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ABBREVIATIONS AND ACRONYMS

AASHTO	American Association of State Highway and Transportation Officials	GoP	Government of Pakistan
ACI	Airports Council International	GoS	Government of Sindh
ADB	Asian Development Bank		
ADP	Annual Development Program	HR	Human Resource
AIT	Asian Institute of Technology (Bangkok, Thailand)	HRDF	Human Resources Development Fund
APCCA	All Pakistan Construction & Contractors Association	ICB	International Competitive Bidding
BCA	Building and Construction Authority	ICT	Information and Communications Technology
CAA	Civil Aviation Authority	IFC	International Finance Corporation
CAK	Contractors Association in Korea	ILO	International Labor Organization
CAPECO	The Peruvian Chamber of Construction	IPC	Interim Payment Certificate
CDA	Capital Development Authority	JXB	Jebel Ali International Airport
CICA	Confederation of International Contractors' Association	KPT	Karachi Port Trust
CIDB	Construction Industry Development Board	KWSB	Karachi Water and Sewerage Board
CIJC	Construction Industry Joint Committee	L/C	Letter of Credit
CITC	Construction Industry Training Center	LCB	Local Competitive Bidding
CITI	Construction Industry Training Institute	LUMS	Lahore University of Management Sciences
COTI	Construction Official Training Institute	MBA	Master of Business Administration
CRS	Contractors' Registry System	MCA	Monopoly Control Authority
CWTC	Construction Workers Training Center	MIT	Massachusetts Institute of Technology
DBS	Development Bank of Singapore	MOC	Ministry of Construction (Korea)
DELFT	Delft University of Technology, Holland	MTDF	Medium Term Development Framework
DEWA	Dubai Electricity and Water Authority	NAB	National Accountability Bureau
DFCs	Development Finance Companies	NEPRA	National Electric Power Regulatory Authority
DIB	Dubai Islamic Bank	NESPAK	National Engineering Services Pakistan (Pvt.) Ltd.
DIFC	Dubai International Financial Center	NHA	National Highway Authority
DLC	Dubai Logistics City	NIT	Notice Inviting Tender
DURL	Dubai Rail Link	NLC	National Logistic Cell
EDR	Engineering Development Board	NPRP	National Procurement Reforms Program
ENR	Engineering News Record	NWFP	North-West Frontier Province
FBR	Federal Board of Revenue	OGRA	Oil & Gas Regulatory Authority
FBS	Federal Bureau of Statistics	P&D	Planning and Development
FIA	Federal Investigation Agency	PC-1	Planning Commission's Performa 1
FIDIC	International Federation of Consulting Engineers	PEC	Pakistan Engineering Council
FWO	Frontier Works Organization	PERT/CPM	Project Evaluation Review Technique/Critical Path Method
GIKU	Ghulam Ishaq Khan University of Science & Technology	PIDs	Provincial Irrigation Departments

PIICA	Pakistan Infrastructure Implementation Capacity Assessment	SOP	Security of Payment
PKR	Pakistan Rupee	SPO	Special Purpose Organization
PPP	Purchase Power Parity	SSGC	Sui Southern Gas Company
PPRA	Public Procurement Regulatory Authority	TEVTA	Technical Education and Vocational Training Authority
PSDP	Public Sector Development Program	ToR	Terms of Reference
PTA	Pakistan Telecommunication Authority	UAE	United Arab Emirates
RFP	Request for Proposal	USAID	United States Agency for International Development
RTA	Road & Transport Authority (Dubai)	WAPDA	Water and Power Development Authority
SECP	Security and Exchange Commission of Pakistan	WB	World Bank
SNGPL	Sui Northern Gas Pipelines Limited		

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EXECUTIVE SUMMARY

1. *Pakistan suffers from a dearth of infrastructure in the water, irrigation, power, and transport sectors; infrastructure which is essential for sustained growth and competitiveness both in the local and international markets.* The gaps between demand and supply in these sectors are alarming. Unless plans are put in place urgently, these critical shortages will continue to undermine the efforts to improve socio-economic indicators and to reduce poverty. Without adequate irrigation resources, power, and transport infrastructure, the very sustainability of Pakistan as an independent nation may be at stake as shortages could lead to increased social discontent and disharmony amongst the federation and the provinces. Pakistan is on the list of the most water stressed countries in the world, and forecasts indicate that available resources are depleting rapidly, possibly leading to a state of water scarcity in the next two decades. Much of the water infrastructure is in poor repair and Pakistan has to invest almost Rs60 billion (US$1 billion) per year in new large dams and related infrastructure over the next five years. In the energy sector, Pakistan will face severe power shortages of approximately 6,000 megawatts by the year 2010 (equivalent to about three Tarbela dams) and 30,700 megawatts by the year 2020. The per capita energy consumption in Pakistan is amongst the lowest in the world and a lack of adequate energy resources precludes industrial growth affecting all sectors of the economy. Similarly, the transport sector inefficiencies are costing the economy between 4-5 percent of GDP each year indicating the need for massive investment in roads, rail, air and ports.

2. *To overcome these infrastructure constraints, the Government of Pakistan (GoP) plans to more than triple the infrastructure Public Sector Development Program (PSDP), but remains apprehensive about the capacity to implement such programs.* The GoP is implementing a Medium Term Development Framework (MTDF) for the period 2005-2010 that will support its medium term annual growth targets of over seven percent. This MTDF will more than triple the infrastructure Public Sector Development Program (PSDP)—from an average of Rs150 billion (US$2.5 billion) per annum to Rs440 billion (US$7.3 billion) per annum. However, the GoP has in the past experienced frequent delays and cost overruns on large projects, indicating a lack of capacity in the industry (clients, contractors and consultants) to plan, program and execute large projects.

3. *This assessment of the Pakistan Infrastructure Implementation Capacity (PIICA) which was carried out at the request of the GoP validates this view.* Given the paucity of human resources and materials, the poor planning and management skills, and the inability of Pakistan to timely attract 'substitute' external implementation resources, it appears difficult that the large infrastructure projects can be implemented on-time and within budget unless some drastic reforms are undertaken. To rapidly overcome the current constraints, a structural reform of the current disintegrated process for implementing large infrastructure is required. PIICA recommends undertaking a revised integrated approach to implement large public infrastructure along with medium- to long-term reforms to address the more fundamental constraints.

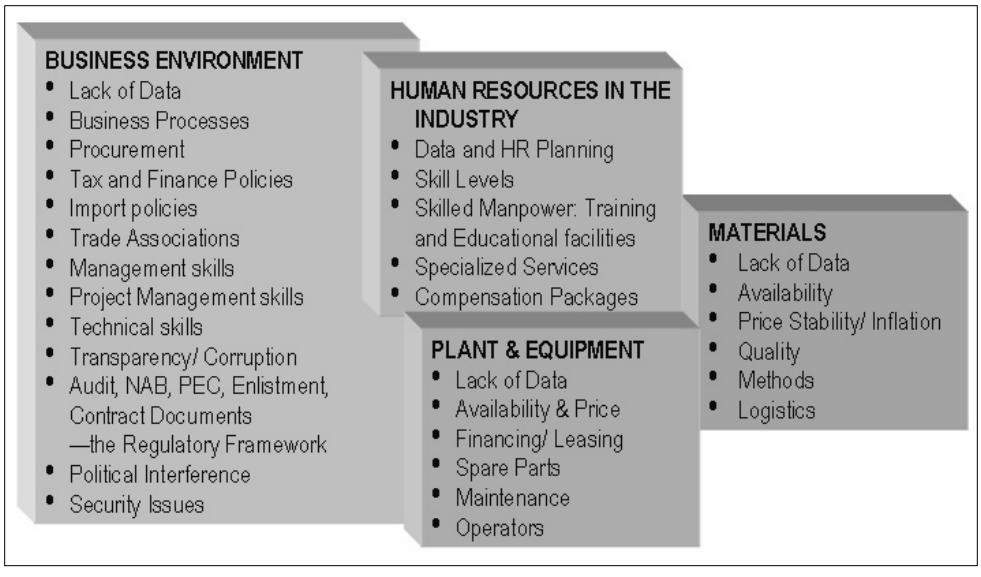
4. This Pakistan Infrastructure Implementation Capacity Assessment (PIICA) is based on a study approach that utilized balancing industry perceptions against primary research and analysis. Staying within the allotted time for this study, a manageable data collection effort was undertaken—focusing on large public infrastructure comprising of roads, water, irrigation, power, ports and railways sectors. The entire public implementation processes and business environment both in Pakistan and in a few selected countries was evaluated. *In order to understand and*

address the issues which typically prevail in the industry, extensive analytical work, assembled around four broad based thematic areas—business environment, human resources, materials, equipment and machinery—was undertaken. The study process included perception surveys and focus group meetings with stakeholders—industry leaders were engaged to guide the study process by forming a consultative group. *The assessment includes the entire set of industry stakeholders comprising of public sector clients, contractors and consultants (the industry).*

5. The industry is characterized by its fragmented and complex nature having a large number of players, with many backward and forward linkages across both public and private sectors and with diverse manufacturing and service industries. Covering this required extensive analytical work and the overall study output was the following eleven separate reports: *Development of Construction Industry – A Literature Review; Local Stakeholders' Perception Survey; Foreign Stakeholders' Perception Survey; Business Environment and Cost of Doing Business; Purchase Price Review in the Infrastructure Industry; A Review of Allocations and Expenditures in the Public Sector; Demand – Supply Gap Analysis; International Case Studies (UAE, China, and Malaysia); Local Case Studies; Response to International and Local Bids; and, Focus Group Discussions*. This PIICA final report summarizes the findings and recommendations emerging from these reports.

6. *The report concludes that the industry stakeholders lack capacity to deliver the planned MTDF infrastructure.* The majority of stakeholders agree that contractors keep getting work even though they lack the capacity to perform. The business environment has delivery constraints, planned projects often took longer to complete, and even longer to achieve a financial close. Issues such as poor project planning, insufficient programming and weak implementation were common, with contractors having a "give it to us and we'll do it" attitude.

7. *Analysis shows that there are many gaps in many areas in the public delivery troika of clients, consultants and contractors.* Out of the four broad thematic areas of business environment, human resources (HR), plant & equipment and construction materials, human resources and business environment were identified as having the maximum number of constraints. *Major challenges to delivery of infrastructure were posed by a lack of required HR in both terms of*



adequate skills and numbers, and the inefficient processes in the business environment – challenges which can only be addressed over the long term, while gaps in materials availability

and efficient equipment (machinery) could be rectified in the short to medium-term.

8. *Lack of adequately skilled HR is across the board, in all related professions, trades and amongst all stakeholders. A rapid brain-drain continues to threaten long term development goals; over half of the number of engineers produced in the country each year in civil, electrical and mechanical engineering fields find employment overseas.* This exodus is due to the wide disparity in remuneration between the local markets and regional countries. When compared to a few selected regional countries, the present remuneration in Pakistan is half to one third. The HR gaps are also widening as the number of fresh entrants is decreasing because of low professional salaries and poor work environments. In 2006, professional and technical staff remuneration was found to be nearly two thirds to a half in the country as compared to that in 1995. The local markets are unable to attract back professionals due to decreasing local wages and higher regional wages.

9. *Implementation of planned infrastructure projects under the MTDF may be constrained by a shortage of required construction materials.* Demand supply gap analysis for basic construction materials showed that although supply of cement was just about sufficient in the long term, shortages of bitumen (100~140 thousand metric tons), and steel (2~3 million metric tons) over the MTDF period, could constrain implementation of planned projects.

10. *Contractors and consultants were not being paid the right cost for products and services.* Costs of materials and equipment inputs in Pakistan were found to be about 200 percent higher as compared to other countries in the region (in US$ PPP terms) while contractors' rates in Pakistan were more or less the same as those prevailing in the region. Local rates despite appearing to be "competitive" in a regional context are in fact unworkable - most contractors also contend that rates are low, precluding adequate profit margins and allowing better salaries to professionals and workers. Given the current disparity between market rates and actual product costs, demand supply gaps will widen when the MTDF program is implemented, unless rates are increased.

11. *A mapping of the construction industry business processes shows that the entire project cycle was plagued with problems making it difficult to identify a single critical weak link.* The business environment was found to be entangled in issues such as that of corruption (a majority of stakeholders agreed that corruption was endemic and restricting growth) and lack of contracts enforcement making *risk management impossible*. *Corruption alone was estimated to account for more than 10-15 percent of the project value, and approximate loss over the MTDF is estimated to be Rs100 billion, which is equivalent to the entire PSDP for major infrastructure in FY 2005.*

12. *Projects took three times as long and twice as much of the planned cost primarily due to extra contractual processes* such as external verifications (National Accountability Bureau, parliamentary committees, chief ministers inspection teams and others), government procedures related to audit and payments, local government procedures (mining, land acquisition, forest department and removal of utilities), law enforcement agencies and corruption.

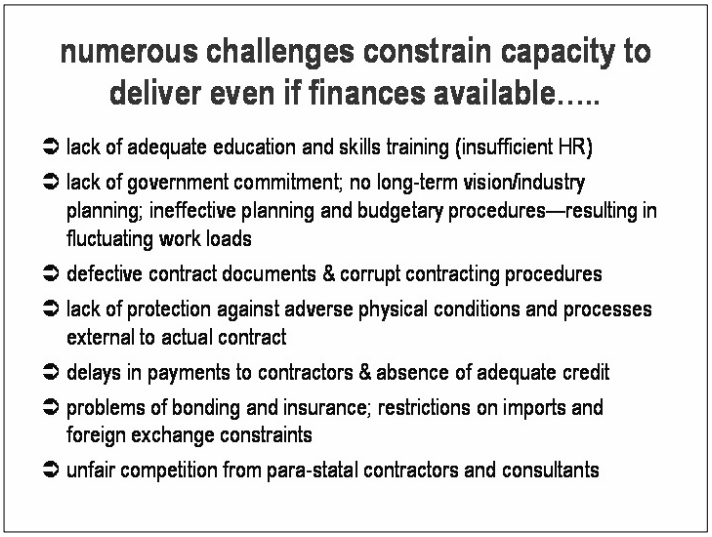
13. *Delays in project implementation reflect poor planning, programming and weak implementation capacity.* Public agencies take on too-many projects in their development programs and end up delivering little, and what they do deliver is often determined by political priorities.

14. *A review of the public expenditures process shows that there is a significant difference in planned projects, projects actually started, planned allocations and actual expenditures.* Recent

levels of allocation of funds as a percent of project costs show that it would take 8 to 18 years to complete projects. Additionally, the projects suffer delays due to interruptions in release of allocated funds (only 50 percent of the allocations were released by the 4th quarter), contractual approvals and payments to service providers.

15. *Delays in payment, imbalanced contracts, inefficiencies and corruption in the system force contractors to incur additional financial and economic costs resulting in squeezing the already poor margins in the industry.* The business processes case study developed on the basis of actual confidential books of accounts illustrated that the contractor had a significant negative cash flow for almost 60 out of the 72 months duration of the project due to systematic inefficiencies and reduced the role of contractors from a service provider to that of a project financier.

16. *The industry is thus weighed down by numerous challenges to deliver even if finances are readily available.* Challenges ranging from a lack of adequate education and skills training, lack of long term planning, ineffective and poor programming, defective contracts and corrupt contracting procedures, unmanageable risks external to the actual contract, absence of credit facilities, delayed payments, 'us' versus 'them' culture, inadequate and aging machinery, and availability of materials.



17. *Given the wide ranging systemic constraints, attempts to meet the expanded public sector infrastructure needs through existing processes, resources and skills, will lead to colossal wastage of scarce resources and frustrate all efforts to meet delivery targets. Internal resources will have to be supplemented by external resources* – including both contractors and consultants. However, an analysis of response to recent invitations to bid on infrastructure projects confirms not only a lack of interest from international contractors but also that local participation is decreasing. *Negative perceptions* about the image of the country combined with poor administrative capacity, endemic corruption and absence of success stories are issues that are *keeping foreign interest away* from the country.

18. *The question arises as to why demand is not fixing supply? The problem with the industry in Pakistan is heightened by the fact that it is compounded by local market and policy failures,* for example unfair competition by parastatal contractors and consultants are distorting the markets; in the public sector infrastructure delivery by contractors, which is usually a government to private sector transaction, it is often the downstream private to private contracts that are not honored - contractors do not pay subcontractors and suppliers on time resulting in a breakdown of the value chain which prevents a large contract management industry from developing and; the industry in Pakistan is still stuck on 'method' based specifications.

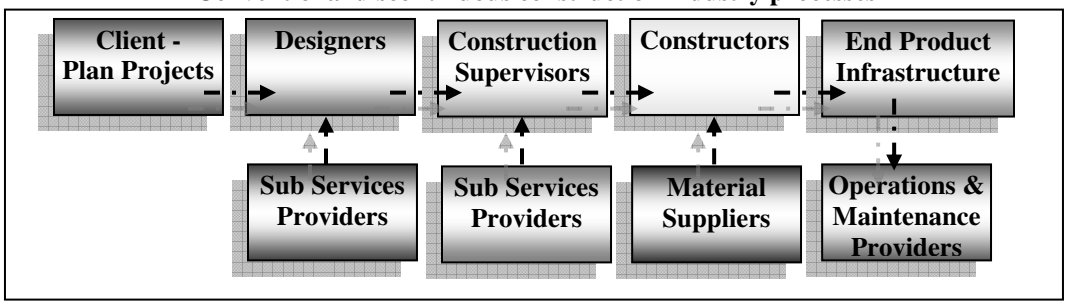
19. *Method vs. end result specifications are resulting in aberrations and thwarting the development of the industry.* 'End result' specifications reduce the number of interactions

between the line agencies and the service providers as approvals at each intermediary step of the process are eliminated, thereby reducing inherent inefficiencies and corruption. Existing 'method based' specifications bind the delivery mechanisms to certain pre-defined processes while the 'end result' based specifications provide discretion to the service providers to procure and produce the desired outcomes in the most efficient manner. Hence, the *current procedures, besides constraining implementation, also contribute to a lack of development of peripheral industries (such as cement concrete batching industry, asphalt batching, pre-fabricated supplies and products, and others).*

20. *The delivery of large infrastructure is constrained by traditional relationships and processes*, which is why solutions offered by stakeholders, were geared towards solving the business environment for each of the three traditional players by addressing the rules and regulations that govern their inter-relationships rather than focusing on delivering the end product efficiently within time and cost.

21. *If Pakistan wants to deliver on the planned critical mega infrastructure, there is an urgent need to re-engineer the construction industry and the processes typically followed in delivering such mega projects.* Construction efficiency is presently constrained due to the segregated processes through which they are generally planned, designed, constructed, operated and maintained. These processes reflect the fragmented structure of the industry which contributes to a contractual and confrontational culture promoting inefficiencies. The generally sequential process adopted in the industry is due to separate teams being engaged for designing, supplying inputs, constructing and for operations and maintenance of infrastructure. This typical process is followed with the aim to minimize risks to constructors by precisely defining through specifications and contracts what each of the players in the process is supposed to do, a strategy now recognized to be inefficient and which does not protect well the client's interests. It acts as an effective barrier in using the skills and knowledge of suppliers and constructors effectively in the design and planning of projects. These segregated processes and discontinuous relationships, with a built in lack of ownership of the end product are illustrated in the following figure.

Conventional discontinuous construction industry processes



22. *The conventional processes require procurement of a new team at each stage of the process and for every project that a client implements* in the belief, that selection of new designers, constructors and suppliers, competitively on a least cost basis for each project provides value to the client. Contrary to this belief, repeated selection of new "teams" inhibits learning within, and the development of, the construction industry; and, does not provide the best value for money. The study determined that while current stakeholders in Pakistan's construction industry feel that the total number of contractors available is a constraint, a similar study in UK in 1998, found the reverse that rather the very large number of contractors, working in a segregated environment, is a constraint to the development of the industry. Processes need to be explored which focus on efficient delivery of the end product, especially large mega infrastructure projects

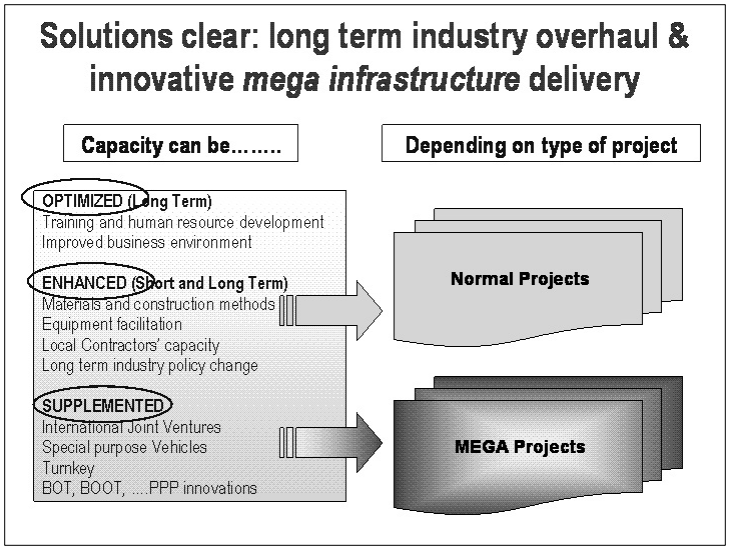
at cost, in time, with quality and functionality.

Recommendations

23. *While a number of excellent reform measures emerged from the study, these will take too long to be implemented to influence the MTDF targets significantly. Many of the measures identified were already recommended almost twenty years ago* in reports prepared by the WB and similarly at an international conference on the construction industry held in 1990 in Islamabad under the auspices of the Pakistan Engineering Council. *It is apparent that the GoP did not follow through with the reforms suggested at that time, otherwise the industry may not be in the crisis situation it now finds itself in today.*

24. *Lessons from international case studies on the development of the construction industry and the literature reviews all clearly show that a holistic long-term planning and a detailed strategy must be evolved with a clear vision and commitment towards developing the industry*, and that this process may take as long as a decade or more of sustained effort. There are no short cuts; however a start must be made if the government wants to continue targeting high growth rates in the future and focus has to be kept on demand side interventions to bring change as these have been shown to be the most effective.

25. *Solutions are clear: long term industry overhaul and immediate innovative approaches for mega infrastructure delivery are needed.* For Pakistan, the focus should be on the development of human resources and brain drain reversal while improving on aspects such as planning, allocation, project management, and payments.



26. *A construction industry development organization should be set up to anchor the development effort and provide an institutional mechanism for reform.* The solutions can be categorized as being those which optimize, enhance or supplement existing capacity, while the strategies to be adopted would require implementation over a short, medium or long term time frame and depend on the type of project to be implemented.

27. *The top most agenda in the development strategy has to be to build up the existing human resources pool and upgrading the skill sets through urgent measures to enhance training capacity and reversing the brain-drain.* Even a fraction of the programmed MTDF if earmarked for this purpose would go a long way in developing HR. *Concurrently, other measures to improve the business environment and processes can be started according to the recommendations made in this report and in further consultation with stakeholders.*

28. *A national construction industry development policy should be prepared and implemented for all stakeholders (contractors, clients and consultants) with immediate actions* on

procurement (procure on best cost and not least cost) with ensured transparency; improved cost estimation; introducing balanced contracts; privatization of parastatals; protecting the payment chain in the industry backed with appropriate legislation; developing the small to medium sized industry stakeholders as these players deliver a major portion of the actual physical works in partnership with large contractors; promoting excellence in education and technical training; institutionalizing linkages between academia and the industry to ensure relevance of curriculum and; improving consulting services charge rates and unit rates for construction.

29. *Providing financial liquidity requires urgent attention* through measures such as setting up a construction development fund; undertaking key tax reforms (for example addressing the negative impact of presumptive tax tools and tariffs which prevent contractors and suppliers from access to finance); tariff liberalization and 'importability' improvements to break mafias and cartels in materials and equipments; and by improving dispute resolution mechanisms.

