
Assessment of Pakistani Construction Industry – Current Performance and the Way Forward

Rizwan U. Farooqui and Syed M. Ahmed

Department of Construction Management,
Florida International University, Miami, Florida, USA

Sarosh H. Lodi,

Professor and Chairman, Department of Civil Engineering,
N.E.D. University of Engineering and Technology, Karachi, Pakistan

The Pakistani Construction Industry has always been of economic and social significance to the country. In contrast to the prospective share of Pakistani construction in the local and global economic market, conversely, the development of the sector has not been at par with the market demands. With the recent rapid economic growth of the country, Pakistan now offers a growing market for the construction industry. The Government of Pakistan has responded to this opportunity by planning extensive infrastructure expansion programs. All of these programs have the potential to lead the local industry to establish respect, status and international recognition when the appropriate efforts are extended to achieve the same. Even with the opportunity for growth the challenges will be extensive. This research presents the current state of performance of Pakistani Construction Industry and provides directions for strategic improvement of the construction industry on a sustainable basis. Major findings of the research include: a cultural and behavioral shift in the mind-set of all participants in the construction process especially top management is necessary if the construction industry is to improve its performance and competitiveness; the “boom cycle” and corresponding shortage of labor trades has increased the need for industry participants to adopt and apply construction project management philosophy, tools and techniques to help them manage the industry performance and productivity in a sustainable long-term mode. The major obstacles to improving the performance of Pakistani construction industry were found to be lack of expertise/resources in construction project management and its applied areas. A rigid attitude and behavior of executive management toward quality, safety and risk management, plus more management and emphasis on employees’ commitment toward project performance, better education and training to drive the improvement process, and tendency to cure the cause of the problem rather than the symptom. If coordination, teamwork, productivity and industry performance in the long run is going to improve, then extensive awareness and training programs to improve the clients’ understanding and approach toward construction project management must be initiated without exception.

Keywords: Pakistan, Construction industry, Performance, Risk, Safety, Quality, Delay, Constructability, Low Bid Procurement, Best Value Procurement, Client Satisfaction Index

1. Introduction

The construction industry is an important sector of the economy and has multiple backward and forward linkages with other sectors. The industry contributes significantly to socio-economic development and employment and there is a consensus on certain common issues that plague the construction industry in developing countries.

Pakistan is a developing country that is currently enjoying relatively strong growth in construction activities. Today, construction is the second largest sector in Pakistan's economy after agriculture. Roughly 30-35% of employment is directly or indirectly affiliated with the construction sector. As such, the construction sector in Pakistan has played an important role in providing jobs and facilitating revival of the economy.

After the lost decade of the 1990s, Pakistan's economy has bounced back and has been exhibiting growth rates of above seven percent in recent years (Economic Survey of Pakistan, 2006-07). This, coupled with population growth rates of over two percent (Economic Survey of Pakistan, 2006-07), places an acute demand on basic and advanced infrastructure. The recent power shortages are a classic example of the rapidly growing economy's aging and deficient power infrastructure which is failing to cope with burgeoning demand and resulting in an energy crisis in the country. A similar situation also prevails in the supply of the transport infrastructure in Pakistan.

The Government of Pakistan has responded to this demand by planning extensive infrastructure expansion. The Federal Medium Term Development Framework (MTDF) allocates Rs2,162 billion (US\$36 billion) to the development of large infrastructure – embarking on an ambitious program to upgrade roads, railways, air, power, water and irrigation and other infrastructure. Of this, Rs993 billion (US\$16.3 billion) will be through the Public Sector Development Program (PSDP). The MTDF envisages a tripling of the infrastructure PSDP from an average of Rs150 billion per year to Rs440 billion per year. The current FY08 PSDP allocation of Rs520 billion has already eclipsed this target.

There are other emerging infrastructure programs that are required to respond to the rapidly developing economy, and are not entirely included in the MTDF. These include the National Trade Corridor Improvement Program (NTCIP), the construction of large water reservoirs (Kalabagh, Diamer, Bhasha), the rehabilitation of the key barrages, delivery of clean drinking water, sanitation, and electricity to all and the new Islamabad Airport project (which alone require substantial investments over and above the MTDF). In addition, provincial governments, districts and towns/municipalities have also embarked on infrastructure improvements in the face of rapid urbanization.

In formulating these plans, the various tiers of government have primarily focused on identification of the required infrastructure and on the availability of public financing. There is also the growing realization that 'this infrastructure is needed immediately' – that is why; most of the implementation periods for this infrastructure delivery is now or at the latest over the next five to seven years. However, very little analysis has been done to factor in the constraints that may or will be posed by the wider construction industry.

This paper looks at the current state of Pakistani Construction Industry in terms of its performance – schedule, cost, quality, safety, risk, constructability, procurement, client satisfaction, etc. The main objective of the research is to identify the challenges and the bottlenecks that the industry is facing and to provide strategic recommendations and the way forward for sustainable improvement.

2. Pakistani Construction Industry – Historical Development

Since independence (1947) until about 1971, there were very few private developers/constructors in Pakistan. Housing for public sector was done by the Provincial and Central Works departments through contractors, while the entrepreneurs constructed their residences mostly with the help of unqualified but skilled persons. After 1971, when land was made available in the city of Karachi by Karachi Development Authority (KDA) and larger allocations were made by the Government of Pakistan to Housing Building Finance Corporation (HBFC), a number of entrepreneurs, industrialists, businessmen, importers, consultants, etc., entered in the construction industry. Some of them had experience in building construction while others had neither enough managerial capability nor sufficient technical knowledge. The building construction industry did, however, get a boost.

