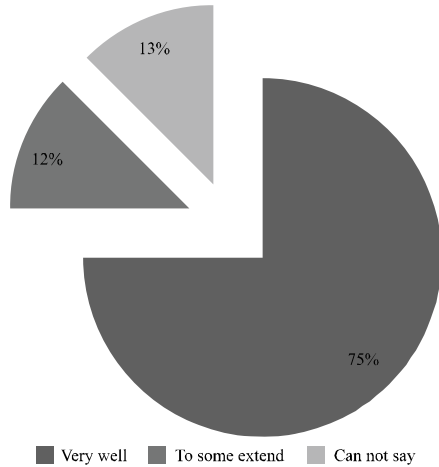


FIG. 2(b). MANUFACTURING COMPANIES' RESPONSE WHETHER TQM WILL WORK IN THEIR COMPANIES

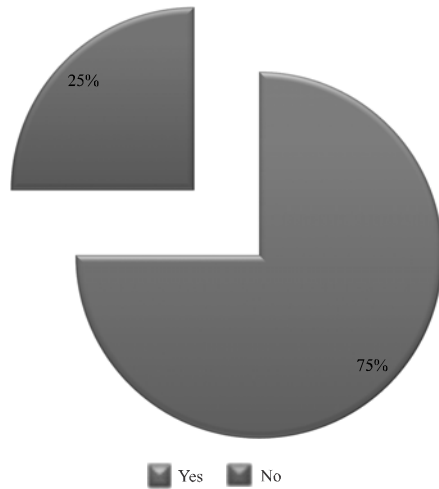


FIG. 3(a). CONSTRUCTION COMPANIES' RESPONSE WHETHER THEY HAVE A SYSTEM FOR GATHERING CUSTOMERS' SUGGESTIONS



FIG. 3(b). MANUFACTURING COMPANIES' RESPONSE WHETHER THEY HAVE A SYSTEM FOR GATHERING CUSTOMERS' SUGGESTIONS

## 5. STEPS FOR IMPLEMENTING TQM IN CONSTRUCTION ORGANIZATIONS OF PAKISTAN

Based on extensive literature review and study carried out in this research work, some steps for implementing TQM in construction organizations of Pakistan are shown in Fig. 4 and discussed below:

- (i) As evident from this study the level of adoption of Quality Management System in construction organization is very low and seems to be on inception stage. Therefore as a first step efforts should be taken to enhance the importance of Quality and Quality Management Systems.
- (ii) Construction organizations should be involved in raising awareness and motivation for implementing Quality Management Systems at Organization and project levels. Organizing seminars and workshops related to quality enhancement with the involvement of construction sector is an important area of attention.
- (iii) Quality enhancement needs a structure or Quality Management System to implement quality objectives. ISO 9001 standards provide necessary guidelines to develop and implement quality system.
- (iv) TQM philosophy is based on customer satisfaction and continuous improvement; it needs a system or structure to implement quality management. Implementation of ISO 9001 standards in construction organization of Pakistan will provide a base and structure to adopt TQM philosophy.

(v) Organizational culture need to be aligned with TQM objectives. Cultural audit of the organization is required to assess the gaps between existing culture and new organizational strategy such as TQM. Cultural audit will help in the design of successful TQM implementation plan.

(vi) Continuous training of employees related to new and innovative approaches is an important step to implement new programs. Proper training should be provided to create the understanding and implementation of TQM at organizational level.

TABLE 2. COMPARISON OF SURVEY RESULTS

Survey Question	Construction Companies	Manufacturing Companies
Perception about quality?	Majority of construction companies perceive customer satisfaction and increased profit as most important. Whereas appearance of the product is considered comparatively less important.	Most of the manufacturing companies have the same perception about quality as that of construction companies.
Will TQM work in your organization?	As shown in Fig. 2(a), significant number of construction organizations (61%) are sure that TQM will be good for their organization.	As depicted in Fig. 2(b), 75% of the respondents from manufacturing sector feel that TQM will work in their organization.
Organization's perception about the advantages of TQM?	Majority of the construction organizations perceive "Elimination of Defects" and Competitive Edge" as the main advantages of TQM.	"Productivity Improvement" and "Elimination of Defects" are perceived as the main advantages of TQM by most of the manufacturing companies.
Importance of Product/Service quality?	95% of the construction companies rate the product or service quality as 'very important'.	All the respondents related to manufacturing rank the product or service quality as 'very important'.
Significance of customer satisfaction?	97% of the companies rate the customer satisfaction 'highly important'	'Customer satisfaction' is perceived by all respondent manufacturing companies as 'very important'.
Rank of importance about quality, cost safety and time?	Majority of respondents rank quality and safety higher than time and cost in terms of level of importance.	About the rank of quality, cost, safety and time; the manufacturing companies has the same opinion as that of construction companies.
System for gathering customer suggestions?	As depicted in Fig. 3(a), 75% respondents in the construction sector have a system for collecting customer suggestions for improvement.	As shown in Fig. 3(b), all the respondents in manufacturing sector have a system for gathering customer suggestions.
System for gathering employees' suggestions?	84% construction companies have a system for collecting employees' suggestions.	87 % respondents have a system for gathering employees' suggestions.
Have you implemented TQM in your organization?	None of the construction organizations surveyed in this study had implemented TQM.	None of the respondents had implemented TQM in their organization at the time of questionnaire survey.
Obstacles in TQM adoption?	Insufficient training, Lack of interest of top management, Less expertise in TQM, Lack of dedication of internal customers, are the main obstacles in adopting TQM as reported by construction organization.	The respondents of manufacturing companies rank the same obstacles in implementing TQM as reported by construction companies.