30. *The cost of doing business has to be reduced by eliminating overlapping and redundant legislative requirements*, all legislative and regulatory policies should be harmonized across all levels of government - federal, provincial, local and district. Legislation targeted to promote growth of the industry such as through reforms in the banking and insurance sector which address requirements of collateral for the industry is needed along with a review of the regulatory framework to assess the requirement to establish new or strengthen existing regulatory bodies. Similarly, regulations regarding registration of construction equipment and machinery should be framed to allow proper classification, assessment and collection of reliable statistics. Tax laws and related policies need to be established which stimulate growth and provide incentives to promote entrepreneurial private sector ownership. A legislative environment conducive to good management of industry risk through balanced contracts, providing for adequate and full compensation for escalation in prices, streamlining audit procedures and enhancing skills of auditors is essential. *Rules that deter the participation of foreign companies should be amended while at the same time increased flexibility in the nature of contracts should be introduced to facilitate innovative approaches to delivery of projects.*

31. *Each of the actions needs to be 'projectized' and urgently undertaken. However, for the mega projects, measures to minimize and manage risks need to be considered to enable rapid delivery while overcoming the systemic capacity constraints.* Immediate implementation of the current infrastructure program over the next five years will *need a ring fenced approach to delivery of mega projects, essentially separating them from the traditional agencies and empowering them to deliver through a team based approach* where clients, consultants and contractors can be selected at the planning stage and targeted to deliver with third party fiduciary control measures, and through special purpose organizations, turnkey, and design build procurement.

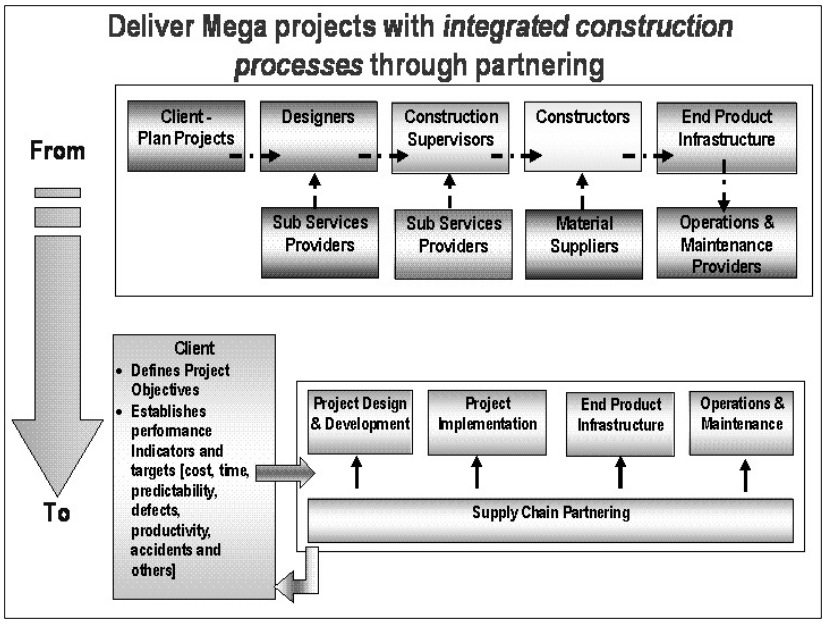
32. Whether these teams could be in the public or the private sector is a question that can be debated, for example, China used public sector driven teams whereas Malaysia used both private and public-private sector teams. *Given the country environment, GoP could opt for autonomous public sector project specific entities run on private sector principles with HR drawn from both private and public sectors. Due to the established paucity of appropriate HR in the country, GoP should explicitly open these entities to international sourcing.* Critical to this project delivery vehicles concept is the recognition that these entities will automatically shut down once the project has been "delivered."

33. *Creating a Special Purpose Organization (SPO) has many advantages.* An SPO operates under a specific charter granting responsibility for all aspects of the project and with a project

manager responsible to the client for all project procurement and execution which may even include detailed design. The SPO is responsible for on-time delivery and within projected costs and providing specialists inputs as needed is the responsibility of the project manager. Typically, an SPO is a joint venture arrangement run by a professional project management firm which in turn engages firms or a consortium of firms comprising financiers (could be public/GoP), consultants and contractors, and has a limited life span - terminating upon completion and delivery of the project. The SPO may also be made responsible for operation and maintenance of a project for a limited time or even on a Build Own Operate and Transfer (BOOT) basis or a similar arrangement. Past experience with SPO arrangements in Pakistan have also shown their effectiveness in developing local specialized skills and HR (for example in the Mangla dam project, 20,000 workers were trained).

34. *Mega projects planned under the MTDF, especially the multi-purpose dam and irrigation projects, large motorway projects and other complex infrastructure related projects are recommended to be implemented through SPO arrangements*, given the constraints identified in the local industry (clients, consultants and contractors). However the GoP will have to ensure professional project management companies are attracted to Pakistan through fair and balanced terms of contract with measures built-in for risk mitigation and transparency.

35. *In order to mitigate and manage risks, the traditional roles need to be collapsed and integrated ending the traditional 'us' versus 'them' syndrome. There is a need to integrate the processes and the team around the end product.* The most successful enterprises do not fragment their operations – they work back from the customer's needs and focus on the product and the value it delivers to the client. The process and the production teams are integrated to deliver value to the client efficiently and eliminate waste in all its forms. Partnering and framework agreements, which contribute significantly to solving the operator/manager-lender-investor/owner issues, are becoming increasingly common in place of traditional contract-based procurement and project management. These recommendations complement the current thinking in financing innovations required for planned mega water projects in Pakistan by addressing the public and private financial viability gaps and balancing risks while ensuring timely delivery.



36. *Concentrating on the needs and functionality of the end product leads to a view of construction as a much more integrated process.* The client defines the project objectives and establishes the performance and monitoring indicators and the framework for the partnering arrangements. The overall process can then be subdivided into four complementary and

interlocked elements: product development, project implementation, integrated supply chain, and production of the end product.

37. *It is recommended that teams of designers, constructors and suppliers work together through a series of projects in a partnering framework, continuously developing the product and the supply chain, eliminating waste in the delivery process, innovating and learning from experience.* Many international clients are doing this through partnering arrangements and are consistently improving on performance levels measured by well defined indicators. The latest example in operation is the over US$4 billion Heathrow Terminal V Phase I project being delivered on-time and within budget. Other similar examples can be found in mega infrastructure development projects in the UAE. The challenge for the GoP is to develop means to procure these integrated teams to deliver the mega infrastructure while meeting or exceeding the performance indicators set by the users/public and dramatically increasing efficiency and quality. *Partnering and framework agreements can be viewed as an improved version of past teaming arrangements such as PPP, as they overcome the cultural confusion within trades and agencies and 'risk denial' by agencies.*

38. GOP needs to establish frameworks under which it will deliver say Bhasha, Kalabagh, Karachi Mass Transit, or other large infrastructure projects and procure teams based on 'framework' agreements. *Further work needs to be done urgently to assemble and procure these framework agreements after deciding on a list of urgently required mega-projects for which public financing is available.*

39. *A proactive approach through packaging of these SPO 'frameworks', and road shows similar to the ones undertaken for privatization of large public sector corporations should be pursued* along with dissemination of information through web portals in order to attract professional managers, construction firms and consultants. A few demonstrative success stories in attracting international stakeholders will go a long way in developing interest in large infrastructure projects in Pakistan.

40. *Concurrently with the targeted efforts to deliver large infrastructure projects through SPO 'frameworks', it is essential for the GoP to take steps which lead to improving existing business processes, developing HR, and removing bottlenecks and constraints faced by the industry.* Measures are therefore, required in parallel for enhancing and optimizing capacity with the need to be implemented in both the short and medium to long term as detailed in the recommendations section of the main report.

41. *It appears from the assessment that the targets are challenging and their achievement would most likely extend beyond the planned MTDF period.* It is only through measures like the above that the GoP can move towards realizing its ambitious development goals. However, the government must persevere and start on the construction industry reforms agenda immediately, with a firm commitment, long-term holistic planning and a detailed strategy in order to achieve its goals of sustained GDP growth.

Further Work

42. The study has identified areas in which the GoP needs to carry out further work, detailed assessments and research such as:

- Structuring a best practices project specific delivery organization (GoP could use

Diamer, Bhasha Dam or a planned Mass Transit project as an example) using an integrated construction process.

- Rationalizing construction related taxes and tariff structures
- Centralizing data on HR availability and future demand for better planning and management
- Streamlining and facilitating import of construction equipment
- Studying procedures to assist in rationalizing cash flows on projects
- Researching and adopting best practices for technical support, financing and credit facilities for the industry
- Institutional arrangements to provide long-term sustainable development of the industry

Concerted efforts are required to implement the reports recommendations as Pakistan simply cannot afford to wait another twenty years.

1 BACKGROUND AND RATIONALE FOR ASSESSMENT

1.1 GoP Increasing Allocations to Meet Rising Public Infrastructure Demands

1. Poor infrastructure services result in constrained economic activity and reduce the country's growth potential. Elasticities of business sector output and productivity with respect to public core infrastructure investments are usually much higher than that of private business investments. The GoP's ability to plan and deliver infrastructure projects effectively will determine the future pace of growth of the country.

2. According to the World Economic Forum Survey (2006-07) of 125 countries, Pakistan ranked 67 in basic infrastructure category. Historically, the balance between demand and supply of infrastructure facilities has faced a chronic imbalance. For instance, (a) the aging and inadequate irrigation and water infrastructure deficit alone is estimated at Rs4 trillion (US$70 billion) and Pakistan needs to invest almost Rs60 billion (US$1 billion) per year in new large dams and related infrastructure over the next five years[1], (b) the underperformance of the transport infrastructure costs the economy Rs300 billion (US$5 billion)[2] per year and (c) existing power shortages of approximately 2000 megawatts will increase to 6000 megawatts by the year 2010 and 30,700 megawatts by the year 2020.[3] The per capita energy consumption in Pakistan is amongst the lowest in the world[4] and a lack of adequate energy resources precludes industrial growth affecting all sectors of the economy.

3. 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.[5] This, coupled with population growth rates of over two percent,[5] 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. It is obvious that lack of appropriate public infrastructure is constraining, (a) GoP's ability to transfer the impact of this growth to the wider public, (b) delivery of basic public services, (c) sustained advancement of traditional sectors such as agriculture and textiles and (d) development of emerging sectors such as services and industries required for continued economic expansion. Therefore, the GoP requires heavy investment in physical infrastructure in order to improve delivery of social services and to enhance its internal and global competitiveness. In short, the infrastructure crisis is here, but the 'meltdown' will be inevitable in five to ten years unless the GoP is able to respond in-time.

4. The GoP has responded to this demand by planning extensive infrastructure expansion. The federal 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.

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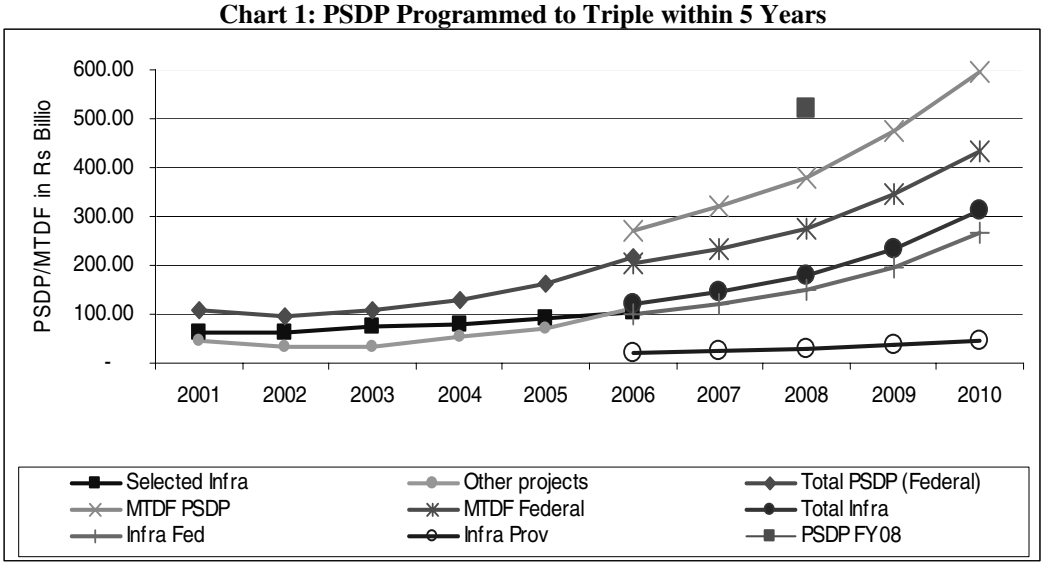
[1] Briscoe and Qamar, "Pakistan's Water Economy Running Dry", The World Bank, 2006
[2] "Transport Competitiveness in Pakistan", The World Bank, 2006
[3] "Potential and Prospects for Regional Energy Trade in the South Asia Region", The World Bank, 2007
[4] "World Development Indicators", The World Bank, 2007
[5] "Economic Survey of Pakistan", Government of Pakistan, 2006-07

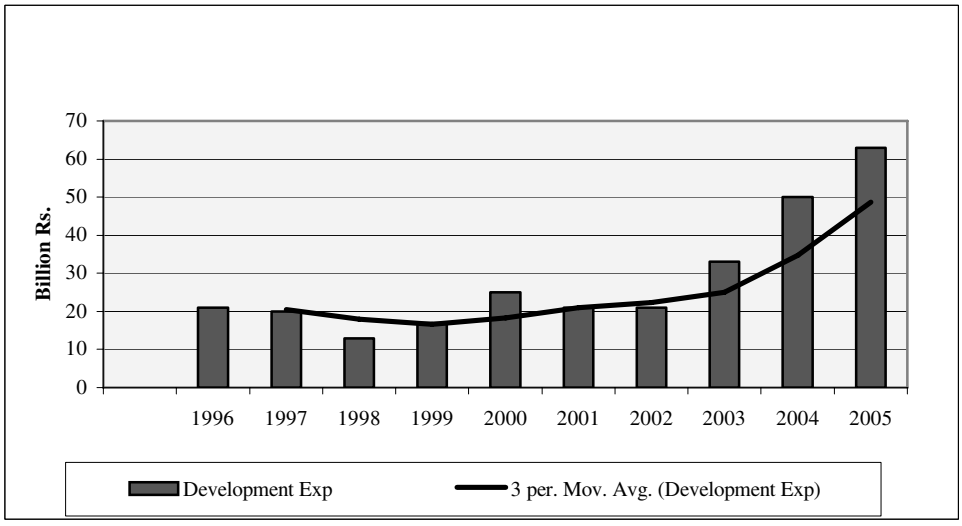
Chart 1: PSDP Programmed to Triple within 5 Years



5. 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).

6. In addition, provincial governments, districts and towns/municipalities have also embarked on infrastructure improvements in the face of rapid urbanization. Provincial capital development expenditure has tripled during the last three years alone and is projected to grow as devolution takes root and service delivery improves during the coming years.

Chart 2: Provincial Development Expenditure Growing



7. 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 was needed as of yesterday'—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.

1.2 Are There Implementation Challenges Going Forward?

8. Public infrastructure implementation goes through the stages of planning and approvals, financial allocations, detailed engineering and physical construction, and finally through commencement of operations. A quick review of the project cycle in Pakistan during the past few years shows weaknesses in all these stages. Of particular interest, and the easiest to find analytical data on, is the planning and financial allocation for projects. This is the foundation of project implementation and this is where things start to go wrong.

9. Poor incentive structures motivate an annual 'mad rush' wherein each public agency puts in requests for maximum possible allocations. The agency neither considers their portfolio's throw-forward, nor do they analyze their implementation capacity. It is common to find that, based on annual project allocations the projected average completion times for projects are seven to eighteen years—a figure that should normally not exceed three years. This occurs because too-many projects are taken in hand simultaneously and without proper planning. So even though 'on-the-record' it appears that total public allocations are more or less spent, the picture is much more complicated—expenditures are not in line with plans and priorities—a lot of projects are allocated money before they are ready for implementation.

10. *Based on the allocations in the PSDPs/ADPs of the last 5 fiscal years, individual infrastructure projects in Pakistan would take a long time to complete*—18 years on an average for irrigation and power (ranging between 3.4 years to 30.8 years) and 8 years on an average for roads (ranging between 4.6 years to 13.6 years).[6]

11. For example, during FY04, two hundred and eighty three projects (costing Rs43.62 billion) at federal and provincial levels in power, irrigation and roads, were allocated a sum of Rs5.16 billion, which was never spent. Conversely, in the same period, fifty nine projects (costing Rs241.43 billion) which were not allocated any money in the budget incurred an expenditure of Rs75.156 billion. So, the agencies started with annual allocations for these two hundred and eighty three projects which were far less than optimal (optimal allocations could be around Rs12 billion), and in effect indicated to stakeholders that these projects will drag on an average for more than eight years. Then, the agencies undertook expenditures on fifty nine new projects which are not in the portfolio and spent above optimal amounts from unplanned allocations indicating their intent to finish these large, 'unplanned' and politically motivated projects in a three-year period.

12. *As demonstrated above, the public agencies seem to be taking-on too much and delivering too little—the 'little' that they do deliver is mostly determined by the political priorities.* But often, even when the government has tried to force public agencies to reduce the portfolio throw-forward, money has been difficult to come-by. The reason behind this lies in the

[6] This assessment is based on analysis of the federal and provincial expenditure portfolio in the power, irrigation and roads sectors over the last three to five years. See Technical Note 6: 'A Review of Allocations and Expenditures in The Public Sector'

nature of public infrastructure projects and related dynamics of the financial allocations.

13. Delivery of public infrastructure has long gestation periods and is built to cope with future anticipated demand. This requires visionary planning and often entails seemingly large preemptive investments. These investments are a political-hard-sell as they cater to a future that is often difficult to visualize today. Further, the higher discount rates in developing countries create a challenge to appropriate funds for public infrastructure from urgently needed consumption expenditures. This in-turn puts huge public pressure on the timely delivery of such projects—high visibility of these projects has often been a political graveyard. Delays therefore, not only have economic costs but also large political costs.

Box 1: Impact of Delays on Project Cost

The overall delay in completion of projects is an accumulation of various delays that are caused during the different stages of a project. In turn the impact of delays on the cost of the project can be viewed as consisting of: (a) additional cost of fixed overheads incurred by the contractor; (b) increase in cost of construction materials purchased at a date later than that when the materials would have been purchased at the time of inputs according to the project plan; (c) financial costs of idle plant and equipment committed to the project by the contractor; (d) opportunity cost of the contractor when resources and capacity remain tied-down to a project during the period of delays (consisting of human resources, finances, plant and equipment, management) and hence prevented him from taking up other projects; (e) operating with negative cash flows and hence incurring a cost of funds arranged, or extended credit availed and; (f) reduced benefits from the project to the beneficiaries. Research carried out as part of this study clearly demonstrates that these delays which average about three times the original implementation period end up doubling the initial cost of projects.

14. Delays also lead to poor commercial returns to construction related enterprises which results in inverse growth of those involved in delivery, such as contractors, consultants, and equipment and material suppliers[7]. This also includes HR which suffers from the low returns. Investing in HR development and growth has no longer remained a viable option. This is a primary part of the infrastructure delivery challenge.

15. Infrastructure projects are usually completed at higher than estimated costs—globally, completion costs average 36 percent more than what has initially been planned and budgeted. This is due to factors including non-robust initial price estimation, price escalation over time, exchange rate variations, natural calamities, force-majeure, and other contractual claims due to poor planning. In Pakistan the unusually long project completion time creates a further cost disadvantage. But, the question arises what is the average completion time and cost for infrastructure projects in Pakistan?

16. The present study conducted a review of the business processes within the context of a typical project life cycle of a water reservoir project implemented by a private enterprise in Pakistan[5]. It used confidential management, administration and accounts data from a participating private construction enterprise. *For the relatively medium sized water reservoir project (estimated cost of Rs271 million), the planned project completion time was 24 months and actual completion was achieved in 72 months with an estimated cost of delays at 32 percent (excluding lost benefits planned from the project).* The contractor ended up indirectly financing the project and incurred losses of Rs19.4 million due to uncompensated costs of delays. *While*

[7] See Technical Note 4:'Business Environment and Cost of Doing Business'

the costs to the economy due to the scheme becoming operational four years later than the intended time have not been factored into this analysis, it is believed that these would be substantial—and so would be its adverse political fallout. In summary, a typical infrastructure project in Pakistan costs twice as much and takes three times longer than planned.

17. Overall, the evidence on this is hard to come by in the official public records, as public sector agencies keep revising the PC-I costs and thus legitimizing increases, without tracking the increase and reasons separately. Sample evidence of this is as follows:

Table 1: Comparison of Estimated Costs and Subsequent Revisions

Project	Estimated Cost[8] (Rs in Million)	FY	Revised Cost[8] (Rs in Million)	FY
Chashma Right Bank Canal	13,870	2000-01	17,097	2002-03
Lahore Islamabad Motorway	27,899	2000-01	39,000	2002-03
Gwadar Deep Water Port (Phase - 1)	10,000	2000-01	16,380	2005-06
PAEC Chashma Nuclear Power Project- II	39,000	2001-02	51,046	2005-06
Secondary Transmission & Grids	27,248	2000-01	37,087	2005-06

18. The current implementation process is inefficient, physical infrastructure does not come 'online' on-time. These delays affect not just the political economy but the development of commercial enterprise—this is the vicious circle of poor infrastructure implementation in Pakistan[7]. *Any attempt to meet the expanded public infrastructure needs through existing processes, resources and skills, will lead to colossal wastage of scarce resources and frustrate all efforts to meet delivery targets.*

19. While summarizing the two preceding sections, it appears that the GoP is willing to finance the rising infrastructure demand but money alone cannot implement and all visible signs point to a lack of proper implementation capacity in the country. The GoP is faced with a tremendous implementation challenge and it is this realization that fuels GoP's demand for this report. Before developing the analytical framework used by the study, a useful exercise will be to look at some global and local characteristics of this infrastructure industry— the context in which the story will unfold.

1.3 Industry Peculiarities, Local Market and Policy Failures—why doesn't demand fix the supply?

20. [9]*Construction is a risky business*: There are no consistent economies of scope and scale. Infrastructure implementation carries more risks compared to other types of economic activities. Unlike a typical manufacturer or an agricultural producer, the contractor and consultant move from site to site, organize the logistics for timely assembly of job specific inputs, and follow a custom design for each site. Jobs are usually won through specific bids. Therefore, costs have to be estimated for each site (or each job), with assumptions made about many variables such as site conditions, weather, productivity of labor, equipment and time required for delivery of inputs.

21. *Large infrastructure is riskier than buildings:* For large infrastructure (large dams, roads, ports, canals and barrages), the risks involved in bidding exceed even those for (small to medium)

[8] These revised costs are as reported in the PSDP. These do not reflect the additional costs for delays, escalation, change in design and other related claims.
[9] Section 1.3 was prepared with the assistance from reports used in the literature review

buildings because the scale of work is usually larger (could be spread over geo-physically diverse areas), the use of heavy equipment is greater similarly, the sensitivity to the effects of inclement weather and remoteness from service and supply centers are far more pervasive. Since the majority of large infrastructure output is dependent on capital expenditure, demand tends to fluctuate considerably more than for most other industries. The consultants, contractors, and suppliers, thus, have to face the risk of sharp fluctuations in volume of work which affects the number of employees and amount of equipment. Again, the risks tend to be greater and the fluctuations more marked for mega infrastructure than for buildings.

22. *Relatively higher level of HR requirement*: Good construction implies good management of risks. This requires skilled HR which are scarce in developing countries. The risks involved in small- and medium-scale building construction work can usually be understood and evaluated by relatively less sophisticated managers. Civil works, on the other hand, require managers who are capable of evaluating and handling a wider, complex array of risks. The necessary managerial and technical ability is generally developed with much greater difficulty and is usually in short supply.