With this boost, the builders and developers gathered to form associations such as “Association of Builders and Developers” (ABAD) with the objectives of improving the state of the industry as well as to provide a platform to showcase and address pertinent issues. Such associations, however, had to face several problems in dealing with authorities responsible for approving building plans, sale prices, conditions of sale, grant of house-building loans and so forth. For these and several other reasons, these associations largely failed to make serious efforts to improve the building construction industry itself. A few attempts to rectify and enhance the building systems could not be successful as those were applied without the adaptations necessary to make them suitable under the existing conditions prevailing in the country.

In relation to industrial and infrastructure sectors, until 1975, all the major projects such as Indus Basin Replacement Works, Warsak Dam, etc., had been done by foreign contractors. However, there was a change in government policy in 1975 to award more difficult projects to domestic construction industry in order for it to develop the necessary capability and confidence. As a result, these particular sectors were able to expand and develop their operations. Most of the development resulted from the decision of the Pakistan Steel Mills Corporation to entrust nearly all the construction work to Pakistan based contractors. Initially, there was resistance from different sectors as well as reluctance from local contractors because it was felt that local contractors were lacking the necessary capabilities (in terms of skill and equipment) and the experience to undertake such large construction work which demanded high level of performance and quality control. The supervision of Soviet experts in the area of project management helped the Pakistani contractors complete the job satisfactorily. Port Qasim is another example of high capacity work performed by local contractors. Owing to such projects, the physical capacity of the contractors increased and the contractors also increased their investment on training personnel and acquiring heavy construction equipment.

Nevertheless, after a short run of notable performances in the gigantic Indus Basin works which included construction of large dams (Tarbela, Mangla etc), barrages and link canals and the prestigious Pakistan Steel Mills project, the construction sector remained in a state of depression until recently, primarily owing to the negligence of the sector from the government in terms of inadequate policies and insufficient support. Companies like MLC (Pvt) Ltd, National Construction Ltd, Imperial Construction Company (Pvt) Ltd (now ICC) and Gammon Pakistan

Ltd played leading roles in the Pakistan Steel Mills project carrying out major portion of the civil, mechanical & electrical works. On the twilight of the twentieth century, all these companies were on the verge of closure in the overall recessionary environment and paucity of major public development projects. Historically, during this long state of depression, a vast majority of our projects have suffered from time delays, cost overruns, quality non-compliance, and safety failures.

The present government, realized that the engineering infrastructure, housing and building sectors are the backbone of any country's economy and play a vital role in the development of the country, has increased resources to further expand the basic infrastructure in the country. The effect has initiated a number of development projects which have led to increased demands of building and construction activities in the country. The government has acknowledged in the latest Economic Survey that the strengthening of the country's infrastructure is a basic imperative for sustaining growth momentum. During the last two years, the government has taken various budgetary and non-budgetary measures which are now yielding positive results. Construction activity in Pakistan is booming; demand for construction-related materials has surged. Many national and international real estate developers have launched or launching large construction projects in Pakistan which has further accelerated construction activity in the country.

As per the report of the Economic Survey of Pakistan, 2006-2007, Pakistan is in the midst of its strongest economic expansion phase and its growth momentum is broad-based. All the three major sectors, namely, agriculture, industry and services have provided support to strong economic growth. The year's real GDP growth has been powered by stellar growth in construction by 17.2 percent. Brisk pace of activities in private housing, high rise buildings along with large public sector spending on physical infrastructure and the on-going reconstruction activities in the earthquake affected areas have contributed to the sharp pick up in construction value-added. Construction with many forward and backward linkages is also making impact on the economic growth by contributing 5.2 percent or 0.4 percentage points to this year's real GDP growth. Construction is also highly labor intensive sector and a strong growth in this sector has generated a variety of jobs.

Pakistan now offers a growing market for the construction industry. According to Vision 2025, more dams and other projects have been announced for the feasibility and construction. Construction of two mega projects of Dams Bhasha Dam & Munda Dam been announced and will complete up to year 2016. Other projects like Liyari Expressway, Northern By-Pass and several other infrastructure projects are in progress.

Business Monitor International's (BMI) newly released Pakistan Infrastructure Report 2007 forecasts an average construction growth rate in the region of 8% over 2006-2010. Increased spending on infrastructure development programs covering the roads, railways and power segments, in addition to the ongoing reconstruction work in quake-hit areas, is expected to drive construction growth over the next few years.

3. A Point in Time Analysis of Pakistani Construction Industry – Research Rationale and Methodology

3.1 Research Rationale, Objectives and Scope

As identified earlier, compared to the past, the current decade is witnessing massive infrastructure growth in Pakistan. There are numerous infrastructure development projects in progress as well as under planning. With the stage set for an increase in development, the challenges are still higher. The “boom cycle” and corresponding shortage of labor trades has increased the need for industry participants to adopt and apply construction project management philosophy, tools and techniques to help them manage the industry performance and productivity in a sustainable long-term mode.

With the objectives to assess the current level of construction industry *performance* and develop recommendations for improvement, the research was aimed at investigating the industry performance in the following respects:

1. General Construction Project Management Practices – Extent of Application of Project Management Functions, Tools, Techniques and Systems
2. General Construction Project Management Practices – State of Adoption and Implementation of Construction Project Management Procedures
3. Risk Management Performance – Stakeholder Perceptions and Trends
4. Risks Management Performance – Critical Causes of Risks and their Responsibility Allocation
5. Delay Management Practices – Critical Causes of Delays and Delay Responsibility Allocation
6. Safety Culture – Perceptions and Practices
7. Quality Culture – A Way Forward to Total Quality Management Implementation
8. Constructability Practices
9. Contract Management Practices
10. Bid Procurement Practices – Performance Implications of Low Bid Environment
11. Bid Procurement Practices – A Way Forward to Implementing Best Value Procurement
12. Client Satisfaction Index in the Industry

3.2 Research Methodology

Structured surveys and expert interviews were conducted to understand the performance constraints as well as issues and problems that plague the construction industry in Pakistan. The analysis thus focused on identifying measures that could be implemented in Pakistan for enhancing local stakeholder performance as well as provide for sustainable growth of the industry.