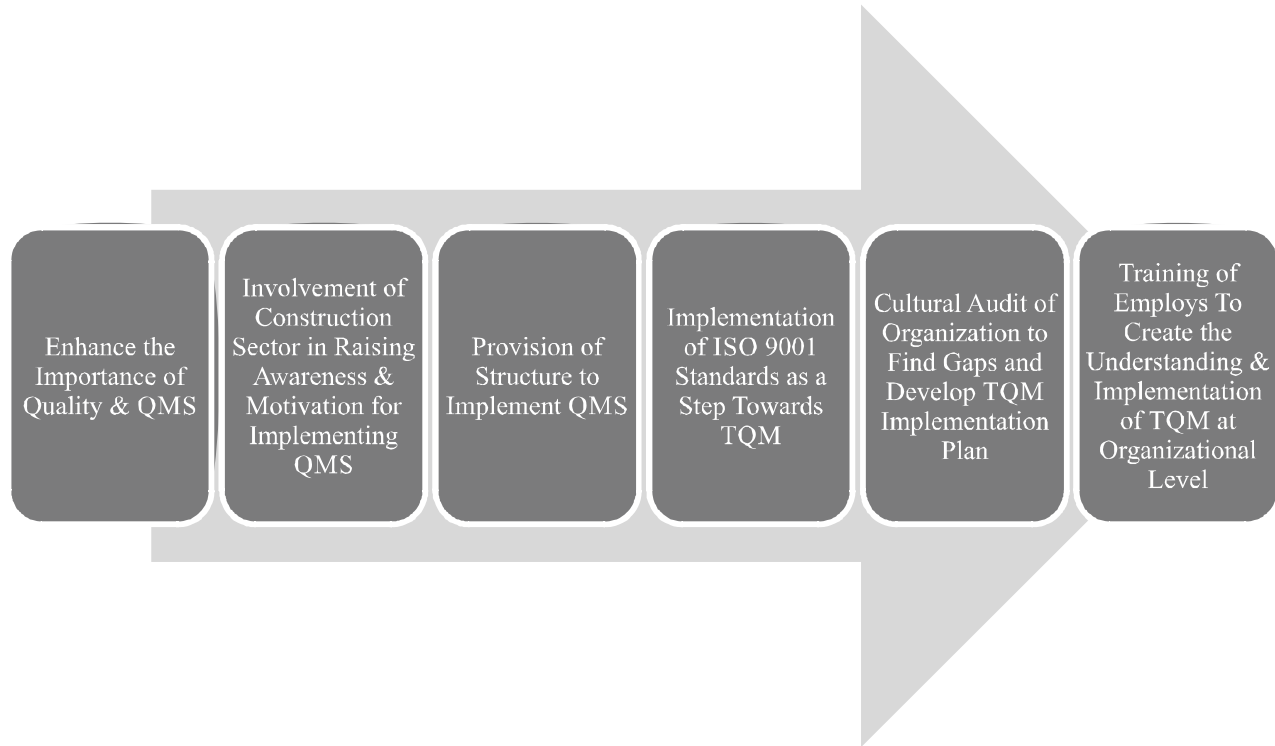


FIG. 4. STEPS FOR IMPLEMENTING TQM IN CONSTRUCTION ORGANIZATIONS

## 6. CONCLUSIONS

From the results of the survey it can be concluded that:

- (i) Both construction and manufacturing companies have same perception about quality.
- (ii) 'Elimination of Defects', 'Productivity Improvement' and 'Competitive Edge' are seen as main advantages of TQM by construction and manufacturing companies.
- (iii) Both sectors rank product or service quality and customer satisfaction as 'very important'.
- (iv) As compared to time and cost, quality and safety are ranked higher by both construction and manufacturing companies.
- (v) Majority of manufacturing companies have a system to obtain customer feedback, whereas a

small percentage of construction companies obtain customer feedback.