23. *"Us versus Them" syndrome*: Traditionally, governments have liked to control infrastructure delivery by using Marxian maxims and ensuring state participation in construction and related activities. The government 'project team' plans, designs and delivers the infrastructure. This appears to be a very effective mechanism but in reality it is often non-transparent and leads to all the various evils that are associated with lack of clear accountability. When outsourcing construction and related activities, the same government forgets the word 'team' in the 'project team' and has traditionally appeared to have adopted the 'us versus them' attitude by assuming the traditional roles of a client and service provider. With the client also being the owner, and the owner (at least on paper) being subject to public accountability, the contracts are often biased in their favor in order to limit exposing public finances to risk liability. Therefore, the enterprise part of the industry, especially the private sector, is often subject to excessive and unnecessary risks. These risks are not 'visible' in the government executed projects mostly because of the explicit 'project team' approach and partly due to absence of clear accountability. We thus find governments under pressure to deliver large infrastructure programs resorting back to the use of force-account[10] or parastatal delivery mechanisms.

24. *Limited focus on professional development—t2 and t3[11] Challenges*: By the nature of the production cycle—such as confinement to project sites 24/7 and uncertainty of demand, large civil works contractors and their managers generally give inadequate attention to the training of staff, especially at the level of management, which is essential to permit greater delegation of responsibilities in support of further growth of the company. Joint ventures and subcontracting arrangements between foreign and domestic firms, while sometimes useful, have not generally proven successful in the transmission of managerial know-how, except in cases where the local partner had a sound management background. Domestic firms are often seen as partners of necessity and relegated to low-end-technical and public relations work. Subcontractors tend to receive special help only when they are the sole supplier of a particular good or service in the market and, therefore, must be cultivated.

[10] The most common form of state participation in construction is force account operation in which a government department administers services directly to achieve construction or maintenance goals. Force account units often attend to emergencies, undertake works that do not attract competitive contracting, and carry out routine maintenance.

[11] Technology transfer (t2) and technology transfer and training (t3).

25. *Owner-Managers often the bane of industry:* Owner-managers abound in the industry. They normally come from another trade or could be professionals who were earlier serving in the industry in another capacity. During periods of high-demand (periods of high economic growth), their capacity to effectively run businesses reflects inherent weaknesses. This is a fact that is often ignored in debates on implementation capacity assessment because it is these owner-mangers who are often assigned the task to assess causes for lack of implementation capacity. They often politicize their trade associations and do not appropriately protect and advance the real interests of the industry.

26. *Pakistan has all the above and a predominantly public owner-client coupled with even higher risks*: Compared to other countries, the public sector is a much larger client than the private sector in Pakistan. Infrastructure implementation can broadly be classified into two categories. One provided by the public sector and the other provided by the private sector. Typically, both in developing and developed countries, residential, official and industrial buildings under the 'Building Sector' category account for seventy percent of the infrastructure delivered, and the clients in these cases are primarily private even though the government may have direct or indirect control over the demand. Transport, water supply (irrigation, power, storage and drinking), sanitation, storm-water disposal, and power generation categorized as the large 'Civil Works Sector,' accounts for the rest of the infrastructure delivered, and the client is primarily public. In Pakistan, this seventy-thirty breakup is closer to fifty-fifty. This is food for thought regarding the role of the government in providing infrastructure that can be more efficiently delivered by the private sector. Client's project planning and administrative capacity has been documented to be weak and inadequate. The business process review[4] indicates that the construction industry in Pakistan takes higher risks as it *spends a higher than average time in business processes relating to external verification, government and local government procedures, corruption, and local law enforcement agencies* than what is spent on the core project related interaction, documentation, verification and correspondence. Such risks are also often unmanageable.

27. Like in most developing countries, the inadequate growth of construction capacity, particularly the capacity to manage construction is a problem that public and private sectors in Pakistan need to face. The GoP and its public sector agencies have a double responsibility as principal client as well as creator of the broader business framework.

2 METHODOLOGY

2.1 Developing the Analytical Framework

28. Assessing the implementation capacity for large public infrastructure projects requires an examination of the overall construction industry. This industry has many backward and forward linkages with other industries and interacts with numerous government departments, ministries and private sector enterprises (refer Charts 3 and 4).

29. The report looks at the entire public implementation processes (not just procurement, financial management, finances or consulting industry) and business environment both in Pakistan and abroad. The assessment was carried to reflect the views and capacity constraints of the entire construction industry. Such as, the executing agencies (or client), construction companies and consulting firms. The scope of data collection in the report was limited to large public infrastructure programs. Within the construction industry, focus is on the sub sectors of roads, irrigation, power, airports, ports and railways. The extent of expansion envisaged under the MTDF and other policy initiatives was estimated and factored in projections and assessments of capacity of the economy in handling future demands.

30. The design of the study incorporated an initial overview of the industry through a national and international literature review with a perception survey of key stakeholders. Once the constraints and bottlenecks faced in the project cycle had been identified an analytical framework (refer Chart 5) was designed to verify these preliminary findings. Analytical information was assembled around four broad emerging themes. Such as, Business Environment, HR, Materials and Equipment/Machinery.

31. In order to understand the complex dynamics of the industry and formulate a strategy it was important to elicit the views of the stakeholders. It not only informed the design process of the report but also helped in establishing a democratic foundation of the review process which the concerned stakeholders took ownership of. The GoP and local stakeholders were involved through a set of four targeted interactive focus groups and also through fortnightly discussions held amongst a local panel of experts. The Planning Commission of Pakistan served as the focal point. Focus group discussions included participants from federal, provincial and district tiers of the GoP through their written inputs, local and foreign consultants and contractors.

32. The research and analytical rigor were ensured by technical studies carried out to evaluate the gaps between supply and demand of HR, materials, equipment, study the business environment and processes, review industry costs, and a review of development models in regional countries. The technical studies further included an assessment of the issues faced by the construction industry in Pakistan relative to some comparators along with a review of the GoP's ability to plan and execute large infrastructure projects.

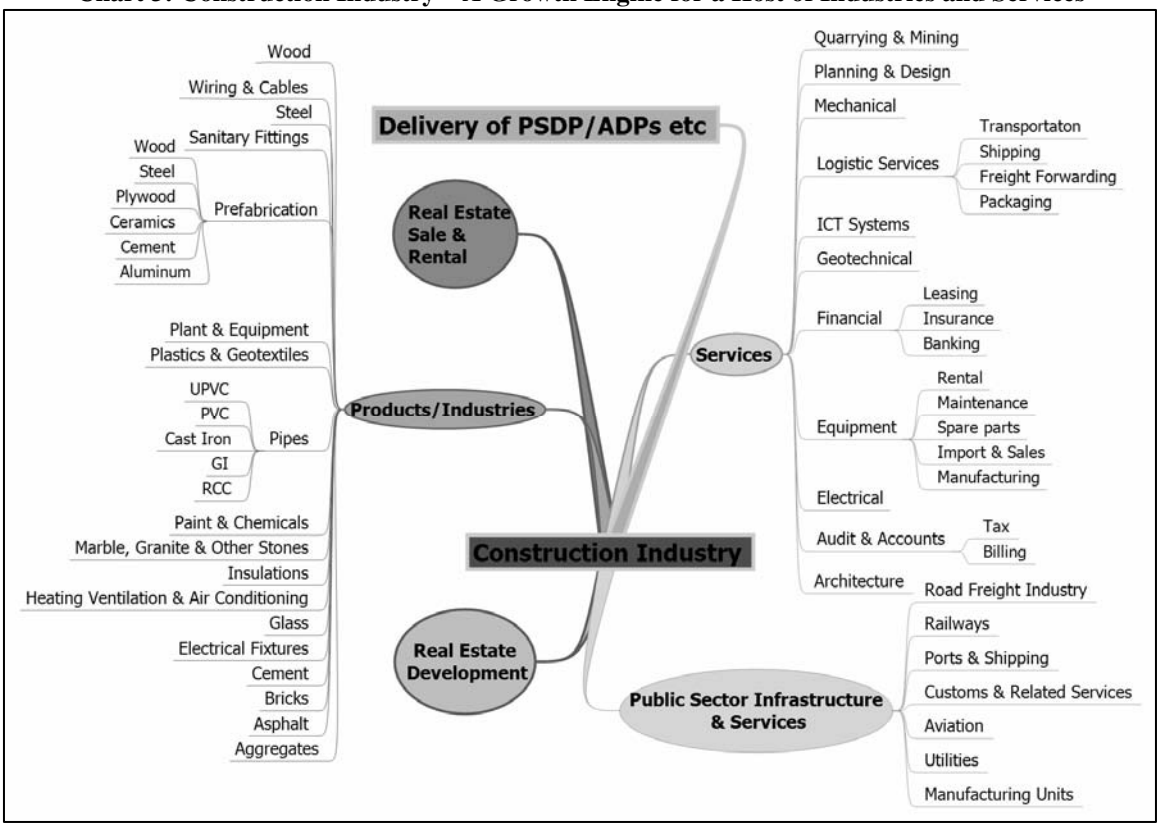
33. This indicative assessment recognized that the stakeholders are also the agents of change. Perceptions are central in motivating behavior and in many cases lead to suboptimal outcomes due to self-fulfilling perceptions causing coordination failures and perpetuating status quo. That is why the importance of factual evidence and on ground realties has not been neglected and extensive diagnostic studies have been conducted within the given analytical framework. The objective is therefore, for developing proposals for change through either reinforcing or refuting perceptions based on facts to ensure appropriate ownership.

34. Considering the backward and forward linkages of the construction industry and the pivotal role of the public sector planners and institutions, understanding constraints in implementation mechanisms for delivery of large infrastructure projects necessitated maintaining a holistic approach. As a result of the extensive and wide ranging technical studies and the stakeholders' surveys, the following technical notes were prepared:

1. Development of Construction Industry – A Literature Review
2. Local Stakeholders' Perceptions Survey
3. Foreign Stakeholders' Perceptions Survey
4. Business Environment and Cost of Doing Business
5. Purchase Price Review in the Infrastructure Industry
6. A Review of Allocations and Expenditures in the Public Sector
7. Demand Supply Gap Analysis
8. International Case Study – UAE, China and Malaysia
9. Local Case Studies
10. Response to International and Local Bids
11. Focus Group Discussions

35. Based on the analysis, short-term recommendations were made keeping in mind that there are vital infrastructure requirements in Pakistan which need to be delivered in the immediate future. Alongside, there is recognition that there are no sustainable quick fixes for the industry at large. Hence long-term recommendations have been developed to address fundamental weaknesses and constraints[12].

Chart 3: Construction Industry – A Growth Engine for a Host of Industries and Services



[12] The analysis and recommendations used a short-term horizon of five years (FY07-12) and 10-15 years (FY07-17/23) for longer term.

Chart 4: Public & Private Sector Stakeholders in Pakistan's Construction Industry

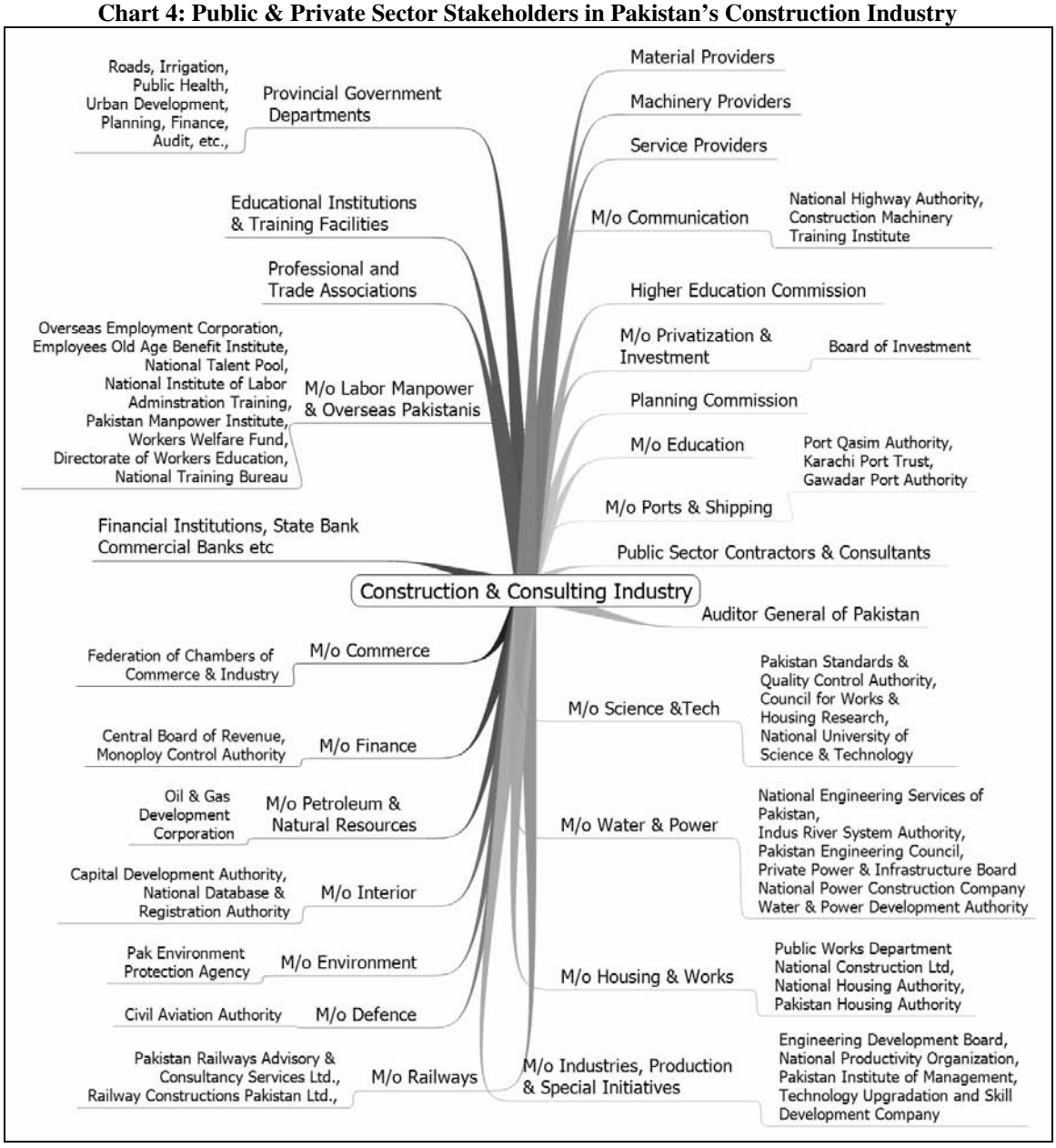
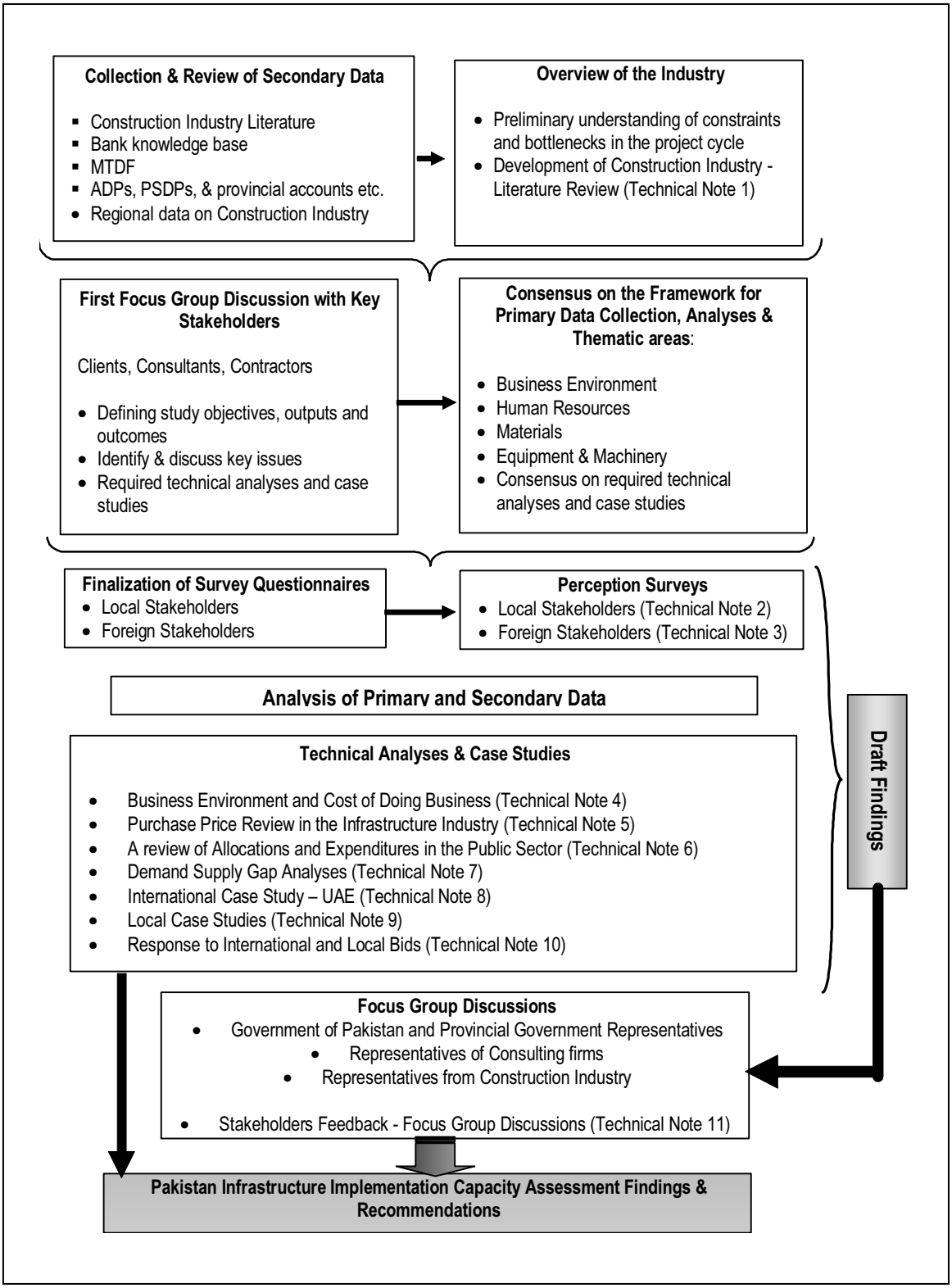


Chart 5: Analytical Framework - Pakistan Infrastructure Implementation Capacity Assessment



3 LITERATURE REVIEW, SURVEYS & TECHNICAL ANALYSES

36. This chapter presents the findings from the literature review, stakeholder surveys and the several technical analyses carried out under the study. The presentation sequence follows the analytical framework shown earlier.

3.1 The Construction Industry – Findings from the Literature

37. The objectives of the literature review[13] were to learn from available relevant national and international studies on the capacity constraints faced by the construction industry in other developing countries, to draw upon their experiences and consider the lessons learnt in the local context. The literature review thus focused on understanding the capacity constraints as well as issues and problems that plague the construction industry in developing countries. It identified measures that could be implemented in Pakistan for enhancing local stakeholder's capacity and provide for sustainable growth of the industry.

38. More than forty research papers and reports were reviewed including the relevant World Bank reports such as, Pakistan Growth and Export Competitiveness, Poverty Reduction and Economic Management Sector Unit South Asia Region (2006b); Pakistan Country Procurement Assessment Report: Consulting Services, OPC (2006c); Pakistan Public Expenditure Management Strategic Issues and Reform Agenda, Poverty Reduction and Economic Management Sector Unit South Asia Region (2004); Islamic Republic of Pakistan Country Financial Accountability Assessment, Financial Management Unit South Asia Region (2003); Pakistan Country Procurement Assessment Report, Procurement Services South Asia Region (2000); The Construction Industry: Issues and Strategy in Developing Countries (1984) and others.

39. The literature review reconfirms that 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. The international studies using different research methodologies ranging from survey analysis to expert opinions have identified best practices and recommendations for resolving such issues.

40. The review shows that generally the contractors and the business environment in developing countries are under developed. Given the opportunity, they can overcome their inadequacies, but they cannot easily change the environment. The challenges being faced by the industry in developing countries include insufficient education and training (lack of HR); weak government commitment; lack of long-term vision and planning for the industry; ineffective planning and budgetary procedures; fluctuations in work load; defective contract documents; corrupt contracting procedures; lack of appropriate and expected protection against adverse physical conditions; delays in payments to contractors; problems of bonding and insurance; lack of adequate credit availability (lack of financial resources); inappropriate restrictions on imports; foreign exchange constraints; unfair competition from state-owned contractors and consultants and problems relating to availability of equipment and spare parts; delays, cost overruns and miscommunication of information.

[13] Refer to Technical Note 1: 'Development of Construction Industry – A Literature Review'

41. In addition, the Pakistan specific papers of previous two decades provide an insight into its construction industry and the business environment. They showed the problems which have persisted and the recommendations put forth. Over time some of these recommendations may have already been tried with varying degrees of success. Due to a lack of recognition, continuity in policies and commitment from the government, the industry in Pakistan appears to be facing the same set of constraints which had been identified over two decades go and found to be common today in other developing countries as well.

42. The literature review shows that sustainable development of the construction sector requires a long-term commitment from the government. The impetus for change has to come from the demand-side as many of the key factors requiring significant improvement are related to the role of the government itself. Over time, the government together with other industry players will have to move from being driven by external and government interventions towards being driven by a desire for self improvement. The efficacy of a central body specifically for construction industry development has been recognized and acknowledged in developed and several developing countries extensively.

43. Most critical is having a long-term vision and a sustained policy for the industry supported by a coherent strategy. Institutionalizing the best practices culture through 'thinking the best and behaving the best' and developing a 'learning culture' in the industry. These three relate to changing the business environment. In addition, other critical factors required are techniques and technologies supporting high production performance, basic resources, infrastructure (physical and institutional), financial support and HR.

44. Due to the unique and fragmented nature of the industry stakeholders a comprehensive strategy is needed to bring about desired cultural change to support reforms. Stakeholders, such as construction clients, consultants, contractors, designers, educators/trainers, government officials, professional bodies, quasi-government officials, researchers, material suppliers, plant suppliers, construction lawyers, trade unions, information providers and others, both within and outside the industry, all have their roles to play to enhance capacity.

45. Within the regional countries, development of the industry in Singapore over the past four decades provides a good reference on a holistic and comprehensive long-term approach to change the business environment and culture. Singapore recognized the importance of the sector and a need for continuous development through a strategy addressing human resources, materials, technology, corporate development, improved documentation procedures, procurement, contracts, operating environments, payment chains, trade associations and institution building.

46. The Pakistan construction industry stakeholders are well aware of the challenges as reflected in various publications[14]. The literature review shows that business environment, human resources, equipment and materials are key constraining factors and that there are no short term fixes. A sustained long-term committed approach to developing the construction industry (contractors, consultants and clients) is of paramount importance.

47. In summary, successful construction industry reform initiatives to enhance and develop

[14] For example the Proceedings of the International Conference on Development of the Construction Industry, Pakistan Engineering Council (1990); Qamar and Mohammad, "Review of Pakistan's Construction Industry in the Irrigation and Drainage Sub-Sectors: Barriers to Growth and Suggestions for Improvement", 1989*;* and others.

capacity require:

- A commitment from the government
- Recognition of importance of developing the industry
- Influence as client and policy maker
- Influence as the leader for change
- Comprehensive long term vision and strategy for development
- Dedicated organization for implementing reform policies
- Well defined and specific action plans addressing needs of the industry as a whole and not just a single stakeholder
- Specialized technical assistance and programs to strengthen construction industry companies, client agencies and financial institutions

Given the GOP's ambitious development plans and the constraints identified from the literature review, innovative and out-of-the-box solutions would be required to deliver the proposed infrastructure projects.

3.2 Local Stakeholders Perception Surveys

48. The literature review provided a basis for evaluation of the current status of the construction industry in Pakistan. The opinions and perceptions of the industry stakeholders were sought regarding the present status of the industry. The pertinent question was: Can it deliver the planned infrastructure under the MTDF? What are the perceived constraints and issues related to the business environment, the availability and quality of HR, construction equipment and machinery and construction materials? What do the stakeholders recommend?