The point in time analysis was done in two stages.

In the first stage, extensive literature review was performed to identify the constraints faced by the construction industry in other developing countries, to draw upon their experiences and consider the lessons learnt in the local context.

In the second stage, using the literature review as well as conducting a number of interviews with local experts, structured questionnaire surveys were developed with the objectives to provide tools for the assessment of the construction industry performance and to develop recommendations for improvement. A synopsis of the survey methodology adopted is given as follows:

1. An exhaustive list of industry stakeholders/owners was prepared as a first step using mainly the Pakistan Engineering Council's (PEC) comprehensive list of consultants and contractors.
2. An initial screening was done to identify stakeholders/owners working mainly in the major cities of Pakistan and primarily with commercial building and infrastructure related projects. Certain dominant firms in the industry were particularly included in the sample.
3. The industry wide survey had a sample size of 209, 36 of whom were public clients, 18 engineering and design consultants, 12 construction management consultants and 143 contractors. The clients selected were mainly decision-makers belonging to executing agencies and ministries which are responsible for delivering large infrastructure projects in road, water, power, railways, Civil Aviation Authority (CAA) and port sectors. In the final selection of 143 contractors, 62 were from C1, 41 from C2 and 40 from C3 (PEC Constructors categories are as follows: C1, no limit, average turnover past 3 years of Rs20 million; C2 up to Rs100 million, turnover Rs15 million; C3 up to Rs50 million, turnover Rs5 million; C4 up to Rs20 million, turnover Rs2 million; C5 up to Rs10 million, turnover Rs1.4 million; and C6 up to Rs5 million, turnover of Rs0.5 million). The C4 and lower category contractors were discarded from the survey list owing to the limited sphere of influence these contractors are able to bring to the improvement of the overall construction environment.
4. Almost 80% of the surveys conducted were face-to-face meetings. This approach, although required a much larger effort, proved to be highly successful and the overall response rate was 71%.

A synopsis of key research findings is given in the section 4 and a portion of the research findings have already been published by the authors in various conference proceedings and will be appropriately referenced in the text.

4. Assessment of the Current Performance of Pakistani Construction Industry – Research Results

The salient results compiled from the research are given in the following sub-sections.

4.1. Construction Project Management Practices – Extent of Application of Project Management Functions, Tools, Techniques and Systems

Lack of professional construction project management implementation is rampant in the industry. Significant project management weaknesses in the client and contractor organizations include: inefficient contract administration; lack of professional planning; lack of competent project control; slow decision making; lack of communication; and lack of leadership. Except for the construction phase, there is a fairly low trend of application of project management functions in various project phases. The Trend of employment of external project management consultants

is low; however, this does not imply strong in-house project management support as is evident by the research results. Also the project management tools and techniques are not used in high frequency among stakeholders/owners for various project management functions. Only the trend of usage of project control tools and techniques is in acceptable range. With computer aided project management tools and techniques are more frequently used only in preconstruction and construction stages, but still not within acceptable range. Lastly the project management data logging and communication system is inadequate and needs considerable refinement.

4.2 Construction Project Management Practices – State of Adoption and Implementation of Construction Project Management Procedures

The implementation of project management has not been at par in most of the organizations and has only moderately succeeded in improving stakeholder relationships and project performance. As evident from the findings of the study, the project management program has not been largely successful by virtue of the following:

- Unsuitable organizational culture for successful project management implementation. Most organizations have a balanced matrix structure; only few are projectized (project-based) – project management organization is still immature in most organizations.
- Lack of project management commitment by top management (lack of project management policies and procedures).
- Inadequate project management team building
- Use of traditional design-bid-build unit price/ lump sum competitive lowest bidding project delivery mechanism, which by virtue is adversarial in nature.
- Lack of application of specialty contracting.
- Lack of emphasis on project documentation submission requirement from contractors as essential bid decision making criterion during the preconstruction stage.
- Lack of focus on formal project planning, scheduling and performance tracking.
- Project decisions mostly made by in-charge of the project based on intuition and personal judgment.
- Project team and managers not extensively subject to audits and evaluation.
- Project lessons learned not logged by most stakeholders/owners for performance improvement purposes.
- Post project performance ratings not being done for contractors/ subcontractors by more than half of the respondents; suppliers also rarely rated for performance.
- Little formal project management training disbursed to employees; only some sort of informal project management training given by moderate number of the respondents to their employees – the major focus of training being project site control.
- Punch list items are usually not resolved in due time.

Compulsory involvement of construction project management consultants for major works in the public and private sectors should be mandated. The present system of construction supervision by engineering and design consultants has not paid off. This is primarily owing to their lack of emphasis on project management as compared to design implementation. Historically, by virtue of their knowledge and experiences, the consultants have proved to be highly technically oriented focusing their time, commitment and skills on design issues rather than management

issues which result in unsatisfactory results on project time, cost, quality, and safety performance.

As major consequence of project management non-performance the clients call the contractors back for warranty claim on almost 50% projects. The results clearly advocate a need for proactive government support for industry capacity building and training in construction project management.