- (vi) Companies in both sectors have system for gathering employee suggestions.
- (vii) Neither construction nor manufacturing companies had implemented TQM at the time of survey.
- (viii) Both sectors have reported same obstacles in implementing TQM in their organizations:
  - o Insufficient training
  - o Lack of interest of top management
  - o Less expertise in TQM
  - o Lack of dedication of internal customers.

- (ix) Overall survey results indicate that the level of quality management is better in manufacturing companies as compared to construction companies.

## **7. SUGGESTIONS**

Based on discussion of results and conclusions, some suggestions are presented in this section.

- (i) One of the main barriers in the implementation of TQM in construction organizations is lack of top management commitment. Conducting seminars in that appropriate area may help in promoting awareness and motivation for the adoption of TQM in top management of construction companies.
- (ii) There is need of education and training in construction organization to enhance the awareness, importance and understanding of TQM. Top management of construction organizations can play a valuable role in that context.
- (iii) Proper human and material resources should be employed by construction organizations in order to promote this quality management philosophy.
- (iv) Employee commitment is also important in effective implementation of TQM. Organizational policies which help in raising employee commitment should be adopted.
- (v) Public and private clients should make it compulsory for designers and constructors to implement proper quality management system

before awarding the works. There should be some legislation and regulations by the government in this context.

- (vi) As evident from literature, construction companies of developed countries like Japan, USA and UK have reaped the fruits of implementing TQM in their organizations. Therefore construction companies of Pakistan and other developing countries having similar scenarios as observed in this study, should also implement TQM in order to promote quality at organizational and construction project levels.

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## **REFERENCES**

- [1] Palaneeswaran, E., Thomas, N.G., and Kumaraswamy, M., "Client Satisfaction and Quality Management Systems in Contractor Organizations", *Building and Environment*, Volume 41, pp. 1557-1570, 2006.
- [2] Arditi, D., and Gunaydin, H.M., "Total Quality Management in the Construction Process", *International Journal of Project Management*, Volume 15, No. 4, pp. 235-243, 1997.
- [3] Low, S.P., and Wei, P.K., "A Framework for Implementing TQM in Construction", *The TQM Magazine*, Volume 8 · No. 5, pp. 39-46, 1996.

- [4] Khan, A.H., Azhar, S., and Mahmood, A., "Quality Assurance and Control in the Construction of Infrastructure Services in Developing Countries - A Case Study of Pakistan", First International Conference on Construction in Developing Countries, Advancing and Integrating Construction Education, Research & Practice, pp. 109-119, August 4-5, Karachi, Pakistan, 2008.
- [5] Xiao, H., and Proverbs, D., "The Performance of Contractors in Japan, the UK and the USA (An Evaluation of Construction Quality)", Journal of Quality & Reliability Management, Volume 19, No. 6, 2002.
- [6] Peter E.D.L., Li, H., Rani, Z., and Holt, G.D., "Re-Thinking TQM: Towards a - Framework for Facilitating Learning and Change in Construction Organizations", The TQM Magazine, Volume 12. No. 2, pp. 107-116, 2000.
- [7] Tamimi, N., and Sebastianelli, R., "The Barriers to Total Quality Management", Quality Progress, Volume 31, No. 6, pp.57-60, June, 1998.
- [8] Pheng, L.S., and Teo, J.A., "Implementing Total Quality Management in Construction Firms", Journal of Management in Engineering, Volume 20, No. 1, pp. 8-15, 2004.
- [9] Bugdol, M., "The Implementation of the TQM Philosophy in Poland", The TQM Magazine, Volume 17, No. 2, pp. 113-120, 2005.
- [10] Yong, K.T., and Pheng, L.S., "Organizational Culture and TQM Implementation in Construction Firms in Singapore", Construction Management and Economics, Volume 26, No. 3, pp. 237-248, 2008.
- [11] Farooqui, R.U., Masood, R., and Junaid, A.J., "Assessing the Viability of Total Quality Management Implementation in Contracting firms of Pakistani Construction industry", First International Conference on Construction In Developing Countries, "Advancing and Integrating Construction Education, Research & Practice", pp. 482-498, Karachi,, Pakistan, August 4-5, 2008.
- [12] Hussain, A., Abdullah, A., Khizar, M., Rehman, Z., Rehman, A., Saeed, M., and Jani, T.A., "ISO & TQM in the Local and Global Construction Industry: A Case from the Construction Industry of Hyderabad and Karachi", B.E. Thesis, Department of Civil Engineering, Mehran University of Engineering & Technology, Jamshoro, Pakistan, 2009.