3.2.1 Local Stakeholders' Sample

49. Gallup International, a survey research firm, was recruited to conduct the survey of key stakeholders of the industry. A *quota purposive* sampling method, widely used to represent subgroups, was employed to select the sample from the Pakistan Engineering Council's (PEC) comprehensive list of consultants and contractors. An initial screening was done to identify contractors and consultants working with infrastructure related projects such as water, power, irrigation and roads only. The industry wide survey had a sample size of 104, 11 of whom were clients, 36 consultants and 57 contractors. In the final selection of 57 contractors, 24 were from C1, 12 from C2 and 21 were from C3 categories[15].

50. Certain dominant firms in the industry which were missed due to the random selection procedure employed were also included in the sample so that their input would be reflected in the survey results. The clients selected were 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. Responses from stakeholders were obtained through face to face interviews. The results were compiled, analyzed and produced as a

[15] Constructors categories (value of project eligible to undertake, required average 3 years turnover) 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.

separate technical note.[16] The key findings are summarized as follows.

3.2.2 The Construction Industry and Perceptions about Capacity

51. *The construction industry in Pakistan is dominated by just over a dozen construction and consulting firms each.* A quarter of the work load of large contractors was reported to have been sublet to others. The smaller contractors (C2 and C3) reported that over half of the work done by them is as sub-contractors, and they in turn sublet almost 50 percent of their work to even smaller contractors. *Contractors and consultants reported deriving almost half of their business from the public sector and half from the private sector*.

52. *Delays and increased costs were said to be primarily due to interruptions in funding*, delays in running payments and the consequential problems of managing cash flows including delays in decisions by the employers, the regulatory framework and the contractors own internal management and planning flaws were said to be main hurdles in finishing the job on time. Almost 40 percent of the stakeholders reported delays in completing projects ranging from 6 months to two years or more adding that almost a third of the projects had exceeded the initial contract costs. Overall, 44 percent of the contractors reported lodging claims for additional compensation.

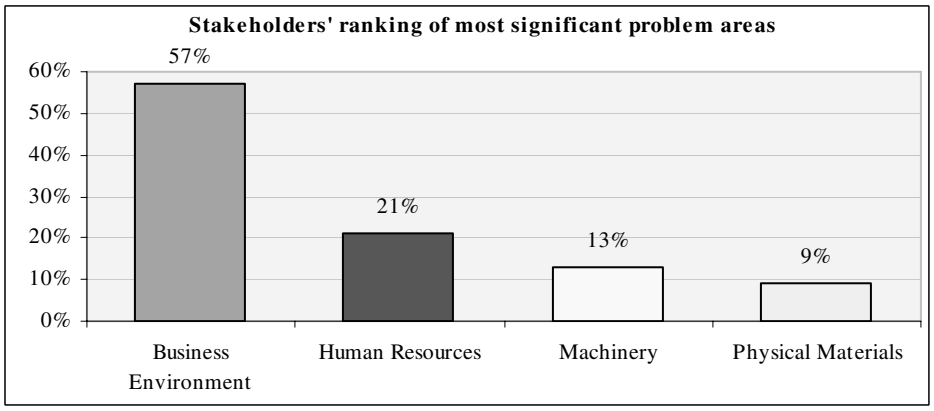
53. *The construction industry does not have the capacity to implement the planned large projects (both in scope and numbers)*. Overall, the majority of stakeholders were of the view that the local contractor's do not have the capacity to expand and that they already had too much work on their hands. The respondents were however equally divided in their opinion when asked whether foreign consultants and contractors would be required to deliver twice the current volume of work.

54. *The industry believes that capacity growth is being restricted* due to the existing poor compensation rates though, it has the potential of growing twice in size if a significant increase in rates is made,[17] and that unfair competition from parastatal public sector companies coupled with uncertainty of future demand discourages investments to increase capacity by the private sector.[18] Furthermore, a dichotomy between government policies and local industry needs vis-à-vis export of skilled man-power[19] exists. Lack of adequately skilled HR in conjunction with regional demand for skilled man-power was cited as a serious concern for the majority of respondents.

55. *An unfavorable business environment was ranked as the most significant constraint for the industry*. Consultants and clients considered lack of HR to be an equally important factor.

[16] Refer Technical Note 2: 'Local Stakeholders Perception Survey'.
[17] 85 percent respondents agree that a significant increase in rates can help double current capacity.
[18] 76 percent of respondents agreed that uncertainty of demand restricted the growth of industry.
[19] The brain-drain versus remittances debate.

Figure 1: Business Environment and Human Resources are Significant Bottlenecks



3.2.3 The Business Environment

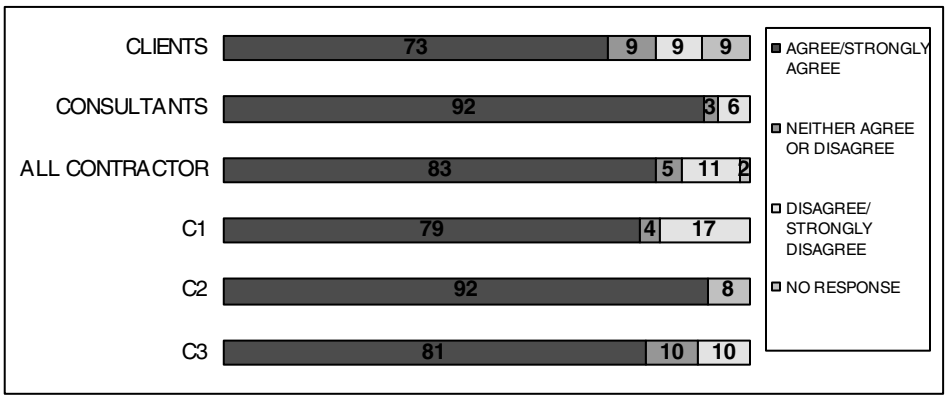
56. Within the broad category of business environment, the areas further explored included:

- Procurement
- Budgeting, Financing, Payment Procedures and Cost
- Administrative and Other Systematic Weaknesses
- Regulatory Framework
- Country Perceptions: Political Interference, Corruption and Security
- Key Issues and Stakeholders' Recommendations

3.2.3.1 Procurement

57. *Barring a few exceptions, most client agencies are plagued by outdated, defective and non transparent procurement rules and regulations.* Stakeholders 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.

Figure 2: Enlistment Procedures and Criteria should be Unified

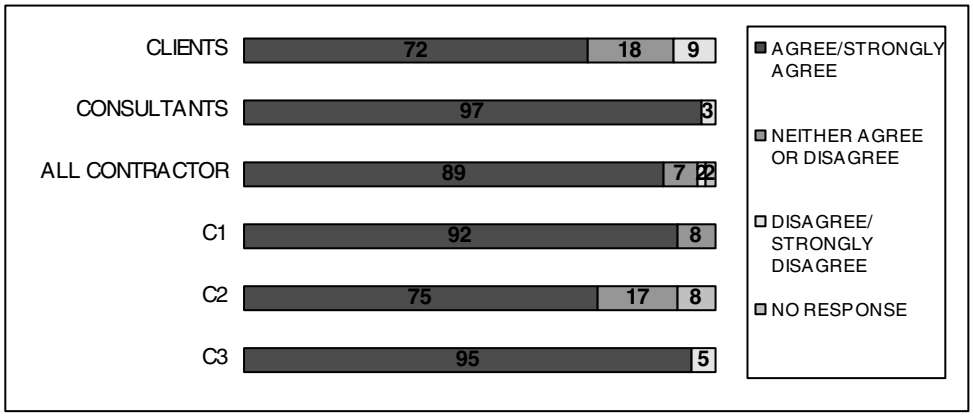


58. *At present, contractors despite lacking in capacity continue to get work.* The practice of awarding contracts on the basis of the lowest bids, which is prevalent in all agencies, was considered to be the major cause for poor quality of inputs and outputs. Similarly, the preferential use of parastatal firms was a discouraging factor for the private sector. They said that higher project costs are being incurred with the use of public sector companies adding that the use of force account procurement was the reason behind causing inefficiencies.

59. *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.

60. *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 desired that the standard FIDIC form of contract should be used by all agencies.

Figure 3: Effective Escalation Clauses are Essential in Contracts



61. Procurement of works was also considered to be delayed due to slow and inadequate release of allocated funds for projects and that the problems are compounded when project cost estimates are often incorrectly prepared.[20] to start with.

3.2.3.2 Budgeting, Financing, Payment Procedures and Cost

62. *Poor planning and programming is a major cause of PSDP/ADP's rollovers and throw forwards which impede growth.* Projects in the PSDP/ADP should be fully funded for the planned completion time and adequate funding should be made available to allow timely project implementation. Inadequate and slow release of funds, poor project planning and portfolio management, coupled with the adverse impact of delayed decision making by clients, lengthy and time consuming payment procedures which cause cash flow problems for contractors and consultants and a lack of financial facilities for the industry are major bottlenecks. In-time payments are essential for on-time project implementation. Stakeholders agreed that disbursements of PSDP/ADP allocations should be streamlined and automated.

[20] Implies poor design and evaluation capacities or the use of incorrect rates

Figure 4: Poor Planning the Major Cause of PSDP/ADP's Roll-Over/Throw-Forwards

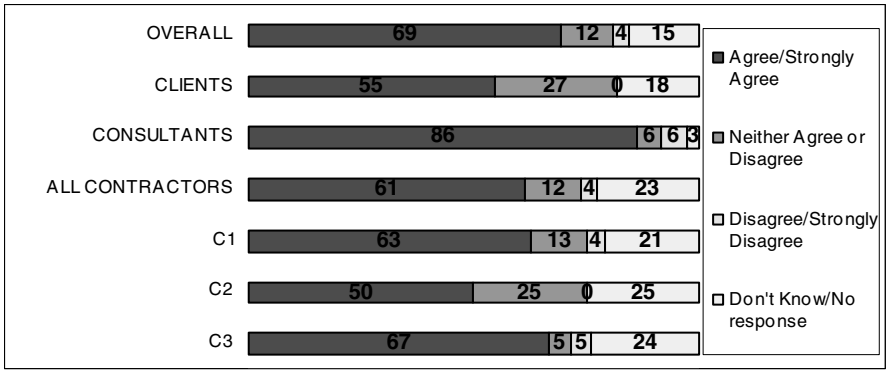
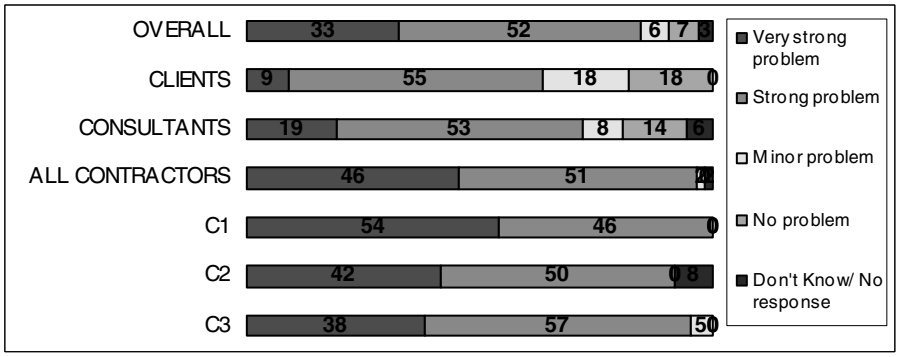


Figure 5: Growth Hampered by Lack of Financing Facilities



Box 2: Procedural Delays in Payments

A consultant related that they have not been paid on two supervision contracts with a major client for over 18 months because of "procedural bottlenecks". For services rendered during extended contract periods, an extension of time approval for contractors has been made a precondition to release of payments to consultants. Payments are withheld pending decision of the employers. They are not paid for services during this period and there is no additional compensation for losses incurred due to delayed payments by the client.

63. *Payment chains are not protected.* Payment procedures for contractors and consultants were considered to be time consuming and hampering progress. The critical aspect for timely execution of projects is timely cash flow. The results highlight the need to strengthen institutional capacities and streamline procedures to ensure payments are made well within the contractual time frames. A difference of opinion between the contractors and consultants and clients, was observed as the latter did not consider delayed payments to be problem.

64. As determined earlier, subcontractors play a significant role in the construction of infrastructure in Pakistan. The consultants and contractors[21] agreed that timely payments to the sub-contractors were an important factor as the sub-contractors were financially weaker and their rates are lower than the rates of prime contractors. Restricted cash flows to sub-contractors can therefore be expected to have a significant negative impact on the overall execution of the project. Conclusions can be drawn that contractual provisions for payments to sub-contractors need to be reviewed for better delivery of infrastructure.

[21] Overall 33 percent of the contractors agreed, however only 16 percent disagreed

Figure 6: Payment Procedures are Time Consuming and Hamper Progress

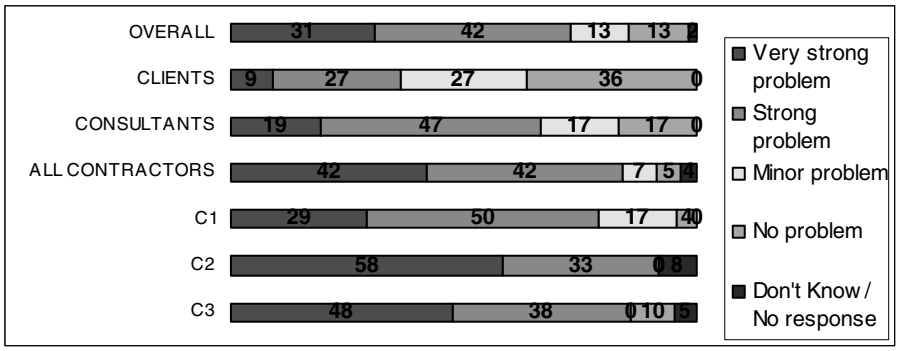
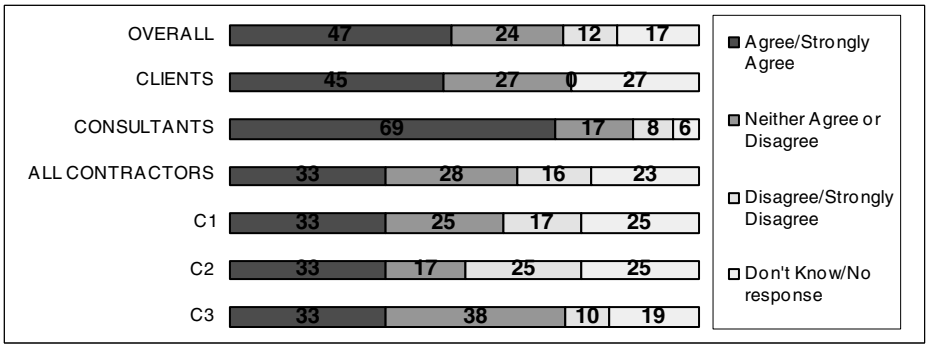


Figure 7: Sub Contractors Are Not Paid on Time



65. In general, the stakeholders believed that a high quality construction industry is constrained by broader budgetary, financial, administrative, institutional and regulatory bottlenecks. Unless, these problems are fixed, the construction industry cannot stage a take-off.

3.2.3.3 Administrative and Other Systematic Weaknesses

66. Inefficiencies and lack of professionalism are rampant in the public and private sectors. Significant administrative and systematic weaknesses in the client agencies include: inefficient contract administration; lack of professional planning in client agencies; client agencies and other government departments lack competent management; client agencies are slow in decision making; and, capacity of industry is not growing due to the absence of a master plan and lack of coordination between government offices and ministries. At the same time, the stakeholders were of the opinion that contractors lacked professional management in their companies; and both contractors and the consulting firms did not have competent personnel with proper execution and implementation skills. There was strong agreement by all stakeholders that construction and consulting firms should be supported and guided by the client agencies and provided with resources for development.

67. *Support required by the contractors and consultants* was identified as shown in the following charts. Contractors need technical support to build capacity, to develop planning capabilities, and a proactive development of the smaller contractors. In addition support was required to ensure cash flows and timely payments, provide financing and credit facilities, and better coordination during project execution. The consultants desired to see better team work and coordination with the client. Consultants assume financial responsibility, therefore support is

required if quality is to be achieved. The clients should not take commissions and decisions must be made within contractual time frames by clients to accelerate progress. Capacity building needs of consultants for handling the mega projects include acquiring of new technology and training, given payments on time, allocated proper time for preparing design and budgets and to be provided with appropriate facilities at the project sites.

68. Conclusions can be drawn that while institutional weaknesses, professional competence, project administration and management skills are more serious issues with client agencies, the contractors and consultants also have similar problems with respect to a lack of professional management and competent staff. The private sector is clearly advocating a need for proactive government support for capacity building and training.

Chart 6: How can the Client Support Construction Firms?

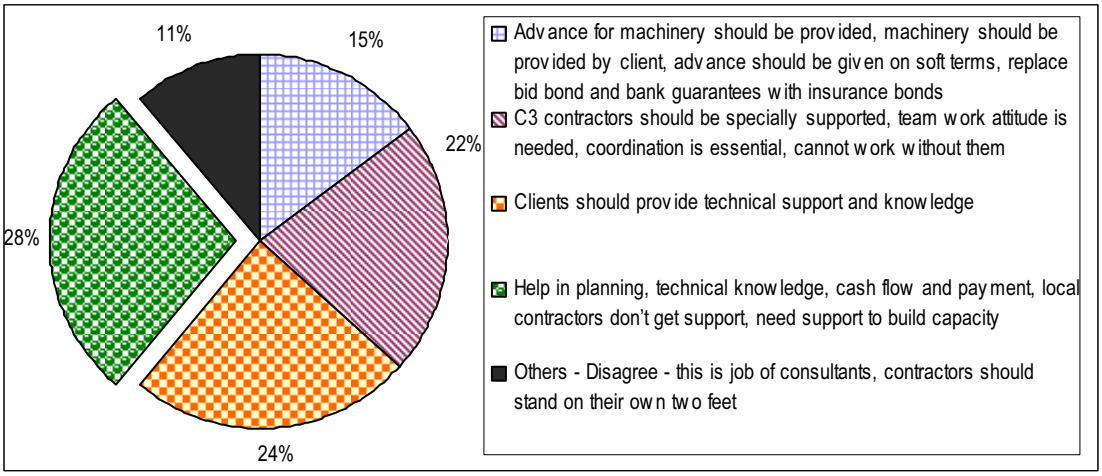
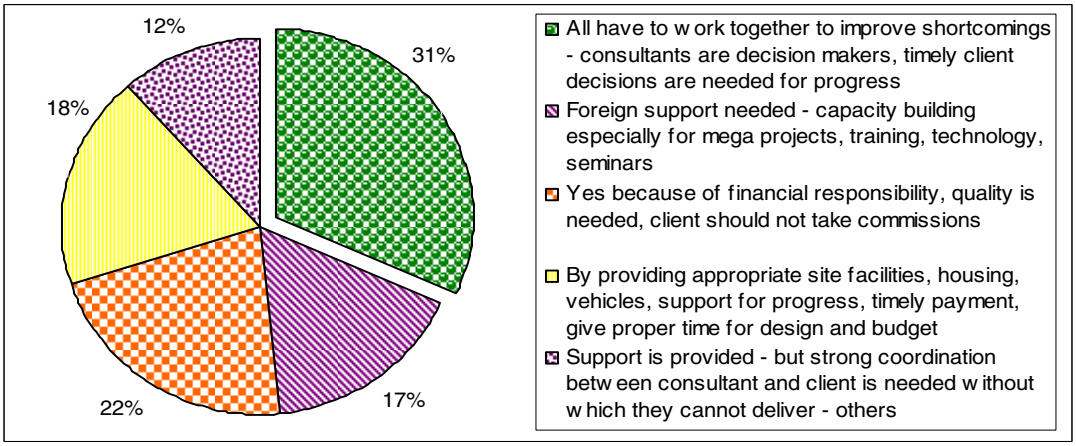


Chart 7: Consultants need the Support of Clients



3.2.3.4 Regulatory Framework

69. *Government policies were perceived to be ineffective and lacking with respect to facilitation of construction and consulting industry.* Granting "industry" status to the

construction business has had no impact as without corresponding support from financial/lending facilities and without the implementation of reforms, no positive results are possible. A lack of continuity and inconsistency in trade (development) policies constrained growth of the industry and caused a lack of confidence. Stakeholders reported that there are too many procedures involved in conducting business in Pakistan and the cost of doing business was high due to the existing government regulations.

70. *Auditors were considered to play a negative role.* Audits are not concurrent, and delayed audits create opportunities for corruption. In addition, audit staff despite not having technical knowledge of the industry or an engineering background, indulges in interpretation of technical decisions and matters. Auditors are not held responsible for causing delays in the final completion of contracts. Perceptions amongst all stakeholders regarding capabilities and technical standards of auditors were very poor and the majority said that "audit" have a high nuisance value and is a source of corruption.

Box 3: Delayed Audits and Poor Standards

A local consultant recently reported receiving a letter from a client to respond to an audit para pertaining to work done in 1987-88 on the WB funded Fourth Highway project. The para pertained to consultancy fee. Auditors contended fee was based on value of work done by the contractor; which is never the case under FIDIC contracts and that a recovery should be made. The project was completed over 10 years ago. To top it all – the contract for consultancy services was with an international firm and not the local consultants!