4.3 Risk Management Performance – Stakeholder Perceptions and Trends [Farooqui et al. (01), 2007]

Formal risk management practices are infrequent among stakeholders/owners and the projects suffer from low productivity resulting in project delays and cost overruns. In many situations, stakeholders/owners perceive risks based on their own experience and judgment rather than using systematic procedures to identify, assess and resolve the risk. It can be concluded from the findings that stakeholders/owners in Pakistani construction industry, owing to lack of systematic procedures, do not have adequate capability of retaining and mitigating risks and hence resort to mechanisms such as transferring risks.

The top 5 obstacles in the implementation of formal risk management program, as indicated by the respondents, are shown below in descending order of responses:

1. Lack of expertise/resources in risk management (shortage of risk analysts)
2. Risk analysis of construction projects is seldom formally requested by clients, as they expect project management practice to set up projects risk-free.
3. Lack of accepted industry model for analysis
4. Time constraints

4.4 Risk Management Performance – Critical Causes of Risks and their Responsibility Allocation

A *risk value* and a *risk criticality index* was used to identify the major risk causes in the industry which, in descending order of criticality, were found to be as given in the top part of Table 1. The *criticality ranking* for various risk categories as identified by the research findings is given, in descending order of criticality, in the bottom part of Table 1.

4.5 Delay Management – Critical Causes of Delays and Responsibility Allocation [Farooqui et al. (02), 2007]

A *delay value* and a *delay criticality index* was used to identify the major delay causes in the industry which, in descending order of criticality, were found to be as given in the top part of Table 2. The *criticality ranking* for various delay categories as identified by the research findings is given, in descending order of criticality, in the bottom part of Table 2. The top most category of delay is “Design related delays” with responsibility lying on the design consultants.

Even though stakeholders/owners in Pakistan are aware of the significance of delay in terms of producing adversarial relationships in a project leading to financial implications, they are not

well aware of the concept of formal delay analysis, avoidance and control. The owners do not involve the contractors by most clients in the conceptual and design-procurement phases, but it is believed to an extent that their involvement in the early phases of the project can avoid delay.

Table 1. Major Risk Causes with Responsible Entities– Various Risk Categories (Top); Categorical Risk Criticality Ranking with Responsible Entities (Bottom)

Risk Cause	Category of Risk	Responsible Entity	Risk Criticality Ranking
Price Fluctuation	Financial/ Economic Risk	Contractor	1
Inflation	Financial/ Economic Risk	Owner	2
Underestimation of project cost	Management/ Administrative	Owner	3
Cost overruns due to schedule delays	Management/ Administrative	Contractor	4
Delayed payments	Financial/ Economic Risk	Owner	5
Category of Risk	Major Responsible Entity	Categorical Risk Criticality Ranking	
Financial/ Economic risks	Owner (100%)	1	
Design related risks	Consultant (100%)	2	
Construction site related risks	Contractor (72.5%)	3	
Contract related risks	Owner (86.3%)	4	
Management/ Administrative risks	No single major responsible entity (Contractor = 45%)	5	

4.6 Safety Culture in Pakistan Construction Industry – Perceptions and Practices [Farooqui et al. (03), 2007]

Although construction industry stakeholders/owners in Pakistan are generally aware of the priority of safety as well as its significance to the industry but lack commitment, cooperation, expertise and familiarity with tools to implement safety culture on their projects. Formal safety management practices are infrequent among stakeholders/owners and the projects suffer from accidents resulting in productivity losses, project delays and cost overruns. Therefore it can be concluded that owners/stakeholders/owners in Pakistan construction industry, owing to lack of commitment as well as lack of systematic procedures, do not have adequate capability of maintaining a safe project. The owners are considered to be the key initiators for project safety; without owner commitment to safety, contractors are not willing to accept major responsibility for safety and hence their lack of commitment. A cultural and behavioral shift is needed in the stakeholder perception about safety management implementation and improvement on projects. The major obstacles faced by contractors to the implementation and improvement of safety include – in decreasing order of significance – absence of the following: worker cooperation and behavior, familiarity and expertise with safety management techniques, safety awareness and knowledge, owner commitment, and a safety regulatory framework.

Table 2. Major Delay Causes with Responsible Entities– Various Delay Categories (Top); Categorical Delay Criticality Ranking with Responsible Entities (Bottom)

Delay Cause	Category of Delay	Responsible Entity	Delay Criticality Ranking
Change orders/ directives	Contract Related Delays	Owner	1
Labor productivity issues	Labor Related Delays	Contractor	2
Poor site management and supervision	Management/ Administrative Delays	Contractor	3
Inspections/ Audits	Construction Site Related Delays	Contractor	4
Poor cost estimation & control	Management/ Administrative Delays	Contractor	5
Category of Delay	Major Responsible Entity	Categorical Delay Criticality Ranking	
Design related delays	Consultant (100%)	1	
Financial/ Economic Delays	Owner (100%)	2	
Contract related delays	Owner (85.71%)	3	
Construction site related delays	Contractor (64.29%)	4	
Subcontracted work related delays	Contractor (100%)	5	

4.7 Quality Culture in Pakistan Construction Industry – A Way Forward to Total Quality Management Implementation [Farooqui et al. (04), 2007]

Although the construction industry organizations in Pakistan are aware of the importance of quality, their knowledge about TQM is limited, as well as their perception about quality is of a ‘curative nature’ (a means to eliminate defects) rather than a ‘preventive nature’ (a process improvement approach).

Majority of the construction industry organizations perceive quality as meeting technical specifications in order to satisfy external customers and provide value for money.

Most stakeholders/owners feel that TQM will not work in their organizations because of current organizational and industry culture. However they are aware, to some extent, of the benefits of implementing TQM in their organizations and feel that it will be highly beneficial if it can be implemented. Most of them think that TQM is a means for improving cost estimating, warranty claims and project economy.

Construction industry organizations in Pakistan are less focused on data acquisition. Neither customer suggestions nor customer satisfaction are given due significance and are rarely incorporated or evaluated. Employee suggestions are seldom taken; neither employee empowerment exists in majority of firms. This also refutes their claim that company policy invites employee participation in the quality building effort. Most of the companies do not rate post-project performance of their service providers.

Quality implementation on projects is not the highest priority to construction industry organizations; due to cost constraints, quality is mostly compromised.

The majority of construction industry organizations either do not have a code of ethics or even if they do have, the implementation of this code is highly questionable because they do not have any disciplinary process for its implementation.

While no unique trend was found in those organizations who have implemented a quality management program, most organizations prefer QA/QC and informal quality management programs. No organization has TQM implemented as their quality policy. Most of the organizations are implementing periodic short-range solutions or motivational programs rather than more formal long-term programs.

Most of the construction industry organizations do not provide any formal training to their employees about quality management systems.

The top 5 obstacles in the implementation of TQM program, as indicated by the respondents, are:

1. Lack of expertise/resources in TQM
2. Rigid attitude and behavior of executive management toward quality
3. Lack of top-management commitment/understanding
4. Lack of employee commitment/understanding
5. Lack of education and training to drive the improvement process

The organizations in Pakistan are generally neither willing nor prepared to adopt Total Quality Management (TQM) as a management philosophy within their organizational cultures.

Most organizations are unenthusiastic regarding TQM implementation and are unwilling to invest in it; in terms of both capital and time.

Only few organizations identified the procedure for TQM implementation that should, through persistence, allow the Pakistan construction industry to adopt TQM philosophy successfully.

4.8 Constructability Practices [Farooqui & Ahmed (01), 2008]

The general perception of stakeholders/owners about constructability needs to be improved as most stakeholders/owners believe that:

- Constructability efforts should typically begin during construction phase, which is a wrong perception.
- Constructability should be implemented only on large projects and not all projects, which is also a wrong perception.

The extent of usage of constructability in Pakistan construction industry is fairly low, particularly during preconstruction (where it's mostly needed).

The main reasons for low extent of usage of constructability practices, as found by the research study, are:

- Constructability is not usually required/ encouraged by project owner (or owner's representative).
- Stakeholder perception about constructability is not totally correct.
- Stakeholder perception about potential constructability benefits needs is not totally correct.

Many constructability procedures are of very simple nature and are not very difficult to practice but the need is to evoke the importance of this to the local professionals. The prevailing project practices are mostly outdated. There is an urgent need of introducing innovative and state-of-the-art tools and techniques that have been developed in advanced countries to Pakistan.

Contractors extend moderate level of participation in constructability operations during construction phase and most of this involvement is self-motivated and self-supported rather than owner required.

The top 5 major barriers (in descending order of criticality) towards implementing constructability are identified as:

- Lack of documentation and retrieval of "lessons learned"
- Lack of owner awareness of benefits, concepts, and so forth
- Satisfaction with status quo ("Over satisfaction" with current performance)
- Lack of designer awareness of benefits, concepts, etc.
- Failure to search out problems and opportunities

A fair number of stakeholders/owners believe that:

- major project problems can be resolved by the early application of constructability and
- Construction should be included as another specialty during the early project phases.

4.9 Contract Management Practices

Equitable basis of bidding at the time of contract be achieved through proper prequalification/ prescreening. Presently, most of the contracts are one sided, giving the government agency overwhelming control. This is generally treated as a major negotiating achievement, but in most cases practically promotes corruption. In order to make undue profits, contractors carry out substandard work, which is passed as satisfactory by the supervisory authority. Prequalification process of contractors should be improved by ensuring that only qualified contractors are prequalified.

Contractors should be given reasonable payments to perform the work. Because of high competition, a substantial number of contractors quote minimum rates and at times quote on the basis of performing substandard work, but most likely to be accepted by the consultants/ owner. The contractors thus cut corners at the time of quoting rates. When contracts are called, the difference between the lowest and the highest bidders is at times as great as 75%. This large difference, apart from other factors, does in fact, to a great extent, reflect the difference in quality

of work that the contractors are offering. The work is awarded to the lowest bidder and hence the quality of work suffers.

The contractors who work for organizations such as Public Works Department face additional financial problems because these organizations award contracts on the basis of scheduled rates which are, in most cases, lower than the prevailing market prices of labor and material. Contractors, having left with no other alternative, quote on the basis of this realization and rely heavily on claiming for changes and extra works arising during the course of the contract as well as try to compensate and make profits by producing work which is lower than the specifications. Corruption has also been reported in approvals of substandard works. Since scheduled rates are unrealistic and are a source of considerable malpractices, situation may be improved if the contracts are based on the bill of quantities rather than the scheduled rates.

Furthermore, while lowest bidding in itself is not a suitable method for award of contracts primarily because it compels the industry as a whole to compromise on low quality standards and not strive for continuous quality improvement, the way it is applied under the present circumstances in Pakistan, further reduces its effectiveness to a point that in most cases it would be economical to reject the project proposal. If the bid evaluation techniques take into account the underlying problems, improvements in the competitive bidding structure are possible.

Low estimates should be looked at utmost care and if it is determined that the contractor is not capable to produce the desired quality of output at the quoted rates, the bid should be rejected outright. It must be ensured that the bidders are quoting for approximately the same quality of work and that they will obtain reasonable profit.

Delays in contractor payments should be avoided. One of the most common complaints of the contractors is the delay in payments by the owners. These delays mainly occur because decisions concerning “extras” are not taken timely. Since matters remain pending, construction cost goes higher causing further problems for the contractors.