Figure 8: Serious Problems in Project Closure occur because Audits are not concurrent

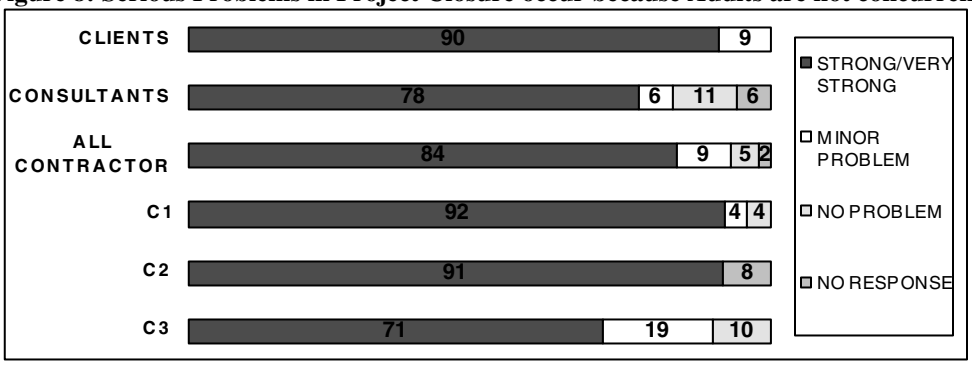


Figure 9: Delayed Audits Create Opportunities for Corruption

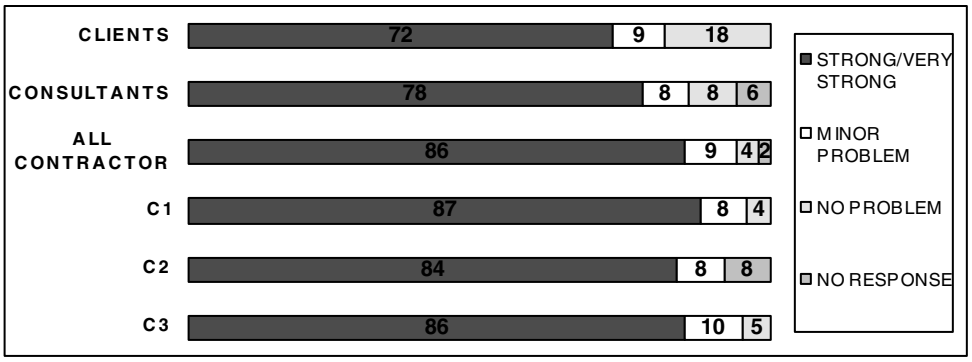
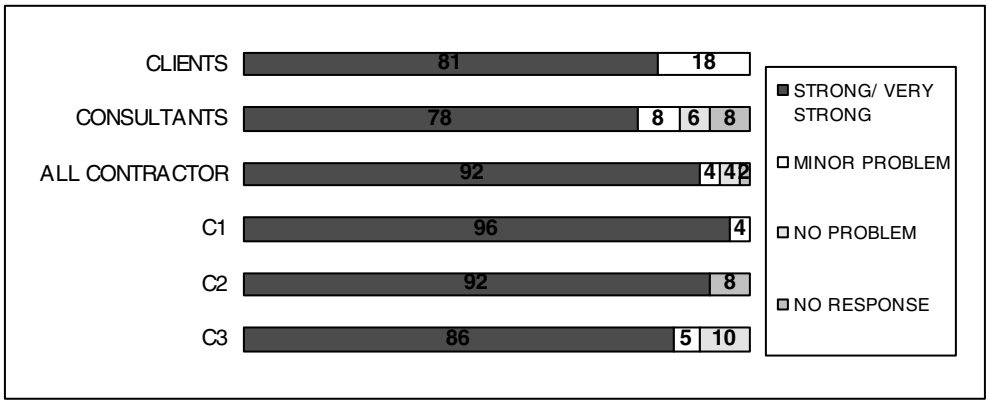
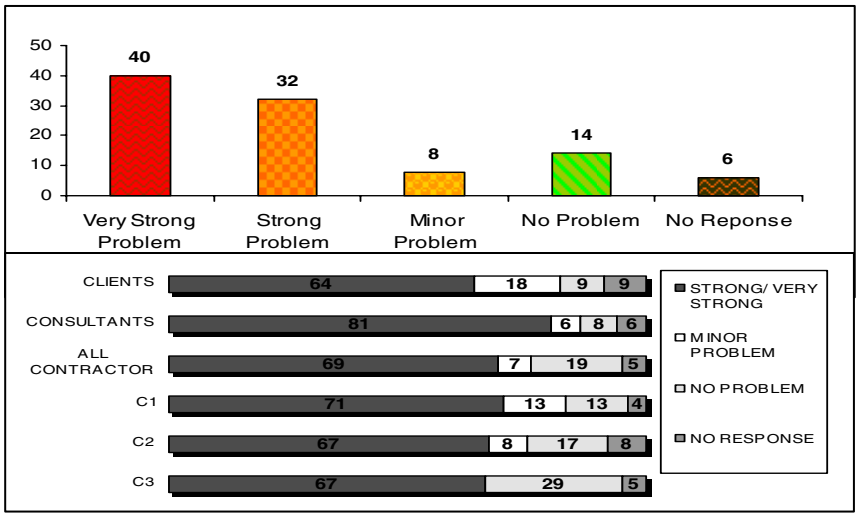


Figure 10: Lack of Auditors' Technical Knowledge Creates Problems



71. The current role of PEC was considered as being ineffective in facilitating the industry and being the primary regulatory body, it should be more proactive in developing the industry.

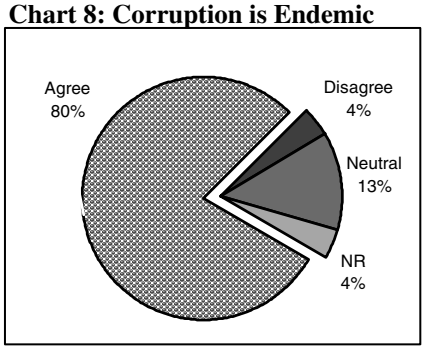
Figure 11: PEC does not play an Effective Role



3.2.3.5 Country Perceptions

72. *Political interference, corruption, transparency, security issues and effects of accepting the lowest bids are the major challenges which need to be addressed.* All hypotheses tested evoked strong agreement. Regarding the stakeholders' perceptions about doing business in Pakistan the majority said that political interference hampers growth of the industry and is restricting the entry of quality local and international contractors and consultants. The size of contracts does not appeal to foreign contractors and consultants, there is widespread and endemic corruption, lack of transparency in procurement and contract administration, client agencies lack management capacity, security risks restrict growth, law and order situation and political instability make Pakistan a high risk country, low bids by local consultants and contractors and the clients' practice to award contracts based only on price discourages foreign consultants and contractors are cited as some of the other reasons for staying away from bidding in Pakistan.

Chart 8: Corruption is Endemic



73. *These perceptions reflect disillusionment with the country's business environment* as a whole. Endemic corruption, is conservatively estimated, will cost the infrastructure related portfolio alone between US$1.6 to 2.5 billion over the MTDF.[22] Corruption and transparency issues are the major challenges the government has to address in order to develop capacity and improve the country's image. Implementation of FIDIC guidelines and contracts in letter and spirit is considered by stakeholders to be essential for helping solve such problems.

Figure 12: Widespread Corruption is Restricting Growth

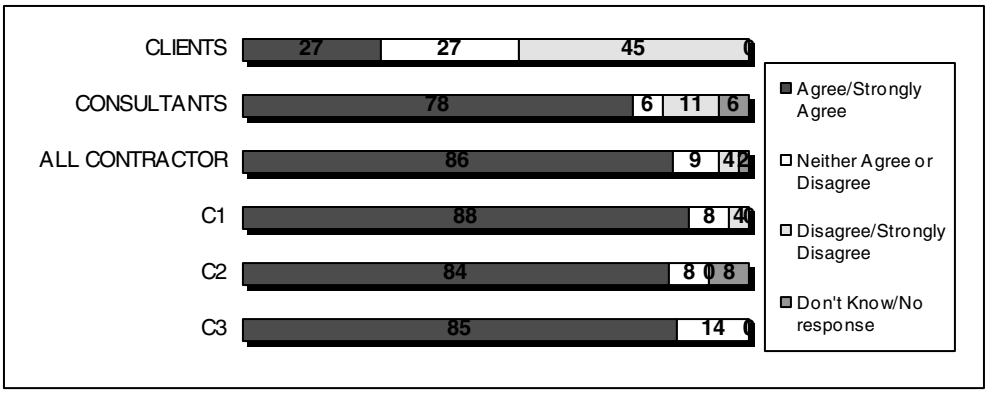
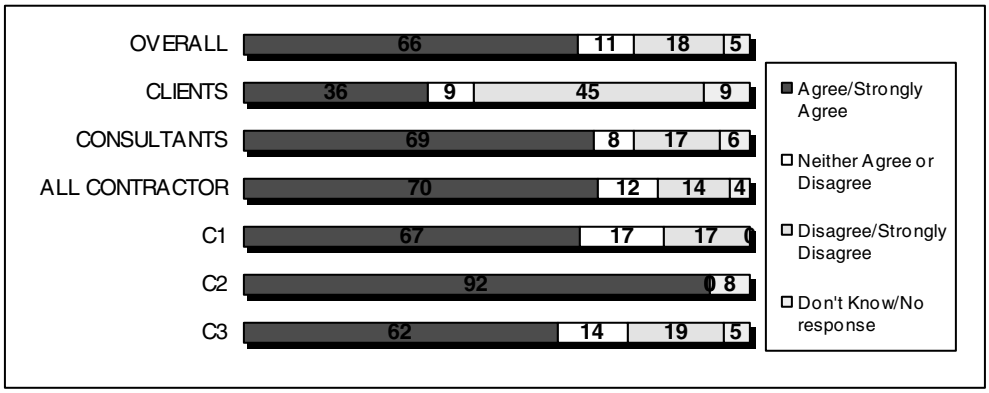


Figure 13: Procurement and Contract Administration Lack Transparency



74. The majority of stakeholders 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

[22] Calculated using weighted average of the reported cost of corruption as a percentage (approximately 10~15 percent) of the value of work. Infrastructure component of MTDF is US$16.55 billion. The majority of smaller C2 & C3 contractors reported corruption costs to be greater than 15 Percent.

- Delayed payment to subcontractors
- Delays in project completion dates.
- Low participation rate from international contractors and consultants

There is an almost non-existent practice of black-listing and eradication of poor performing contractors/consultants from the list, which further compounds the problem. Switching from accepting the lowest bid to the lowest evaluated bid is a challenge to be addressed.

3.2.3.6 Stakeholders Solutions to Key Issues in Business Environment

75. Six key areas of concern were identified as:
- Administrative and systematic weaknesses - systems do not work as per contract stipulations
- Corruption and transparency issues
- Regulatory framework and unclear, inconsistent policies
- Lack of financing; low rates, high cost and taxes
- Poor planning, budgeting, funding of projects and delayed release of funds, and
- Security and risk factors

76. Suggestions made by stakeholders to resolve these issues were:
- Improve administrative competence and streamline procedures, adopt FIDIC guidelines in letter and spirit, ensure balanced contract documents, provision of training at all levels
- Eliminate corruption and ensure transparency in procurement and contract administration
- Implement the PEC guidelines and make it more effective
- Facilitate credit/financing, make timely payments and rationalize taxes
- Prepare correct cost estimates, make realistic budgets, carry out long-term planning and ensure availability of funding for projects
- Improve security and risk perceptions

3.2.4 Views on Human Resources

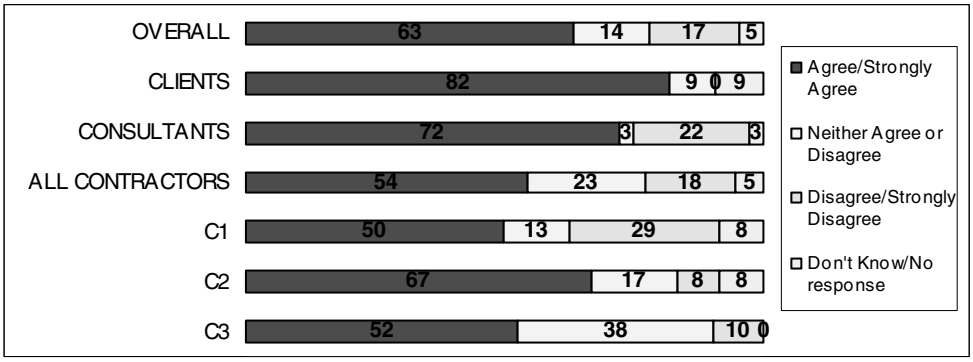
77. Stakeholders reported the following factors to be significant with respect to HR:
- Institutionalize development of skills/vocational training of manpower
- Database of skilled manpower should be maintained
- Existing in-house training facilities at construction firms and client agencies are highly insufficient
- Provision of training opportunities should form a part of criteria for evaluation and assessment of contractor/consultant by clients
- Client agencies should help contractors/consultants to build their manpower capacity, and
- Shortage of adequately skilled HR at all levels is the number one constraint

3.2.4.1 Availability of Adequately Qualified and Skilled Personnel

78. There is a general agreement that the quality of HR available to Pakistani contractors, consultants and clients is low. When asked to rate the ease of availability of various technical staff, a mixed response was received for all categories. This is indicative that at the current

volumes of work, the supply-demand position for manpower is just balanced, with data indicating a slight shortage. However, when asked the direct "bottom line" question on whether shortage of adequately qualified personnel was a "number one constraint," the majority of respondents agreed strongly. The source of the problem lies partly in deficient training arrangements (at various levels) and in inadequate and non-competitive compensation rates.

Figure 14: Shortage of Qualified and Skilled HR at all Levels is the Major Constraint



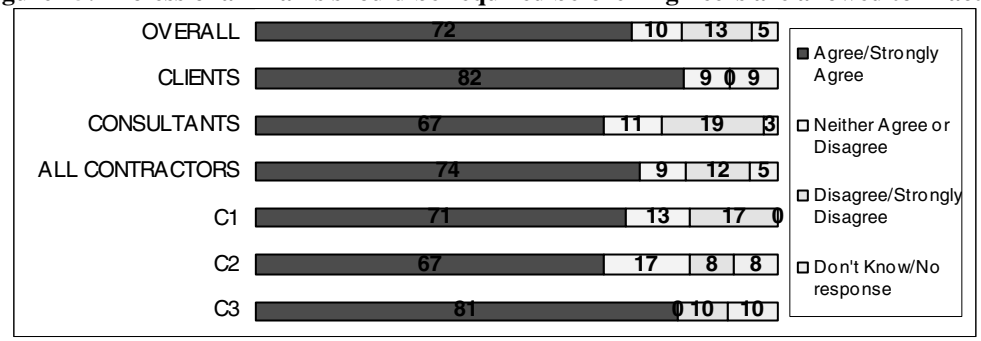
3.2.4.2 Employee Turnover and Low Retention

79. The problem of HR gets compounded, when low compensation rates and an inhospitable professional environment leads to overseas migration of qualified personnel. Contractors and consultants feel very strongly that poor contract management practices, especially the practice of awarding to the lowest-cost bidder, coupled with high costs of materials, drain them out of resources which they could otherwise invest in development of HR. They argue that they have no surpluses left to invest in HR development or to offer compensation packages which are high enough to make overseas migration unattractive. Turnover rate for employees with an experience of 5 years and less was reported to be as high as 40 percent, implying that as soon as staff gains significant experience at a firm, almost half of them seek employment elsewhere. This high turnover was said to discourage them from investing in HR development. They also believed that non competitive salary structures are deterring the induction or retention of qualified professionals in the client agencies. The stakeholders said that the government should take the lead in investing in training facilities, but the industry will also be keen in coming forward to share, once its business conditions become healthier.

3.2.4.3 Better Training and Higher Wages are the Key Requisites

80. Investment in human capital always pays dividends and does not depreciate. There was strong support for introducing professional exams at the point of entry in the job market adding that career advancement should be contingent with additional training and examinations. The stakeholders agreed that conducting education programs for engineers was the need of the day.

Figure 15: Professional Exams should be required before Engineers are allowed to Practice



3.2.4.4 Stakeholders solutions for issues with Human Resources

81. *Solutions suggested by stakeholders for HR related problems* can be placed in two broad categories. The first being increasing the skills and training to improve the level of core competencies and the second being changing the environment in order to increase the pool of HR and thereby help in reversing the brain-drain. The first group includes recommendations to enhance quality of education and the relevance of curriculum, a need for long-term HR and career planning in the industry, providing continuous training, seminars and scholarships in both pubic and private sectors, and focusing on imparting vocational training and upgrading skills. While the second group suggests improving the fee, charge rates and salary structures in the industry to reverse the brain-drain, increasing technical training, improving the corporate structure by more professional management (including in client agencies); and improving the work environment and employment packages in the industry.

3.2.5 Construction Equipment and Machinery

3.2.5.1 Lack of Financing, Leasing and Credit Facilities

82. *The majority of national contractors are faced with the limitation of equipment resources.* The industry has an aging equipment pool and the capacity to increase equipment resources is limited due to a lack of financing and leasing facilities. The stakeholders believed that the absence of specialized financing facilities, especially a lack of leasing facilities for the construction industry leads to overall shortage of funds for operational and developmental purposes, which forces them to use of old and obsolete machinery, causing:

- Rapid breakdowns
- Repair and maintenance issues due to the unavailability of spare parts
- Low productivity
- Delays

83. The stakeholders also believed that exclusive use of the bank guarantees without the option of insurance guarantee as substitute collateral, leads to perennial cash-flow problems as sizeable part of the equity is tied up in bank guarantees for long durations. Based on these views, the contractors and consultants seek comprehensive reforms in banking, leasing and insurance regulations which would facilitate investing in new tools and equipment.

3.2.5.2 Parastatal and Foreign Contractors

84. It is widely recognized that contractors often employ used and out-dated equipment which limits their capacity to deliver quality work on time. Despite recognizing that new machinery provides a greater bang for the buck, they can not, or do not, invest in new machinery because financing is not facilitated and future business prospects are uncertain. The exceptions to this, it was believed are only a few, namely parastatal companies, Frontier Works Organization (FWO), National Logistics Cell (NLC) and a few others. Stakeholders also believed that import regulations and conditions of contract documents favor foreign contractors through specific exemptions. The national private sector is mildly resentful that these segments of the business deny them of their rightful share in a competitive business.

85. However, all stakeholders, including contractors, believed that problems can be addressed through policy and regulatory reforms which can resolve issues, such as, shortage of funds, deficient credit, leasing and financial facilities.

3.2.5.3 Stakeholders Solutions for Issues with Equipment and Machinery

86. Solutions offered by stakeholders focused on areas such as, a need for active government support through policy and regulatory reforms to facilitate provision of credit, loans, financing and leasing facilities for machinery along with reduction in taxes on machinery and spare parts. Policies are needed which enable affordability and use of new equipment. The government should focus on planning and conducting equipment surveys for determining the costs, gaps in supply and demand and other statistics. The initiatives to help bring in new equipment have to be supported by the setting up of proper repair facilities with adequate spare parts and trained technicians. Vocational training institutes must also be geared up for this purpose and international experts should be engaged to provide training in the operation of the latest equipment. Skilled operators and technicians should be paid higher wages to reduce overseas emigration. In addition, specialists help should be available to the contractors for providing guidance on selection and use of appropriate equipment.

3.2.6 Construction Materials

87. *Stakeholders crib about quality of materials, price instability and non payment of escalation costs.* Problems identified in the survey relating to construction materials include: a rapid escalation in price of materials; difficulty in managing cash flow due to instability of market prices; clients resist honoring the escalation clauses; escalation clauses do not adequately compensate increase in prices; government price-controlling agencies are ineffective and cannot control cartels and monopolies; a lack of data on material production and requirements hampers planning; inconsistent quarry regulations; multiple regulations and taxes which cause delays and cost over-runs; the unpredictable supply of bitumen, cement and steel; and high fuel and carriage costs.

3.2.6.1 Need for Rationalizing Regulations and Providing Data

88. Multiple quarry regulations across the country were said to be affecting the cost of materials and that such multiple regulations and taxes were a cause for delays and cost overruns. Majority of respondents were of the opinion that a lack of data on material production affected

their project planning and execution. It also indicated that material production statistics and forecasts need to be made available to the industry.

3.2.6.2 Uncompensated Increase in Cost of Construction Materials

89. There is a strong view that material costs including energy and transportation are very high in Pakistan. The costs, many felt, are rising unjustifiably because the monopoly control mechanisms for checking unfair practices in the pricing of items, for example cement, are either absent or the existing ones are totally ineffective. The rapidly rising costs lead to the complications of "price escalation." In the absence of fair and balanced contracts, coupled with the lack of suitable "dispute resolution mechanisms," rising costs cause serious disputes on price escalation. This paralyzes on-going projects and seriously affects the prospects of maintaining and developing future business relationships.

3.2.6.3 Stakeholders' Solutions for Issues with Construction Materials

90. *Effective price control mechanisms, long- term planning, quality control and proper price compensation are needed.* Not surprisingly, the solutions proposed were quite straight forward and pertained mostly to the demand side. Government regulatory agencies need to control prices and inflation, price escalation should be fully compensated for and such compensation should be disbursed on time. Proper planning is required for ensuring supply of required materials and controlling of smuggling, hoarding and exports to minimize local shortages. Stakeholders also wanted to see stringent quality checks on material manufacturers, better access and logistics for remote sites, rationalization of cost of road transportation and an enhanced use of railways.

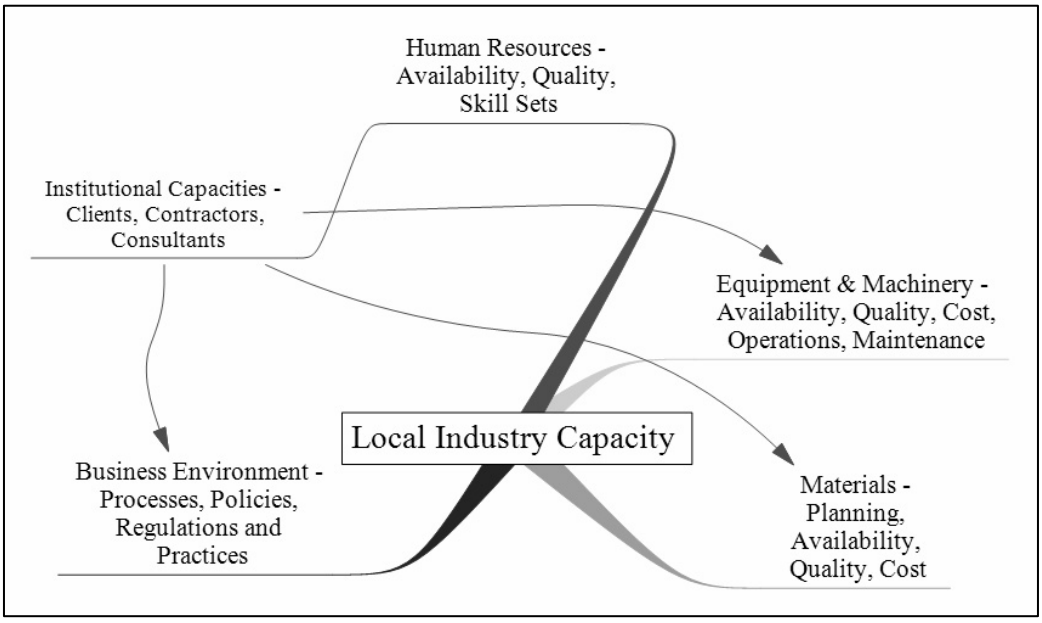
3.2.7 Local Stakeholders Survey – Cross Cutting Issues

91. The survey finds a similarity of views on key issues pertaining to the four thematic areas, such as business environment, human resources, supply of materials and equipment. Though, the degree of agreement might vary between different groups, yet all stakeholders' views evidently converged on the basic issues. All four thematic areas explored have a contribution in the prevailing low infrastructure implementation capacity.

92. HR (availability, quality and skills) is the cross cutting issue. Although ranked as being the second most important thematic area after business environment, it is the over arching constraint since the institutional capacities (clients, contractors, consultants and others) to carry out their respective functions depends on availability of appropriately skilled HR within each stakeholder institution. The relationships and dependencies are depicted in Figure 16.

93. The capacity of the industry to deliver infrastructure and to increase its capacity would be directly influenced by an improvement in the business environment (processes, policies, regulations and practices); availability, affordability and quality of equipment and machinery; proper materials requirement planning and effective cost control. All of which are dependent upon institutional capacities to develop appropriate polices, regulations and processes, to prepare long-term visionary plans, programs, budgets, manage financing, stream-line processes, administer contracts, design, operate and maintain machinery, carry out materials requirement planning and other related activities. Developing HR at all levels comes out to be the key factor in enhancing the capacity of the industry.

Figure 16 : Factors Causing Low Capacity to Deliver Planned Infrastructure



3.3 Foreign Stakeholders' Perceptions Survey

94. Many major international consultants and contractors are working in the region; however their interest in Pakistan has remained limited. The literature review and especially the country specific assessments and reports also indicated that the capacity of local construction industry may be limited due to a wide variety of reasons. A survey of "foreign stakeholders" was therefore planned as one of the activities of the PIICA. The objective of the foreign stakeholders' survey was to obtain insight on the perceptions of international contractors and consultants and their level of interest in pursuing business in Pakistan. The key issues explored included:

- For countries with the "worst business environment," what are the various issues that make the business environments in these countries "challenging?" Are such challenges acceptable?
- For countries with the "best business environment," how are the same issues rated there?
- What would attract foreign stakeholders to pursue business in Pakistan and what deters them?
- What are the perceptions about the business environment in Pakistan?
- If Pakistan is not on top of the list for exploring business, is it because there is plenty of work available elsewhere?

3.3.1 Methodology and Sample

95. A web-based foreign stakeholders' survey was employed using a questionnaire developed with the assistance of Gallup (Pakistan). A sample of 59 international contractors and consultants was selected from amongst the top 100 firms listed in the Engineering News Record (ENR) and it

also included firms that had previous work experience in Pakistan. The sample comprising 26 consulting and 33 construction firms were contacted first over telephone to introduce the objectives of the WB survey, solicit interest and encourage response. Individual personalized e-mails with website access information were then sent and follow up telephone calls were also made. Detailed analysis of responses received may be seen in the Technical Note 3, "Foreign Stakeholders' Perception Survey."