Contractors should be given reasonable time to carry out the work. In most cases, the time provided by the owner to the contractor for work completion is not reasonable. This is primarily because the deadline is more based on time decisions taken by the higher ups with their own bureaucratic and political reasons, rather than a structured management approach to project time analysis based on the scope and complexity of work involved as well as considering the industry work productivity. Provision of unreasonable time not only affects the quality of work but also reduces the probability of project completion on time. With little organized structure of resolving disputes and claims, these issues usually remain unresolved pending court decisions for a significantly long period of time.

Drawings, specifications and project supervision should be improved to ensure better productivity and quality. Provision of detailed drawings is one factor which needs attention. In many projects, detailed drawings are either missing or are inadequate and provide the contractor very little information about the job.

Engineering and design consultants usually require that the construction work be done as per given specifications. However, in the absence of locally developed standards by the parties involved, these requirements often come from U.S. or British construction standards manuals. In many cases, the contractors do not have sufficient knowledge and understanding about these standards. Some may not even have a copy of these standards. This is one of the basic and common inadequacies among the contractors. Most contractors perform work as per their idea of standard practice rather than standard specifications. Another common issue is that the set of specifications provided by consultants in several cases lack clarity. Basic details such as acceptable tolerance levels tend to be missing. Improvement in specifications writing and compliance is required for improved construction output. There is a need for professional construction project management consultants to improve the management scenario.

As regards project supervision, contractors are usually faced by the following issues:

- Essential information related to the project is not disbursed timely to them resulting in unnecessary costs to the contractor.
- The program of work framed by the consultants is, in many cases, unreasonable resulting in idle labor and equipment on site.
- Prompt measurement of work is not done.

In summary, prequalification of unqualified contractors, unfair quotations, lack of adequate specifications and working drawing details, delays in decision making in various stages of the project, and delays in making payments are some of the reasons which are preventing the construction industry from growing at a faster pace. Each of these problems has grown to such an extent that corrective action by the government is absolutely essential to improve the efficiency of the construction industry.

4.10 Bid Procurement Practices – Performance Implications of Low Bid Environment [Farooqui & Ahmed (02), 2008].

Barring a few exceptions, most client agencies are plagued by outdated, defective and non transparent procurement rules and regulations. Stakeholders/owners strongly desired that the enlistment procedures and selection criteria should be uniform across all executing agencies. They said that same inefficient consultants and contractors continue to get work due to the absence of objectively enforced stringent selection criteria. It was believed that the procurement processes would improve considerably if an independent consultant/contractor rating system could be introduced.

At present, contractors despite lacking in capacity continue to get work. Legislation of the country requires that construction contracts for public work projects be procured using a competitive sealed bidding process and awarded to the responsible bidder submitting the lowest bid. The majority of public sector construction contracts continue to be awarded solely based on the lowest price. A long-standing concern expressed by public owners, however, is that low bid, while promoting competition and a fair playing field, may not result in the best value for money expended or the best performance during and after construction. The practice of awarding

contracts on the basis of the lowest bids, which is prevalent in all agencies, was considered to be the major cause for poor quality of inputs and outputs. Similarly, the preferential use of public sector firms was a discouraging factor for the private sector.

The procurement processes were thought to take too long to complete, decisions regarding approvals were delayed and similarly, procedures prescribed by donors were considered to be a cause of delays. Quite often government rules were said to be in conflict with donor/lender rules.

Conditions of contract were considered to be imbalanced, suffered from a lack of effective escalation clauses and had complex and time consuming dispute resolution mechanisms. Stakeholders/owners desired that the standard FIDIC form of contract should be used by all agencies.

Procurement of works was also considered to be delayed due to slow and inadequate release of allocated funds for projects. The problems are compounded when project cost estimates are often incorrectly prepared to start with (implying poor design and evaluation capacities or the use of incorrect rates).

The majority of stakeholders/owners including clients, acknowledged the negative impact of low bids by local consultants and contractors on foreign firms seeking work in Pakistan. Acceptance of the lowest bid was stated to be the cause of:

- Insufficient rates
- Inadequate salaries
- Insufficient cash flows
- Delayed payment to subcontractors
- Delays in project completion dates (Unrealistic schedules)
- Specifications compliance problems
- Problems with physical interference
- Tolerance problems
- Weather related problems that could be avoided during design phase
- Low participation rate from international contractors and consultants

Major Project Delay Factors, Cost Overrun Factors, Quality Non-Conformance Factors and Safety Non-Performance Factors as attributed to Low Bid Environment are given in Table 3 (each in descending order of criticality).

Table 3. Major Project Delay, Cost Overrun, Quality Non-Conformance and Safety Non-Performance Factors as attributed to Low Bid Environment

<i>Delay Factors</i>	Criticality Index
Payment delays	1
Budget difficulties	2
Material procurement delays	3
Approval delays	4
Work suspensions	5
<i>Cost Overrun Factors</i>	Criticality Index
Incompetent site staff of designer	1
Economic problems (e.g. price escalation, exchange rate fluctuation)	2
Approval issues	3
Weather related issues	4
Permits approval process	5
<i>Quality Non-Conformance Factors</i>	Criticality Index
Material selection/ Procurement	1
Economic problems (e.g. price escalation, exchange rate fluctuation)	2
Lack of coordination on Site	3
Design decisions	4
Poor supervision	5
<i>Safety Non-Performance Factors</i>	Criticality Index
Incomplete construction drawings	1
Work suspensions	2
Ineffective safety observation program	3
Lack of effective work procedures/ rules for safety performance on site	4
Poor supervision	5

4.11 Bid Procurement Practices – A Way Forward to Implementing Best Value Procurement

The perceived benefits of adopting alternate procurement strategies (such as design-build), in descending order of value of benefit, are:

1. Improved contract management
2. Improved team coordination
3. Improved project quality
4. Reduced number of project changes
5. Improved schedule and cost control

The perceived benefits of adopting best value procurement as an alternate procurement strategy, in descending order of value of benefit, are given in Table 4.