96. The response to the survey was however poor as only 5 out of the 59 firms responded. Of which, 4 were consulting firms and 1 was a contractor. Because of the very low response, a statistical analysis was not possible; however, a compilation of the responses received does provide some insight.[23] Low response is itself indicative of a lack of interest in Pakistan by foreign consultants and contractors.

3.3.2 Attributes Defining "Worst" and "Best" Business Environment Countries

97. Out of 38 regional countries, the respondent companies had a collective work experience in 33 countries. The "Worst Business Environment Countries" identified by four respondents were India (4), Vietnam (3), Thailand (2), Pakistan (2), and China, Bangladesh, Indonesia, Philippines and Saudi Arabia (1 respondent each). "Best Business Environment" countries identified by five respondents, were said to be Qatar, Bahrain, Oman (Gulf countries-3 respondents), and Hong Kong, Singapore, Australia, Korea, China, Lao, Vietnam, Thailand, Iran, Yemen and Pakistan (1 respondent each).

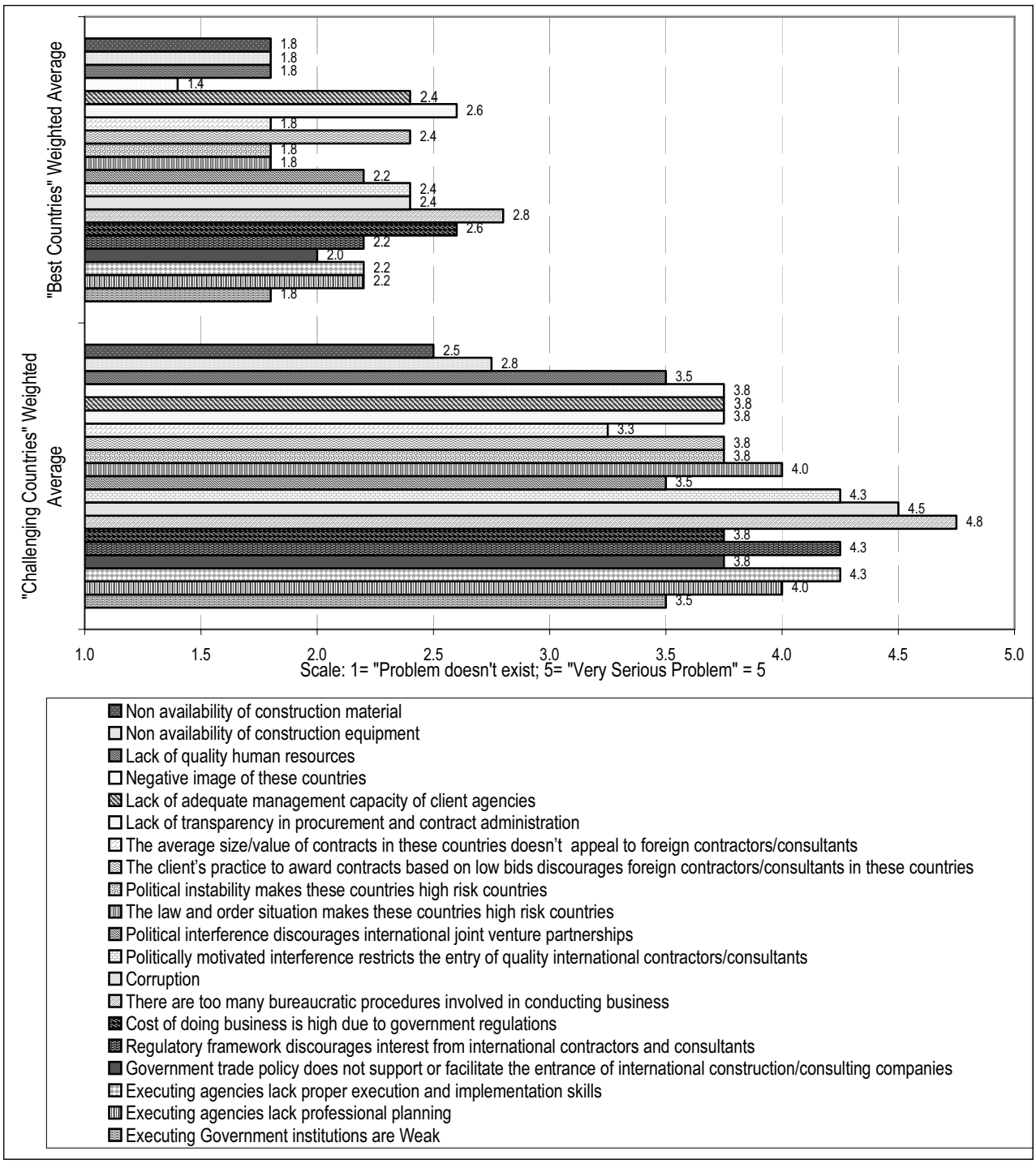
98. Twenty key attributes related to business environment were explored. Figure 17, shows the comparative weighted average score[24] for each issue in "challenging" and in "best" countries categories. In the case of "good business environment" countries, overall, the attributes scored 2.1, while for "challenging" countries they scored 3.8.

99. The sub-set of "serious problems" that define and differentiate "challenging business environment" countries are as follows:

- Executing agencies lack professional planning
- Executing agencies lack proper execution and implementation skills
- Regulatory framework discourages international contractors and consultants
- There are too many bureaucratic procedures involved in conducting business
- Corruption
- Politically motivated interference restricts the entry of reputable international contractors and consultants
- Law and order situation makes these countries high risk countries
- Political instability
- Practice of awarding contracts on the basis of the 'lowest cost bid'
- Lack of transparency in procurement and contract administration
- Negative international image of these countries

[23] Details are provided in a separate Technical Note 3 : 'Foreign Stakeholders' Survey'
[24] Score on a scale of 1 to 5, where 1 is problem does not exist and 5 a very serious problem

Figure 17: Business Environment Attributes – "Best" countries and "Challenging" countries



3.3.3 Key Attributes Defining Perceptions about Pakistan

100. Perceptions about Pakistan on the same twenty key "business environment issues" were also obtained. The results are shown in Figure 18. The sub-set of fourteen key attributes defining

the country's perception, all of which are demand-side related attributes are:

- Overall negative image of the country abroad
- Lack of adequate management capacity of client agencies
- Lack of transparency in procurement and contract administration
- Practice of awarding contracts based on the lowest cost bids discourages foreign contractors/consultants from participating in the bidding process
- Political instability increases the high risk factor
- Law and order situation makes it a high risk country
- Corruption
- There are too many bureaucratic procedures involved in conducting business
- Cost of doing business is high due to existing government regulations
- Regulatory framework procedures discourage international contractors and consultants
- Government trade policy does not support/facilitate entrance of international construction/consulting firms into the Pakistani market
- Executing agencies lack proper execution and implementation skills
- Executing institutions lack professional planning
- Executing government institutions are weak

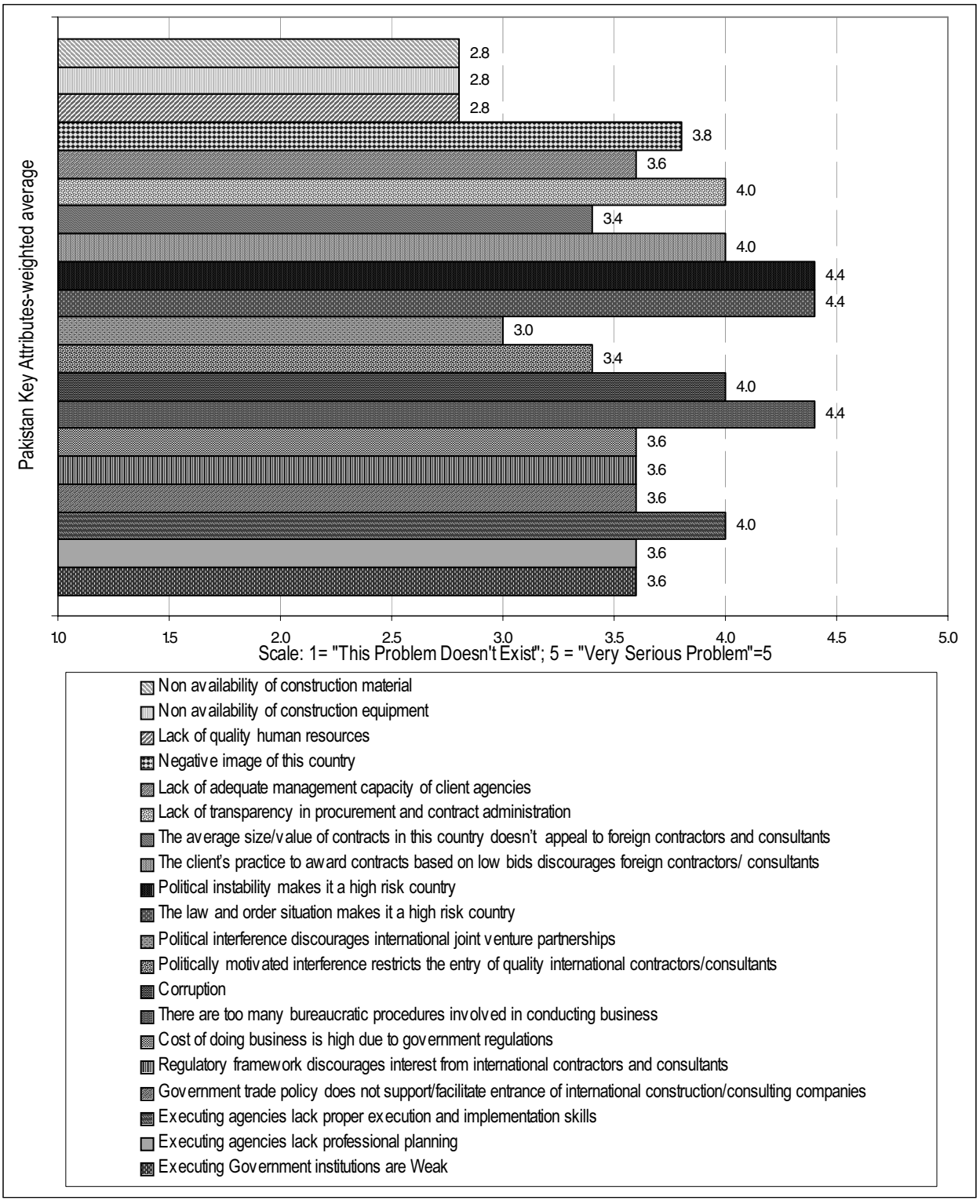
101. Despite the very small survey sample, results indicate that demand-side factors related to client institutional capacity, policies, regulations, processes and the negative image of the country are perceived as barriers by foreign stakeholders for doing business in Pakistan.

102. All five respondents agreed that *"Pakistan is not on top of the list as there was plenty of work available elsewhere."* Respondents said they would be interested in working in Pakistan if:

- Conditions and financial returns justify
- A donor organization would give a certain measure of governance to the project implementation,
- Security and business confidence improves
- Mega-size projects are offered

103. Work is clearly cut out for Pakistan's planners. The literature review and the local stakeholders' survey indicate that the local construction industry may lack the capacity to deliver the planned mega infrastructure projects. If the development plans entailing construction of mega projects are to be realized with the assistance of international firms, then Pakistan must not only develop a coherent strategy to address the myriad issues the local construction industry faces but should also make concerted efforts towards developing the government's institutional capacity. It should put in place processes that provide an enabling environment to attract reputable international firms working in regional competing markets.

Figure 18: Business Environment Attributes Defining Pakistan



3.4 Business Environment and Cost of Doing Business

104. A need to map the business processes involved in delivering infrastructure projects, in order to obtain an in depth insight in the ways the "actual real life" business environment functions, was identified in the first focus group meeting. The literature reviews also indicated that the business environment has a significant impact on the construction industry. The business processes, regulatory framework and other practices in the industry together contribute towards creating a conducive business environment (or otherwise). Hence, as part of a series of technical analyses carried out under the infrastructure implementation capacity assessment, the mapping of the business processes, the cost of doing business and an evaluation of the regulatory framework plays a key role in validating perceptions and in separating mere perceptions from facts.

105. The mapping of the business processes[25] was developed from confidential interviews with several construction firms followed by a detailed confidential study of the records and books of an actual project completed by a contractor in the water sector. The mapping shows that from the beginning construction and engineering consulting firms trying to participate in the construction sector are faced with frustratingly lengthy, complicated processes and government regulations.

106. Complex and dysfunctional processes contribute to delays in completion of infrastructure projects. These delays in turn have an adverse impact on overall capacity, efficiency and costs. In addition, there is a dearth of complete and reliable information. Absence of a single point of entry for seeking guidance and lack of a centralized data repository, which can serve as a decision-support repository for clients and stakeholders for identifying business opportunities, and for augmenting the capacity and quality of such functions and processes such as evaluation, selection, monitoring, managing, and regulation, are absent.

3.4.1 Mapping of Business Processes in an Infrastructure Project

107. The major stages, steps and activities involved in a project life cycle have been graphically illustrated in **Annexure I**. The illustration is based on actual data from a water reservoir project that was planned to be completed in two years but instead took six years. The analyses allowed each main project activity to be mapped and placed into three "zones" identified as the defined core processes, the outer processes and the unofficial "dark zone" processes. The illustration depicts not only the main stages involved during the life cycle of a project, but also highlights the time and relative effort as compared to the expected norms, the business processes where major delays occur and the different zones where such processes reside.

3.4.1.1 Inefficiencies in the Defined Processes Zone

108. This zone contains all such defined business processes that are expected in the project plan of any infrastructure project. The main players, client, contractor and consultant, involved in executing a project according to a realistic and agreed project plan are assumed to have a tacit understanding of various stages, steps and activities and the time that a process will realistically

[25] Refer Technical Note 4: 'Business Environment and Cost of Doing Business'

take to complete. Variances or delays in this zone are a direct result of inefficiencies and non-performance by one or more of the players or because an unrealistic project plan is agreed between them.

109. The efficiency of defined business processes depends on whether the unexpected or undefined aspects have been adequately catered for and taken into account. Efficiencies can be improved through direct involvement from all stakeholders by having in place a *Contract Document* that goes beyond the legal content and also encompasses internationally accepted best practices (such as those embodied by FIDIC), providing a comprehensive business framework for a project; by recognizing the role of effective and proactive *Project Management* and therefore emphasizing on sound project management methods, tools, documentation and continuous monitoring so that the impact of delays on overall time to complete the project, or on additional costs (direct and indirect) are highlighted and quantified at each step of the project, rather than be the subject of attention at major phases or milestones only; and by recognizing the importance of *Risk Analysis & Management*, so that at the time of project planning all the players have reached consensus on risks involved, its potential impact on time and costs of the project, and on how the risks will be mitigated or managed.

3.4.1.2 Outer Processes Zone

110. Projects contain elements or processes, which bring the project or its players in contact with external agencies and processes. The processes are not core to the project, cannot be fully anticipated and are generally not mentioned in the contract document. However, many of these processes are an integral part of the overall business and regulatory environment of the country, such as governmental verification and payment release; audit requirements; provincial and district permissions and licenses; land acquisition; removal of encroachments and utilities; and others. Detailed project plans that are based on past experience of similar projects, or are undertaken in the same project location (province /district) provide the anticipation of such "outer processes" and external requirements. This zone provides many risks, in terms of the time delays and cost escalations that can be caused due to inadequate information and lack of prior knowledge.

111. The following questions arise from the mapping of business processes and requirements in this zone:

- Why cannot the Terms of Reference (ToR) of a project be improved so that either the information relating to the requirements (governmental laws and regulations that will need to be taken into account by the bidder) are included or alternatively, the relevant sources where the information can be obtained from are identified? Without such a mechanism, can we say that an even playing field exists, when the project contains imponderables that only perhaps certain experienced stakeholders know about?

- If such requirements, residing in the external processes zone form an integral part of the existing business and governmental environment, why do contract documents not state them upfront, so that these are seen as residing in the "defined core processes zone" and hence the responsibility for addressing the requirements is clearly seen as primarily that of the respective players?

- Are there any processes (such as standard governmental audit and payment release procedures, and even internal institutional procedures), which supplant the agreed terms

and specific clauses of the contract, with no regard to the main substance of a contract or the effect that these have on the undertakings committed by the contractor or consultant? Why are these not incorporated in the contract agreements?

3.4.1.3 Unofficial Practices "Dark" Zone

112. This zone contains corrupt practices, which are a bane in the overall environment but over time have come to be accepted as 'necessary' and to be included if a project is to be won and then delivered with minimum hindrances. These practices cannot be called business processes but are an integral and unavoidable reality of the existing business environment. The zone contains unwritten procedures and fixed financial costs and charges for procedures such as; obtaining successful pre-qualification or enlisting with client organizations; for facilitation in winning a contract; for having an audit objection cleared or expedited; for obtaining timely approvals of work and release of payments; for winning the support of the local government official; for mobilizing the police to assist when needed; for requesting the "Patwari"[26] to facilitate; and for getting customs to give a favorable ruling of the duties and taxes on imports.

113. The options in this zone are clear. The contractor can either continue to persevere by addressing the written objections and completing the requirements until these are cleared, or pay the accepted charges and obtain an expeditious exit out of the zone. The questions, which arise relating to this zone, are:

- Are these practices and related costs accepted as the 'norm' by the contractor because of inadequacies present in the "system," documentation and contract administration or are they due to weaknesses on part of the contractor in complying with sound project management practices?

- Are there any requirements where the burden of responsibility is being unfairly shifted on the contractor when it should actually be the client that should be responsible?

3.4.2 Identified Bottlenecks in Business Processes

114. *Many delays are caused, not because several steps exist for completing a process, but simply due to repeated effort required to move a stage or process forward and lack of responsibility or weak regulations that cause hindrances in moving to the next step*. Similarly there are several processes where delays are caused because of inadequate documentation, lack of pro-active project management systems and accounting methods and records. In addition, there are many defined and undefined procedures that reside in different zones, many of which are not stated in the contract documents, nor contained in the project plans and are not subjected to risk analysis and risk mitigation at the outset. These render the best of project time-lines and budgets irrelevant.

115. *While entry barriers are greater for new firms during start-up of operations, fulfilling pre-requisites and pre-qualification criteria, difficulties are also faced by all contractors in carrying out the project cycle activities*; areas that contain business processes and which relative

[26] "Patwari" is an important official in the revenue administration. Being responsible for maintaining land revenue records, the register of mutations and the record of rights, Patwaris play an important role in compensation for land acquisitions and transfers.

to other processes in the life cycle of a project are disproportionate, are a cause of significant time delays in completion of projects. Such disproportionate business processes, that are unpredictable and vary greatly from the planned time or inputs, are areas that can be the focus for selective further analysis, process re-engineering and recommendations. Some of the processes identified include land acquisition, obtaining clearances, work and progress certification, audit procedures, external agencies processes, funding and payments, cost escalations, changes and modifications, final certification, final payments, legal closure, release of performance guarantees and others. Such areas can be targeted to improve the overall business and regulatory environment applicable to stakeholders and relevant to infrastructure projects.

116. *Capacity and efficiency is inhibited by factors that not only reside in the external processes and procedures but also in the internal business and organizational systems and methods of construction and consulting organizations*. Some of the internal business and organizational systems are the result of short-term government policies introduced as quick fixes or "holidays," the long-term effect of which have emerged over time as severe gaps and inadequacies in the accounting, reporting and project management systems of construction and consulting organizations.

117. *The mapping process showed that corruption in the overall environment exists which over time has become embedded and accepted as "necessary" if a project is to be successfully won and executed* with minimum hindrances from the government. Offering bribes during the project lifecycle has become institutionalized. These practices cannot be called business processes but are an integral and unavoidable reality of the current business environment.

118. *Lack of regulatory reforms, inadequate government planning, cumbersome policies and weak client agencies are responsible for the problems faced by stakeholders.* One of the main impediments in the development of the construction industry appears to be the poor business environment and practices. All of these drawbacks serve to multiply the transaction costs of doing business.

3.4.3 Impact of Delays on Project Cost

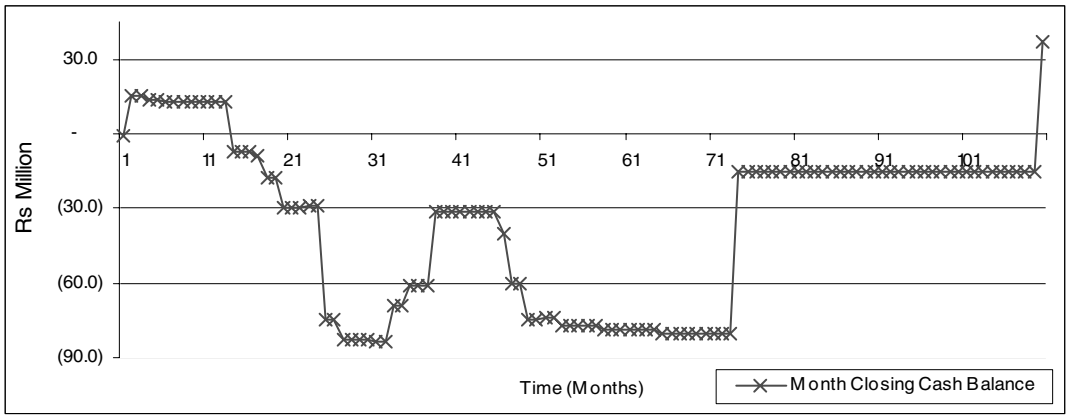
119. If an infrastructure project is completed within the prescribed time, resources that constitute overall capacity for executing the project (i.e. HR, money, plant and equipment) are released and can be utilized for the next project. Delays directly impact the overall capacity as the resources remain tied-up beyond planned project durations. Delays also cause increases in direct cost of materials and other inputs that get purchased at a later stage of the project than originally planned, as the cost of these materials generally increases during the intervening period.

120. Moreover, extended project periods involve additional fixed overheads and operating costs. Prolongation costs such as financial or "time cost" of money, and opportunity costs are incurred on delayed payment releases and on money invested by the contractor on plant and equipment which stays idle or is only partially utilized when delays between stages and activities occur and for the extended contract duration.

121. **Annexure II** shows the detailed analysis of project cash flows and costs for the same water reservoir project for which business processes had been mapped (refer Annexure I). The timing of cash inflows, outflows and the net cash balances, and most importantly, the impact of

delays in terms of additional costs such as fixed overheads, increased cost of running finances, and the effective profit or loss for the project are quite revealing. For the relatively medium sized water reservoir project (estimated cost at Rs271 million), the planned project completion time was 24 months and actual completion was achieved in 72 months. The contractor is seen to generally operate with *a negative cash flow from the 12th month until the claims were settled three years after the final payment against work done.*

Chart 9: Monthly Closing Cash Balance of Contractor on Water Reservoir Project



122. Estimated cost of delays is Rs86 million or 32 percent of the initial project costs (excluding lost benefits planned from the project).[27] The loss to the national exchequer in the form of delayed benefits is above and beyond this figure. The contractor ended up indirectly financing the project and incurred losses of Rs19.4 million due to uncompensated costs of delays.

Box 4: Cost of Delays in a Water Reservoir Project

Contract Cost Rs (In millions)	**271**
Variations	1
Revised Contract Cost	**272**
Expenses incurred	265
Net Profit on books before claims - at end of project after a delay of 48 months	7
Claims Paid (out of 100 Mil claims)	30
Total Revised Completion Cost	**302**
Revised Net Profit on books with claims paid	37
Un compensated losses	(56.5)
Actual Profit/(Loss) to Contractor	**(19.4)**
Actual cost (including uncompensated losses)	**358.5**
Percent increase in Project Cost on completion	**32 percent**

123. *The role of the contractor seems to have shifted from that of a provider of specialized services to that of a financier of the project.* If he is not expected to play the role of a financier, than why and how does he operate with negative cash profiles and what is the impact of this on his capacity to perform, deliver on time and enhance his future prospects as a contractor. The business mapping process and the analysis of the impact of delays on project costs reinforce the conclusions that the business environment and implementing agencies role needs to be carefully evaluated and perhaps re-engineered.

[27] Project final cost including uncompensated losses is Rs358 million (Rs271 million initial cost+Rs1 million variations+Rs30 million claims paid+Rs56.5 million uncompensated claims)

3.4.4 Regulatory Framework

3.4.4.1 Registration and Regulatory Bodies

124. Construction, engineering and consulting organizations in Pakistan are subjected to three types of registration, which at present, are the only form of regulation for the industry. These are;

- Registration for the legal entity of the business upon its formation, followed by the requirement to submit annual/periodic reports;
- Registration with the official engineering body, i.e. the PEC, requiring periodic Renewal of registration and
- Registration with client agencies

125. In the case of registration as a legal entity, the submission of annual/periodic returns applies only to incorporated business entities such as limited liability, public or private companies. Other registered entities, such as registered partnership, sole proprietorships do not have a requirement for annual returns. In registration with PEC, the periodic renewal plays a limited role, in so far as regulation is concerned, and registration requirements with the client agencies vary from client to client. Apart from the above, other associations which exist for the construction and consulting organizations mainly provide a forum and voice for their members, but cannot be considered as part of the regulatory framework of the construction and engineering consulting industry.

126. *The registration requirements are cumbersome and playing a protectionist role* by discouraging foreign companies from operating in Pakistan.[28] The PEC's role is limited to encouraging contractors/consultants to employ qualified engineers without any effort to facilitate joint ventures or other programs aimed at transfer of technology. The exclusion of foreign firms limits competition in the Pakistani market and restricts exposure to international 'best practices' and to latest technology upgrades. Given these negative impacts, it was recently announced that the PEC will revise the registration requirements.

127. *The PEC is however the only formally recognized legal body which plays the role of a regulator for the industry,* ensuring that minimum criteria are met for initial registration of an organization (construction contractors and consultants) and those criteria are maintained to enable yearly renewal of registration. A participating construction or consulting organization is required to keep its registration with PEC up to date. Although PEC is the official body for the industry, its role as a regulator is not dynamic or effective. At present, PEC is not capable of monitoring projects and activities, their performance, adherence to professional and ethical standards or quality of construction materials used or application of technical skills on a project. There exists no form of continuous reporting or verification mechanism which should be in place for enabling such continuous monitoring[29].

128. *Regulation of the construction and engineering consulting organizations is hence weak if not altogether absent,* and in the absence of an effective regulatory body the client plays the role

[28] In 2002, only 3 out of 170 professional consulting companies registered with the PEC were foreign firms.
[29] The PEC classifies contractors in various categories (value of project eligible to undertake, required average 3 years turnover) from C1 (no limit) to C6 (work up to Rs5 million). There is no mechanism to report how many projects a contractor is currently handling and smaller contractors may take on several contracts simultaneously which cumulatively exceed the limits defined for this category of registration.

of a regulator to a great extent through flawed and one sided contract documents. At times, in addition to client, several other government agencies and "committees" (such as chief ministers' inspection team) also indulge in acting as regulators. The client can, in the short to medium term and until such time as an effective overall regulatory environment develops, play its de facto role of a regulator in a more positive manner, provided that the relationship between client, "The Engineer" (consultant), and the contractor is honored as laid down in the FIDIC and PEC standard contract documents in letter and spirit. Strengthening of the PEC or establishing a separate regulatory body is an option, which can be explored.

129. The absence of a strong regulatory environment and authority which is at par with the role and functions that Oil and Gas Regulatory Authority (OGRA), National Electric Power Regulatory Authority (NEPRA) or Pakistan Telecom Authority (PTA) play is a problem that requires priority attention. Structurally weak legal and regulatory framework acts as a deterrent for attracting qualified consultants and contractors. Legal and regulatory limitations affect the GoP's ability to manage risk and raise capital for investment.

130. The procurement activities of the government are regulated by the Public Procurement Regulatory Authority (PPRA).[30] The federal government through PPRA has issued procurement rules with legal and constitutional cover for all procurements. PPRA rules provide an over arching framework for procurement of goods and services, specifically, for consulting services, these can follow donor agency or present PEC rules, depending upon their application. In the first two years since the rules were promulgated, PPRA has been focusing on creating awareness about its rules and re-drafting of procurement procedures for major departments, such as the Karachi Port Trust (KPT), Water And Power Development Authority (WAPDA), Sui Northern Gas Pipelines Limited (SNGPL), Sui Southern Gas Company (SSGC), Capital Development Authority (CDA) and National Highway Authority (NHA) in order to bring them in line with procurement rules. This is being followed up in the next phase with detailed procurement audits of selected line departments. Although, the PPRA rules are applicable to federally funded projects, the Government of Sindh (GoS) has adopted the same rules by reference for all its procurement. However, at present, a lot of work is needed to streamline procurement practices, develop institutional capacities to implement the new procurement rules and bring all procurement procedures into compliance with the PPRA rules.

131. Hence in practice, various procurement rules and regulations are vague, often having contradictory clauses, making them not only inefficient but also impractical to apply. Ambiguous and imprecise rules allow for inconsistent and arbitrary behavior to flourish in public procurement. A lack of consistency in overall rules means higher transaction costs for consultants and contractors when doing business with the government.

132. The regulatory framework leaves many issues unaddressed including remuneration, which is seldom adjusted creating unfavorable terms for prospective consultants and contractors and adversely impacting the quality of industry's output. Additionally, the only criterion emphasized in the regulations available is price competition and no provision is made to ensure the quality of work being delivered. A weak regulatory system implies weak institutional capacity on part of the government to select, monitor and regulate consulting and contracting services. Institutional weakness allows corrupt practices and rent-seeking to thrive. There is no institution that is dedicated to the development of the construction industry. There is no

[30] PPRA has the status of an ordinance in pursuance of the Proclamation of Emergency of 14th October, 1999 and the Provisional Constitution Order No. 1 of 1999, read with the Provisional Constitution (Amendment Order No. 9 of 1999).

government or professional body working on upgrading the management capabilities of contractors and consultants. The role and mandate of institutions such as the PEC should be clarified and be made devoid of conflicting agendas as both a representative of the profession and an agent of the government.

3.4.4.2 Taxation

133. Construction contractors have for some time now gladly accepted the presumptive tax method (i.e. taxes deducted at source being treated as the final tax liability[31]). It provided the relief that the contractor sought, i.e. avoiding an interface with the tax department and the uncertainties it involved. *However, as a result of the presumptive tax method, the business to a great extent no longer saw the need for maintaining proper accounting records.*

134. Maintaining books and accounts are the basic tools for reliable costing, sound project management, and overall efficient management of revenues, expenditure, receivables, payables and cash flows. The absence of accounting systems creates inherent disadvantages. *Contractors cite the lack of facilities from banks as one of the reasons that stunts business growth and limits execution capacity, while perhaps failing to recognize that with inadequate accounting and reporting systems, banks cannot be expected to take a positive view of construction contractors and their specific business needs*.

135. Self assessment – based on documentation – is the long term recommended strategy charted by the government and the Federal Board of Revenue (FBR). A self assessment environment, backed up by sound accounting practices and systems negates the very reasons that created the presumptive tax environment in the first place. It is not recommended for the construction contractors to continue under presumptive tax, when a self assessment environment is evolving, however, both options, presumptive taxation and self assessment, should be available to the construction contractor. As self assessment proves to be the better taxation option, it would propagate the need for maintaining proper accounting systems, and provide the basis for banks to focus on this sector and look at ways to provide financial and technical assistance.

136. In addition to direct and indirect taxes, calculated on the revenues and profits, or on the basis of presumptive taxes, various other employee welfare and payroll related contributions, under different schemes and related laws, also apply to construction and engineering consulting organizations as shown in Table 2. Construction contracts stipulate and suggest compliance. The extent, to which there is actual compliance by construction contractors and accordingly the cost impact, is probably minimal.

137. Skilled and unskilled workers are recruited mainly from the local area where a project is located. Many loopholes are available to the contractor. Inspection and verification methods are weak and the nuisance of local inspectors visiting the project is solved through 'gratification payments' for certifying that the books and returns are correct. A large part of the work force are shown on the records as part time workers or employed for a short-term by falsifying records to show intervals between employment and re-employment periods, giving an employee different names on the payroll records. The process of registration of an employee with the institutions, such as with Employees Old Age Benefits Institution (EOBI), Social Security among others is

[31] For contractors tax deducted at source @ 6 percent of gross payments is the final tax liability. Other presumptive taxes are for services (consultants) 6 percent, on supply of goods 3.5 percent & Sales Tax (ST) 15 per cent.

carried out by the employer, with employees in this sector remaining largely unaware of their rights or of the benefits and facilities available.

Table 2: Employee Welfare and Other Schemes

Name of Scheme	Cost/Funding Source	Applicable To
Workers Welfare Fund	2 percent of Taxable Income of the Enterprise	Workers of Registered Organizations earning less than Rupees 5,000 per month
Education Cess	Rs100 per worker, per year	Workers in establishments with more 10 workers and earning below Rupees 3,000 per month
Provincial Social Security (Employees Social Security Institution)	Employers contribution, based on 7 percent of the wages of workers earning less than Rs5,000 per month.	All workers of the enterprise, falling in the category of wages less than Rs5,000 per month
Group Insurance	Approximately 2-3 percent of gross wages of the enterprise	All employees of the enterprise, covered for a minimum of Rs200,000 as life insurance
Employees Old Age Benefits Institution	6 percent of minimum wage of Rs 3,000 per month	Workers in establishments with 10 workers or more
Workers Profit Participation Fund (WPPF)	5 percent of the annual profits after tax of the enterprise	All employees falling in the category of workers of the enterprise, with a maximum amount of Rs5,000 to be paid
10C Bonus	One month gross payroll, in case of profit being declared by enterprise	All employees entitled to annual bonus of one month gross salary
Gratuity	30 days wages for each completed year of service of the employee after 6 months of regular employment to be paid by the employer at the time of end of service of the employee	All employees

138. *A difficult operating environment is created by the absence of an effective regulatory mechanism, a weak administrative capacity, prevalent corruption and a plethora of taxes* besides those mentioned above, such as mining and quarrying laws, district and local government rulings and taxes, General Sales Taxes (GST),[32] professional taxes and others. In such an environment costs for compliance remain undocumented to a great extent and go unrecognized by the client agencies. Because of the use of the lowest bid selection procedures, such costs are not recovered through the standard overheads and profits used by client agencies in their project estimates and consequently, the progress and quality are likely to suffer.

3.5 Purchase Price Review

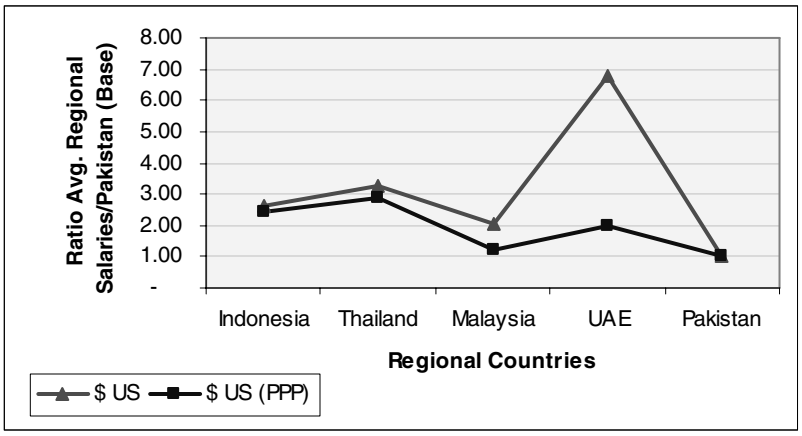
139. A comparative analysis of the cost of materials, construction inputs and technical services across the region can help in better understanding the various dimensions of the infrastructure construction industry and help in analyzing common perceptions regarding the disparity in "cost of doing business," reasons for migration of technical, skilled and unskilled personnel to regional countries, quality of construction and other similar issues.

[32] GST is to be collected from suppliers, however in the construction industry most materials and carriage suppliers are a part of the undocumented economy, and ST becomes a direct overhead cost for the contractor.

140. An analysis[33] to assess the relative differences in professional salary structures, cost of construction inputs across regional countries and the contractors working (unit) rates was carried out. Indonesia, Malaysia, Thailand and the UAE were selected from the region as comparators with Pakistan due to sustained and significant growth in their infrastructure sector over the recent past and also their ability to attract a large number of international construction and consulting firms. For Pakistan, current market prices for basic materials, professional staff salaries and unit construction costs based on the prevailing schedule of rates with applicable premiums were used. For regional countries, average current market prices were obtained through consultants and contractors working in these countries. The cost data in local currencies was converted to US dollars ($) using prevalent exchange rates. Further analysis was carried out on US$ Purchase Power Parity (PPP) basis. Conversions to US$ (PPP) were made using the factors provided in the "World Bank Development Indicators, 2005".

141. *Professional salaries are 2-3 times lower in Pakistan than what is offered by regional competitors thus making it hard for Pakistan to retain its engineers, construction workers and consultants who can earn substantially higher wages in the regional market.* The advantages for Pakistani professionals seeking employment overseas are obvious, especially for the skilled and unskilled labor class working in the UAE market which gives them salaries in US dollars that are 5 to 8 times higher than the local rates. In most employment contracts overseas, in addition to salaries the staff is provided, housing and food allowances are also given; thus the major portion of earnings are saved and remitted to Pakistan. Considering Pakistan as a base, the salary multipliers in US$ are twice higher in Malaysia, thrice in Indonesia and Thailand and about 7 times higher in the UAE. However in terms of US$ (PPP), the multipliers vary from 1.22 for Malaysia, 2.0 in UAE, 2.42 in Indonesia and 2.90 times in Thailand (refer Chart 9).

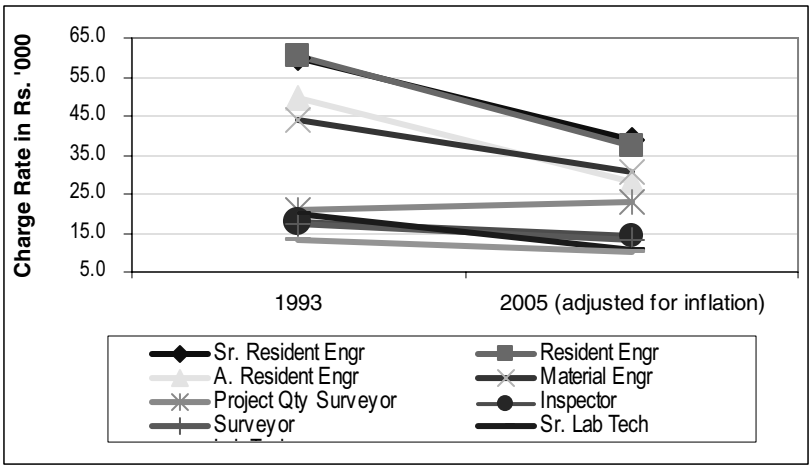
Chart 10: Comparative Salaries in Pakistan and Regional Countries



142. *Supervisory personnel in Pakistan commanded significantly lower charge rates in real terms (when adjusted for inflation) in 2005 as compared with rates during 1993 and 1995* (refer Chart 10). The effectively decreasing charge rates and salary levels over the past decade confirm accentuates the trend of professionals seeking more lucrative jobs in the overseas market. The brain-drain experienced in the past is expected to continue unabated in the short to medium term unless, market forces and policy interventions correct the prevailing salary structure for professionals.

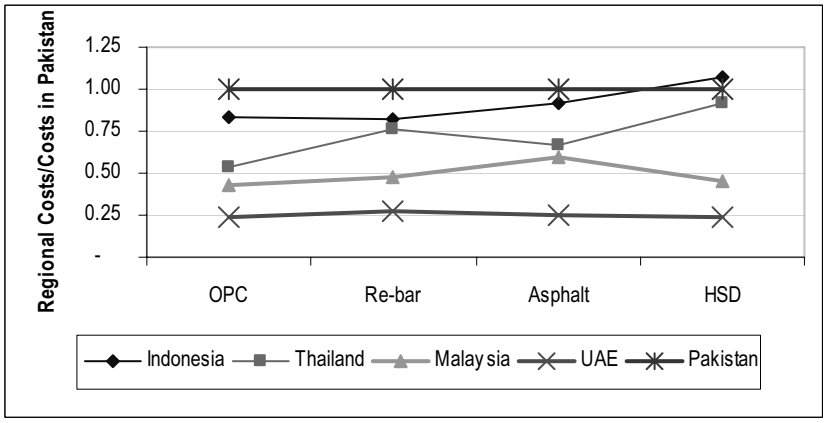
[33] For details refer Technical Note 5: 'Purchase Price Review in Infrastructure Industry'

Chart 11: Average Monthly Charge Rates for Supervisory Staff in Pakistan



143. One of the reasons for low wages suggested in discussions with stakeholders was that the construction and consultancy rates in Pakistan were too low. It is therefore, of interest to compare the cost of basic materials, and the unit rates of construction items in the region. *In US$ terms, cost of basic materials are lower in the region as compared to Pakistan and are generally, 75 to 90 percent of the costs in Pakistan.* A comparison, on the basis of PPP shows that market cost of construction materials in Pakistan are not only the highest in the region, but compared to the UAE, the cost of basic materials is 3 to 4 times higher in Pakistan (refer Chart 11). This indicates a need for planners to review in detail the cost structure of construction materials and see how the basic costs can be made more competitive.

Chart 12: Relative Regional Material Costs US$ (PPP)



144. A comparison of unit rates shows that *the relative contractors' unit item rates in US$ (PPP) are by far the lowest in the UAE and the highest in Indonesia.* As in the case of cost of basic material inputs in US$ (PPP), the unit item rates for Pakistan in US$ (PPP) are also observed to be generally higher as compared to the regional rates. (refer Chart12).

145. The composition of unit item rates for selected items in Pakistan, consists of the cost of skilled and unskilled labor which contributes to about 1~8 percent of the contractors' rate, materials 17~78 percent and equipment 12~60 percent, depending upon the item being analyzed. Overheads (including cost of engineering staff) and profits are normally taken as 20 percent of

the cost of inputs (materials, labor and equipment).[34] Chart 13 illustrates the breakup for a few major items used in road works. The chart shows that in all items except for granular soil, the major cost component is materials, while granular soil needs extensive machinery inputs.

Chart 13: Relative Regional Contractors Item Rates/Unit US$ (PPP)

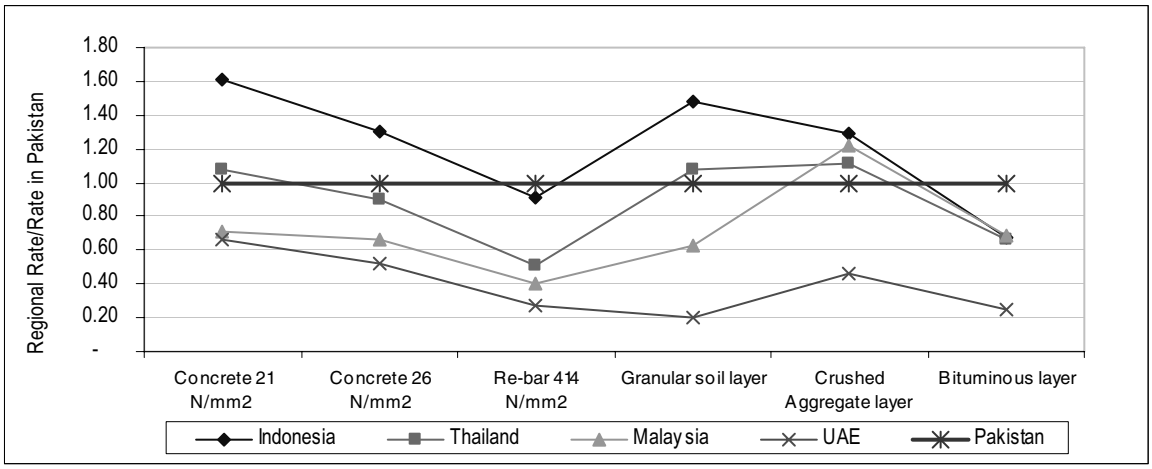
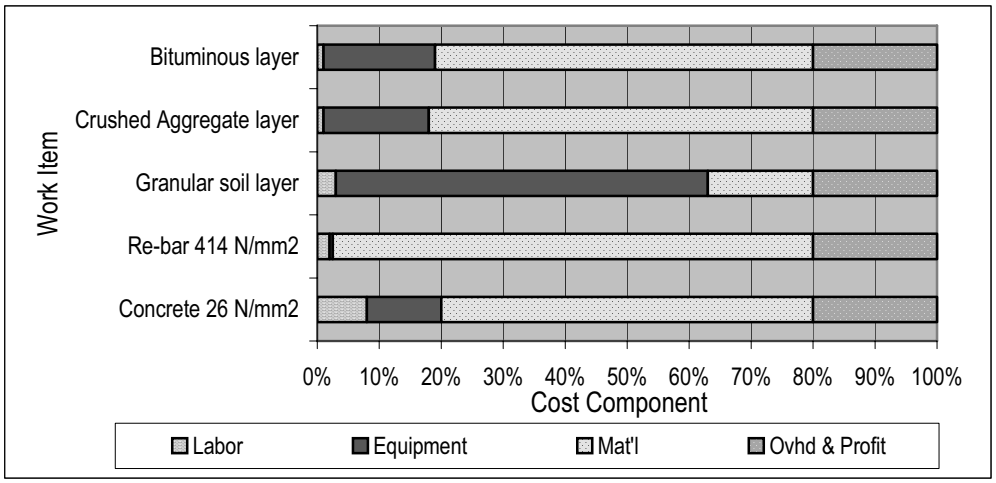


Chart 14: Typical Composition of Contractor's Rates in Pakistan



146. The major portion of a contractor's rate is the cost of materials and machinery. Considering that basic cost of materials, including the cost of fuel is about 200 percent higher as compared to other countries, the contractors' unit rates in Pakistan in US$ (PPP) terms may not actually be as high as they seem. Although the professional salaries in Pakistan are on an average 2 to 3 times lower than the salaries offered in regional countries, these do not contribute as significantly and would have less of an impact on the total rate of an item. The rates in fact could therefore, be considered to be quite competitive. However, when adverse effects of other variables like old, inefficient equipment, systematic weaknesses and inefficiencies, corruption, transparency issues are also considered, the rates despite being "competitive" may well in fact be unworkable. The contention that rates are low and do not allow for profits and for providing better salaries to professionals and workers may very well be true, but for all the wrong reasons!

[34] Source: "Composite Schedule of Rates", NHA, 2005

3.6 A Review of Allocations and Expenditures in the Public Sector

147. One of the factors contributing to delays in project completion, as cited in the literature review and also highlighted in the first focus group discussions, was the apparent mismatch between planned project funding requirements, the budgetary allocations, and the actual release of funds and expenditures. A review of the allocations and expenditures in the public sector was therefore, carried out to gain insight into the Pakistan economy, its budgetary process and structure, and its allocations and expenditures in the previous PSDP.[35]

148. *The planning, programming, budgeting and managing processes are flawed.* The analysis of federal PSDPs and the provincial ADPs for the periods 2000-01 thru 2005-06, for major infrastructure sector projects (water, power, roads and irrigation) shows that the number of projects in hand are much greater than the funds available for allocation. This implies large throw-forwards for projects each financial year, as is also evident from the large number of projects accumulated in the portfolio.

149. *Too many projects are taken up simultaneously with limited resources resulting in a mismatch between the planned completion of projects and the funding made available.* In effect, projects are programmed to be delayed. For example, in the roads sector, where projects are typically planned to be completed within 2 to 3 years, the average allocations per year for federal projects are 17 percent of the cost of projects, which implies a completion period of 6 years. For provincial projects, the average annual allocations are about 9 percent of the cost implying a completion period of almost 11 years. Similarly, for the irrigation and power sectors, the completion time of projects based on annual allocation of funds was found to be 18 years (refer Table 3). Unavailability of funds as required cause delays in completion of projects, and such delays obviously have an associated cost effect.