Table 4. Perceived Benefits of Best Value Procurement

Benefits	Benefit
-----------------	----------------

	Rating
<i>Qualification Benefits</i>	
Opportunities for the contractor to create innovative management plans	1
Opportunities for higher safety	2
Opportunities to add significant value to the team	3
<i>Quality Enhancement Benefits</i>	
Opportunities for contractors to provide higher quality materials	4
A competitive advantage on variance in construction management techniques	5
A competitive advantage on variance in construction quality	6
<i>Cost Savings Benefits</i>	
Opportunities for contractors to provide products or designs with lower lifecycle costs	7
Opportunities for contractors to provide products or designs with lower construction costs	8
Improved ability of contractors to accept and positively respond to project growth	9
<i>Schedule Savings Benefits</i>	
Opportunities for contractors to reduce the project schedule	10
Improved ability of contractors to accept and positively respond to schedule growth after award	11
Opportunities for a shorter schedule	12

The major obstacles in adopting alternate procurement strategies (such as best value procurement), in descending order of severity, are:

1. Lowest price bidding is the traditional form of contracting strategy
2. Lowest price bidding is mandated by government regulations for public projects
3. Owners/ government only care about bidding price
4. Rigid attitude and behavior of executive management
5. Cost and time of implementation

4.12. Client Satisfaction Index

Mean Client Satisfaction Index (CSI) for Various Categories of Factors are given in the top part of Table 5, while the major Client Dissatisfaction Factors are given in the bottom part of Table 5, both in descending order of criticality.

Table 5. Major Client Satisfaction Indices (Top); Major Client Dissatisfaction Factors (Bottom)

Category	Mean CSI	Criticality Index
Regulatory/ Code related factors	3.13	1
Financial / economic factor	3.20	2
Administrative and management factors	3.21	3
Construction related factors	3.44	4
Design related factors	3.43	5
Contract related factors	3.50	6
Logistic factors	3.58	7

Factor	Category	Criticality Index
Political issues	Administrative and management factors	1
Law and order issues	Administrative and management factors	2
Contractor input in value engineering and constructability assessment	Construction related factors	3
Economic issues (e.g. price escalation, exchange rate fluctuation)	Financial/ Economic factors	4
Adequacy of subcontractor resources	Construction related factors	5

5. Pakistani Construction Industry – The Way Forward

5.1 Recommendations for Industry Performance Improvement

Using the research findings, the following recommendations are proposed for industry performance improvement.

There is a tremendous need for application of professional construction project management knowledge, tools, skills and techniques, which cannot be achieved until concerted speedy efforts are extended toward educating the industry, universities, supervisory bodies and owners as well as improving and strengthening the construction industry practices.

Successful implementation of construction project management in Pakistan construction industry can be achieved through persistence, positive hands-on leadership, upfront preparation and continuous maintenance of a sensible plan. The following basic steps are identified for improving the implementation of construction project management in the Pakistan construction industry:

1. *Obtain client commitment to risk assessment. This is crucial to success.*
2. *Generate awareness, educate project staff and change attitude.*
3. *Develop and document approaches to project management to projects.*
4. *Prepare project management plans for all levels of work and for various aspects of project management (risk, safety, quality, delay mitigation, etc.).*
5. *Install organization and managing bodies.*
6. *Institute proper tools and techniques which may enable the participants perform formal project management.*

7. *Promote staff participation and contribution by pre-task meetings and initiate brainstorming sessions.*
8. *Review response plans and measure performance.*

The authors strongly believe that a major need of the industry is to *develop the attitude of clients towards an active project management implementation*, since clients are usually the driving factor towards an active and mature project management system. Therefore, a change in the views and attitude of the clients through awareness programs can bring a prominent and distinctive change in the project management status in Pakistan not only among stakeholders/owners but also in the entire construction industry.

It would be appropriate to *arrange some form of formal and/or informal education and training on various aspects of construction project management* (quality, safety, risk, delays, cost, etc.). Formal education could be graduate studies in safety management systems. Informal education and training could take the form of career development programs organized by academic institutions or professional organizations.

Early contractor involvement in a project (in design phase) can help improving the constructability of a project and hence can contribute significantly in avoiding delays, project risks and in improving project quality and safety.

A constructability coordinator should be assigned by the project owner on every project to oversee the implementation of constructability.

Construction should be included as another specialty during the early project phases (just like architecture, design etc.).

Allocating the construction personnel (experts) to or locate them in close proximity of the design team and proposing construction methods that may improve construction efficiency of the project during preconstruction can improve project productivity as well as increase the probability of project success.

Careful analysis of layout, access and temporary facilities to improve productivity and use of tools that reduce labor activities, increase mobility, accessibility, safety or reliability can do the same in construction phase.

In Pakistan, currently there is no regulatory agency or organization for occupational safety management (for instance, OSHA – Occupational Safety and Health Administration in the USA). The primary construction regulatory body in Pakistan – the Pakistan Engineering Council (PEC) has yet to lay down safety laws and regulations that will be adopted by the stakeholders/owners in order to implement safety practices. Such regulations need to be defined and enforced. Hence the *need for such an administrative body is evident*; however, the integrity and effectiveness of such an organization is a major concern in relation to the existing adversarial business environment in the construction industry of Pakistan and need to be addressed. The jurisdiction and authority of this organization also need to be defined.

The current rating of contractors by PEC does not incorporate contractor safety performance. Incorporating safety performance as a factor in contractor rating would encourage the contractors to adopt safety management practices in their companies.

As a catalyst for maintaining safe, risk free and quality projects, contractor top management should formulate strategies and develop policies that nurture a project management culture. Construction management should be emphasized at all times no matter how fast the construction needs to be completed and under what budget constraints. Contractors should integrate management training programs with other practices according to their budget. Training can be provided in many ways: on-site training, meetings before the start of any work; large size contractors may develop separate training departments. Contractors should encourage their project managers to develop detailed project plans and schedules incorporating risk, safety and quality.

The project management has to play a key role in project management implementation. They should take it as their responsibility to consider managerial concerns during the planning stage and give safe and quality work plans to their clients (project owners and contractors). Project managers, as project coordinators, should also educate and motivate all stakeholders/owners to implement safety and quality on projects.

Coordination is needed from initial phase to end phase among all stakeholders/owners for successful project management implementation. However, most of the clients use the traditional design-bid-build delivery system, which, by nature, leads to lack of trust and confidence, adversarial relations, and increased arbitration and litigation, hence rendering the system devoid of effective communication and teamwork. Also, partnering, as a contracting strategy, is not practiced by any client. The industry has become increasingly reliant on back-dated poorly defined specifications, which neither exactly say what the owner intends them to say, nor compel the contractor to improve performance. This has led the owners to shift more of the risks to the contractors. The net outcome is that the construction industry has been bogged down with paperwork, defensive posturing, and generally tends to have a hostile attitude toward the other participants. Total Quality Management can help reverse this trend. Although, not a magic pill or panacea for all illnesses, it will, if properly implemented, help construction companies improve and will help all the parties come closer that would bring long-term benefits.

5.2 Future Research and Development Directions

The findings of the research conducted have helped in identifying the future course of action for long term sustainable improvement of construction industry in Pakistan. The root causes of underperformance of the industry have been identified, which have led to the conclusion that there is a tremendous need for application of professional construction project management knowledge, tools, skills and techniques, which cannot be achieved until concerted speedy efforts are extended toward educating the industry, universities, supervisory bodies and owners as well as improving and strengthening the construction industry practices. Future research and development in the sector should aim to achieve the following key objectives:

- Develop a strategic model for the improvement and strengthening of construction management education, research and practice in Pakistan with particular focus on enhancing the competitiveness of industry professionals so as to enable them to apply state-of-the-art construction and construction management practices in infrastructure development as well as equip them with the necessary knowledge, skills, tools and techniques so that they are able to take effective assets management decisions.
- Devise a framework to standardize the construction industry practices for achieving improved performance on cost, time, quality, aesthetics, reliability and safety
- Build capacity of academia, industry and government in the area of construction management so as to improve the overall efficiency and productivity of the construction industry and hence improve its contribution toward the country's economy and improving international image.
- Replace the existing low bid procurement system with best value procurement system. As such, the research findings have formed the baseline for developing a proposal for implementing best value procurement system for the construction industry of Pakistan, which can be an essential contribution to attain the strategic objectives of improving the construction industry in Pakistan.

References

- Business Monitor International. (2007). *The Pakistan infrastructure report*, London, UK.
- Economic Survey of Pakistan. (2006-07). *Economic Review FY 2007*, Government of Pakistan.
- Farooqui & Ahmed (01). (2008). "Assessment of Constructability Practices among General Contractors in Pakistan's Construction Industry". *CIB W107 Construction in Developing Countries International Symposium "Construction in Developing Countries: Procurement, Ethics and Technology"*, 18 – 20 January 2008, Trinidad & Tobago, W.I.
- Farooqui & Ahmed (02). (2008). "Assessing Impacts of Low-Bid Environment on Performance of Public Work Projects: A Case Study of Pakistan". *CIB W107 Construction in Developing Countries International Symposium "Construction in Developing Countries: Procurement, Ethics and Technology"*, 18 – 20 January 2008, Trinidad & Tobago, W.I.
- Farooqui, R.U., Lodi, S.H., and Saleem, F. (01). (2007). "Risk Management Perceptions and Trends among Construction Contractors in Pakistan". *Fourth International Conference on Construction in the 21st Century: Accelerating Innovation in Engineering, Management and Technology (CITC IV 2007)*, Gold Coast, Australia, July 11-13, 197-216.
- Farooqui, R.U., Ahmed, S.M., and Saqib, M. (02). (2007). "Delays in Construction – An Empirical Study of Contractors' Perceptions in Pakistan Construction Industry". *Fourth International Conference on Construction in the 21st Century: Accelerating Innovation in Engineering, Management and Technology (CITC IV 2007)*, Gold Coast, Australia, July 11-13, 420-437.

Farooqui, R.U., Ahmed, S.M., and Panthi, K. (03). (2007). "Developing Safety Culture in Pakistan Construction Industry – An Assessment of Perceptions and Practices among Construction Contractors". *Fourth International Conference on Construction in the 21st Century: Accelerating Innovation in Engineering, Management and Technology (CITC IV 2007)*, Gold Coast, Australia, July 11-13, 420-437.

Farooqui, R.U., Lodi, S.H., Rafeeqi, S.F.A., and Panthi, K. (04). (2007). "Assessing the Quality Culture in Client Organizations in Pakistan Construction Industry – A Way Forward to Total Quality Management Implementation in Pakistan". *Fourth International Conference on Construction in the 21st Century: Accelerating Innovation in Engineering, Management and Technology (CITC IV 2007)*, Gold Coast, Australia, July 11-13, 469-486.