Table 3: Average Cost of Infrastructure Projects, Annual Allocations and Years to Complete

Sector/Province	No. of Projects	Average Cost (Rs/mil)	Average Allocation (Rs/mil)	Allocation as Percent of Cost	Years to Complete
Roads					
Federal	184	4148	717	17.3	5.8
Punjab	653	415	35	8.3	12.0
Sindh	742	191	14	7.4	13.6
NWFP	743	117	11	9.8	10.2
Balochistan	1229	56	12	21.9	4.6
All Provinces	3367	153	14	8.8	11.3
Federal + Provinces	3551	376	48	12.8	7.8
Irrigation & power					
Federal	182	12977	704	5.4	18.4
Punjab	549	264	9	3.2	30.8
Sindh	133	90	8	9.3	10.7
NWFP	253	408	19	4.7	21.2
Balochistan	471	20	6	29.7	3.4
All Provinces	1406	184	10	5.6	17.9
Federal + Provinces	1588	1650	90	5.4	18.4

150. *Portfolio management is impossible or difficult at best, when funds are not available for*

[35] For details refer Technical Note 6: 'A Review of Allocations and Expenditures in the Public Sector'

the number of projects taken on board. Quality of projects at entry, reliable cost estimates and allocations to match the project scheduled completion times are essential. Allocations and expenditures reviewed for the period show that out of more than 5,000 projects in the 4 years' PSDPs and ADPs, there were only 744 projects which had both allocations and expenditures. Certain projects received additional allocations even at the expense of other "planned" projects, possibly due to political interferences.

151. While there were many projects which showed expenditures greater than the funds allocated.[36] There were several projects which had been allocated funds but incurred no expenditures at all, similarly there were projects where no allocations were made but had incurred expenditures (refer Tables 4, 5 and 6).

Table 4: Summary of Over and Under Spending

Province	Roads		Irrigation		Railways		Ports	
	2002-03	2003-04	2002-03	2003-04	2002-03	2003-04	2002-03	2003-04
Federal	+	+	+	+	+	+	+	+
Punjab	(-)	(-)	(-)	(-)				
Sindh	Na	(-)	Na	na				
NWFP	(-)	+	+	+				
Balochistan	=	=	=	(-)				

+ Expenditure more than allocation (-) Expenditure less than allocation
= Expenditure equal to allocation na Not Available

Table 5: Projects with Allocations and No Expenditure

Year	Sector	No. of Projects	Cost Rs/million	Allocation Rs/million	Expend Rs/million
2002-03	Roads	118	32034	2787	0
	Irrigation & Power	75	11508	4994	0
	Total	**193**	**43542**	**7781**	**0**
2003-04	Roads	198	18820	2779	0
	Irrigation & Power	85	24800	2385	0
	Total	**283**	**43620**	**5164**	**0**

152. *Besides a mismatch of plans and allocations made, the funds were found to be mostly released during the last quarter of a financial year.* In the water sector (which includes irrigation and power) for instance, the percentage utilization of PSDP allocations did not exceed 50 percent in the first three quarters of 2005-2006. As a result more money was released to projects during the last quarter of 2005-2006, than the first three quarters put together. The provincial data for Balochistan, for the years 2000 through 2005, shows that except for 2001-2002, the Government

[36] Out of 744 projects, 174 had expenditures less than allocations, 248 equal to allocations and 322 had expenditures substantially higher than allocations. This result is likely because the analysis focused on on-going projects, and expenditures made on closed projects and carried over liabilities, and also due to re-allocations made which have not been reflected in the PSDPs and ADPs reviewed.

of Balochistan (GoB) had released 100 percent of its share of project allocation each year. In contrast, the federal government provided only 20 to 70 percent of its share in any given year. Projects are bound to be delayed when funds are not made available when needed.

Table 6: Projects with Expenditures but without Allocations

Year	Sector	Province	No. of Projects	Cost Rs/million	Allocation Rs/million	Expenditure Rs/million
2002-03	Roads	Federal	4	19411	0	1653
		Punjab	1	10	0	1
	Irrigation & Power	Federal	16	131404	0	9949
		Punjab	2	0	0	25
	Railways	Federal	1	11291	0	2275
		Total	**24**	**162116**	**0**	**13903**
2003-04	Roads	Federal	19	24028	0	4106
		Punjab	5	50	0	150
	Irrigation & Power	Federal	27	216838	0	70672
		Punjab	6	517	0	114
	Railways	Federal	2	0	0	113
		Total	**59**	**241434**	**0**	**75156**

153. *The analysis shows that even at current levels of PSDP, the portfolio of projects is clearly not manageable, with too many projects and too little funding*.

154. The MTDF envisages a total and an overall national PSDP expenditure on infrastructure of Rs2162 billion. The annual phasing of the overall PSDP was in the range of Rs272 billion during 2005-06, to Rs597 billion during 2009-10. This is almost six times the average PSDP over the past three years. Besides the PSDP, projects undertaken through public-private sector partnerships and private sector financing are estimated to cost an additional Rs554 billion in the Power and Transport & Communications (T&C) sectors alone. In addition, there are other emerging infrastructure programs that are required to respond to the rapidly developing economy, and were not entirely included in the MTDF (2005). 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, which alone requires substantial investments over and above the MTDF. Clearly, delivery of the projects planned under the MTDF will be a challenge given the current institutional capacities of the government stakeholders.

3.7 Demand Supply Gaps

155. Shortage of manpower emerged as a significant theme when studying the implementation capacity of large infrastructure projects in Pakistan. Stakeholders (clients, consultants and contractors) in the first focus group identified the lack of suitably qualified and trained people in their organizations as an impediment to both successful implementation as well as the quality of the products and services they deliver. In addition, shortages in availability of key materials such as cement, bitumen, steel and machinery are perceived to be greatly affecting the growth of the construction industry. It is thus important to quantify the HR gap within the construction industry, both in absolute numbers and skills deficiencies and the gaps in materials and machinery, given the enlarged infrastructure construction program planned during the next few years under the MTDF. Have the planners and policy makers catered for these pre-requisites in the MTDF? This is the question that has to be addressed.

3.7.1 Materials and Equipment

156. A detailed assessment of demand supply gaps[37] for construction materials (cement, asphalt and steel) determined from past project requirements for the roads and water/irrigation sector, the future development plans provided in the MTDF and the estimated available resources, concludes that *there is an acute shortage of key material inputs*. The gap between demand and supply is expected to further increase as exports to regional countries increase and projects as described earlier which are not wholly included in the MTDF are started.

3.7.1.1 Demand Supply Gaps in Asphalt (Bitumen)

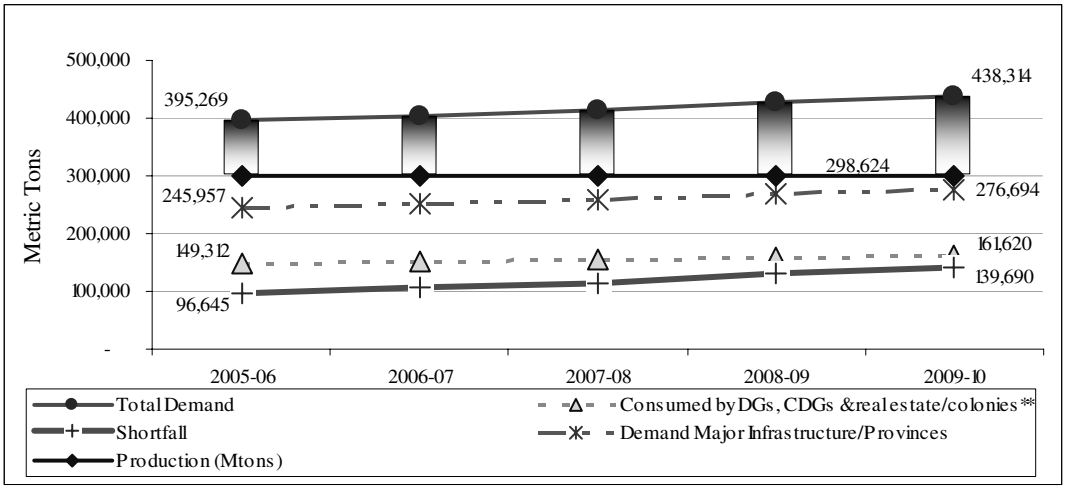
157. Local production is expected to remain at around 299,000 metric tons (MT) while the total asphalt requirement is estimated to be between 395,000 MT during 2005, and expected to increase to 438,000 MT by 2010. Of the total estimated demand, asphalt requirements for infrastructure projects under the federal and provincial governments over the next five years are estimated to vary from approximately 246,000 MT during 2005-06, to approximately 277,000 MT during 2009-10. In addition, other stakeholders such as city district governments, the housing sectors, township developers and others are estimated to require between 150,000 to 160,000 MT during the 2005 and 2010 period. The demand supply gap is estimated to be between 96,000 to 140,000 MT per year over the next five years (refer Chart 14).

158. The shortage of bitumen is reported to have already become a foremost issue with several on-going projects suffering delays because of the non-availability of bitumen for road works in the country.[38] Availability of asphalt could be further affected as exports to Afghanistan increase during the coming years.

[37] For details refer Technical Note 7: 'Demand Supply Gap Analysis'

[38] APCA is reported to be engaged in formal talks with the Federal Minister for Communications, FBR and other concerned departments to address the crisis situation in bitumen supplies. A proposal has been submitted to allow import of bitumen from all countries including India, and to reduce the duties and tariffs to control the price. Cost of local bitumen is Rs23,000/MT while imported is Rs30,760/MT – Monthly Construction Review, July 2007.

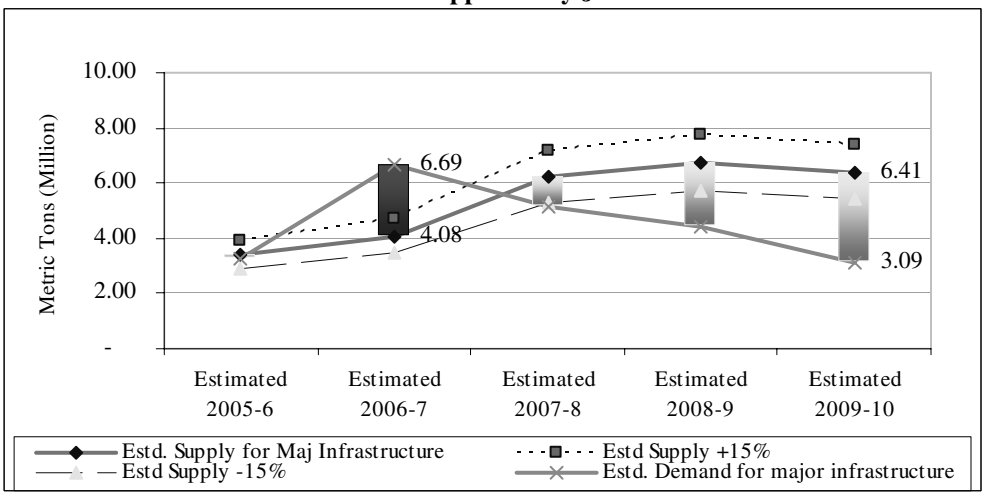
Chart 15: Estimated Demand Supply Gaps in Asphalt



3.7.1.2 Cement Availability Doubtful unless Capacity Expansion Programs Materialize

159. The country produces about 23 million MT of cement of which about 10 percent is exported. According to industry estimates,[39] out of the remaining amount, 60 percent is consumed by the housing sector, 20 percent by the industrial sector, and the rest is available for public sector projects. Cement demand for the major infrastructure projects under the MTDF is expected to range between 3.3 million MT to 6.7 million MT per year over the next five years, with the highest demand during 2006-07.[40] Local availability of cement for the projects has been estimated at about 3.4 to 4.0 million MT per year. This projected availability does not account for the increase in demand over the years from other competing sectors such as housing, which are likely to experience enhanced growth rates and any increased demands from projects in Afghanistan. Though capacity enhancement has been planned over the next few years in the industry (42 million MT installed capacity by 2009), nevertheless, the import of cement is likely in the short term of around 2 to 3 million MT to meet the increase in demand.

Chart 16: Cement Supplies May Just be Sufficient

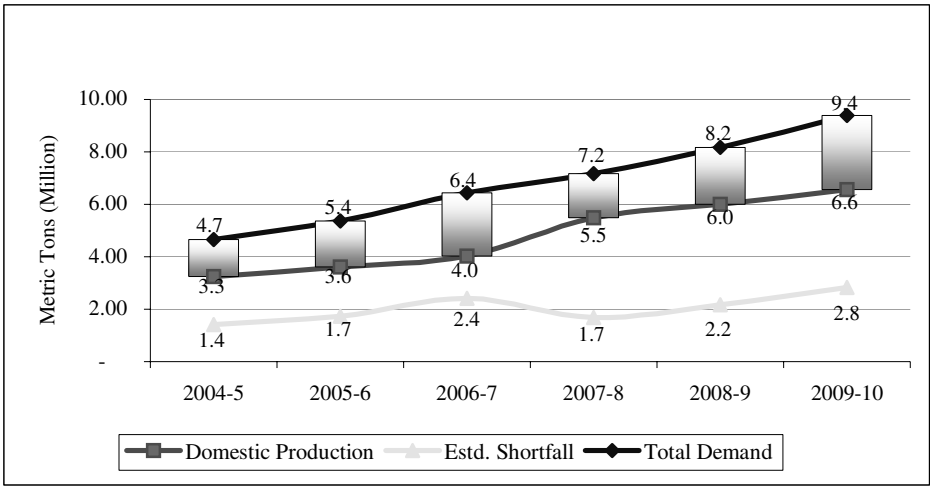


[39] Source: Lucky Cement Pvt. Ltd.,
[40] Expected primarily due to earthquake reconstruction activities

3.7.1.3 Supply of Quality Billets and Overall Steel Shortage a Serious Concern

160. The gap between domestic production and demand, and the availability of quality billets for producing reinforcement bars appears to be of concern. Total consumption in Pakistan was estimated at 4.7 million MT during 2004-05, with Pakistan Steel Mills (PSM) producing about 1 million MT of quality steel, while the other local re-rolling and smelting mills (which use imported scrap) produce about 2.3 million MT of steel. The balance requirement of 1.4 million MT is met through imports. The estimated import requirement for steel over the MTDF period varies between 2 million MT during 2006-07 to 3.0 million MT during 2009-10.

Chart 17: Steel Production will not cope with the Demand



161. Besides, the overall shortage of locally produced steel products, the main concern for the construction industry is with respect to the production of quality rolled billets and long products. The PSM produces about 0.3 million MT of steel billets while the demand for long products was about 2.5 million MT in 2004-05.

3.7.1.4 Availability of Construction Equipment

162. The government agencies, clients, PEC or the trade associations like All Pakistan Contractors Association (APCA) do not compile any statistics on the existing machinery pool. Due to the absence of relevant data, the available resources in the country could not be ascertained. The equipment pool however was determined[41] to comprise mostly used (12 to 15 years old) equipment, requiring a high degree of maintenance and hence having lower productivity.

163. An anomaly exists in the registration requirements for construction machinery and equipment as no records are maintained on the make, type, and model of construction equipment. Self propelled construction equipment is classified as a Heavy Transport Vehicle (HTV), and then as a "truck" since no further sub classification for equipment machinery exists, for example, a dumper-truck or a bull-dozer would be classified simply as "truck". No mechanism exists for

[41] 76 percent of the stakeholders surveyed reported their equipment to be imported and in used condition, actual age of equipment would therefore, be more.

capturing further details in the current processes. The various motor vehicle registration authorities use their own discretion for classification of vehicles which can lead to delays and corrupt practices.

164. Considering the development plans in the MTDF, an estimated 16,000 pieces of heavy construction equipment and 56,000 trucks would be needed. It is likely, that there would be a need to import a significant number of new, efficient construction equipment to meet the requirements.[42] Liberal import policies along with leasing and financing facilities and the availability of equipment (new and used) in neighboring international markets including China, Japan, Korea and the UAE should enable any shortfall to be easily met.

165. This is assuming that companies procuring equipment foresee a reasonable certainty of their continued use in the long term, and policies facilitate import by being simple and responsive to the needs of the industry. The planned infrastructure projects and the projected overall growth over the next five years provide reasonable certainty of a continued need for machinery and this demand should encourage imports by the industry.

3.7.2 Gaps in Human Resources

166. Given the perceptions of the stakeholders regarding a critical shortage of adequately qualified and trained HR in the industry, it is important to estimate the gaps and gain an appreciation of the scale of the problem. Manpower requirements of the construction industry can broadly be categorized as comprising:

- Professionals who are graduate or associate engineers[43] (planners, project managers, design engineers, supervision engineers, and other staff)
- Technical and vocational, comprising skilled workers of various trades (surveyors, laboratory technicians, steel fixers, machine operators, electricians, mechanics, among others)
- Administrative staff who provide essential back-office support
- Unskilled labor

Demand-supply gaps were identified through estimates of available professionals and vocational staff and those required for undertaking the planned MTDF projects[44].

3.7.2.1 Estimated HR Requirements for the MTDF

167. An estimate of the HR needed to undertake the projects planned under the MTDF were derived based on typical patterns of staffing required to design and supervise similar infrastructure projects. Approximately 7,700 engineers, 62,000 skilled workers, 140,000 unskilled workers and about 1,000 administrative support staff would be needed for projects in the roads, water, irrigation sectors[45] and for the earthquake reconstruction activities alone (refer

[42] For the purpose of analysis, construction equipment was classified as heavy equipment and trucks. "Heavy equipment" comprises of dozers, mechanical shovels, graders, cranes, excavators, crushers and batching plants etc. "Trucks" comprise of dumpers, transit mixers, bowzers etc.

[43] Graduate engineers have an engineering degree; associate engineers have a three years diploma after matriculation.

[44] For details refer Technical Note 7: 'Demand Supply Gap Analysis'

[45] Projects taken in the analysis were from roads, water and irrigation sectors (dams, canals, barrages, etc).

Table 7). The peak requirement is expected during 2006-07 and 2007-08, when the earthquake reconstruction work will be in full swing.

Table 7: Professionals Required - Roads, Water, Irrigation Sectors and Earthquake Reconstruction

	2005-06	2006-07	2007-08	2008-09	2009-10
Engineers/Associate Engineers	5,315	7,678	7,117	7,043	5,645
Skilled Workers	13,287	62,281	49,447	29,463	22,016
Unskilled Workers	69,094	140,305	133,366	106,351	83,245
Administrative Staff	886	1,107	1,133	1,213	967
Totals	**88,582**	**211,371**	**191,063**	**144,070**	**111,873**

3.7.2.2 Estimated Available Professionals, Skilled Manpower and Gaps

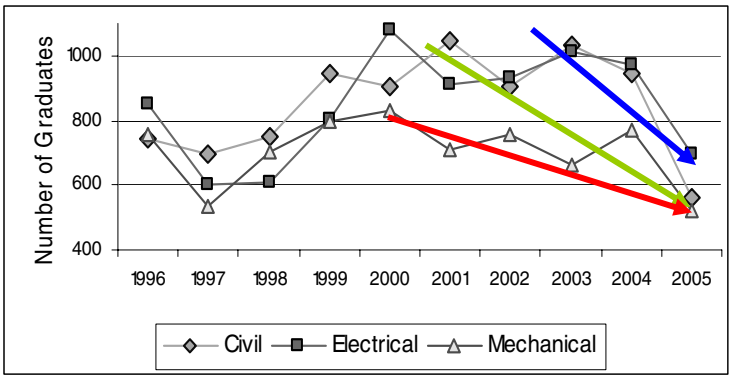
168. The HR available for the planned major infrastructure projects are dependent upon the professionals being trained each year, the numbers emigrating overseas for employment, numbers leaving or retiring from the profession and the demand made on available manpower resources from other competing sectors.

Table 8: Registered Engineers (up to April 2007)

Discipline	Total Registered	Valid Registrations
Civil	25941	19433
Electrical	22170	14645
Mechanical	19581	12983
Chemical	6069	4008
Electronics	8273	5775
Metallurgy	1919	1056
Agriculture	2518	1395
Aeronautical	991	652
Mining	1079	620
Petroleum	716	461
Telecommunications	375	365
Industrial	660	456
Textile	198	178
Biomedical	199	189
Computer Sciences	4075	3346
Others	106	101
Total ====>	**94870**	**65663**

169. Availability of engineering staff is especially of importance considering the key role played by them in planning and delivering infrastructure. Since, it is mandatory for engineers to register with the PEC in order to practice within the country, the PEC registrations may be taken as indicative of the total engineers produced in the country over the years (refer Table 8). Of the approximately 66,000 actively registered engineers, nearly 47,000 or 72 percent are from the three major disciplines of civil, mechanical and electrical engineering. There are about 19,500 civil engineers, who are of particular importance for assessing capacity to deliver the planned infrastructure projects.

Chart 18: Declining Number of Engineers



170. *Numbers of engineers being produced in the country show a steep downward trend* as shown in Chart 17. The country was producing approximately 900 civil engineers each year during 1999 to 2004, however, the numbers dropped sharply to about 560 engineers during 2005. A similar trend is seen in the other engineering disciplines. This may be attributed to the past

slump in infrastructure sector in the country and a simultaneous interest and world-wide demand in electronics, computer sciences and the service sectors. This may have prompted a significant shift in the focus of new entrants to universities, the results of which becomes evident after 4 years in 2005.

171. It may be assumed that this change in trend is likely to continue for the next 5 years, even if it shifts again towards civil engineering considering the current boom in the construction industry within the country and in the region as a whole.

172. *A significant amount of qualified manpower emigrates from Pakistan each year* as approximately 950 engineers went abroad for employment during 2005, which is almost 38 percent of all graduating engineers.[46] Total number of engineers emigrated is reported to be 23,000 (refer Table 9). The latest emigration figures for the six-month period from January to June 2007, shows an even more alarmingly situation with 975 engineers emigrating overseas. If this trend continues almost 1,800 engineers would have immigrated overseas during 2007, or almost 70 percent of the numbers produced in 2005.

Table 9: Professionals Proceeding Overseas for Employment

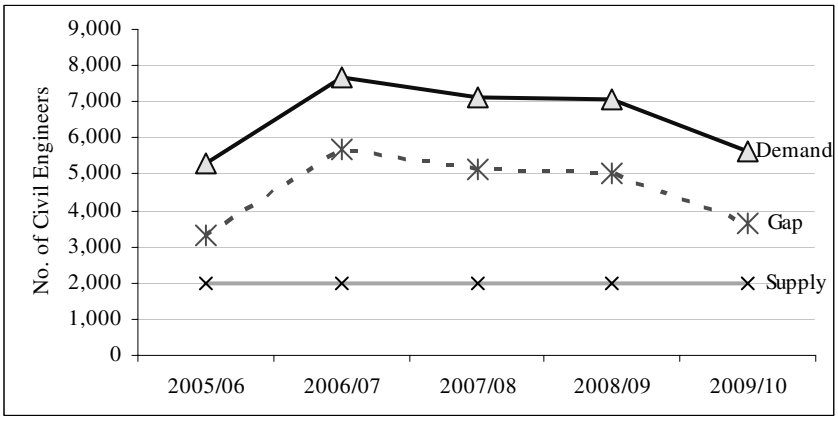
Sr. No.	Categories	Year						Total	Estimated Jan-June 2007
		1971-2000	2001	2002	2003	2004	2005		
1	Engineer	18,338	1,227	861	821	880	951	23,078	975
2	Welder	31,103	1,237	1,545	3,263	1,770	1,435	40,353	1,706
3	Foremen	31,528	884	1,147	1,964	1,544	1,522	38,589	1,631
4	Mason	218,229	11,083	11,312	16,415	13,645	9,685	280,369	11,851
5	Carpenter	151,112	7,304	9,954	13,355	11,231	8,027	200,983	8,495
6	Electrician	97,623	4,718	6,570	8,614	6,024	4,201	127,750	5,400
7	Plumber	42,067	2,412	3,517	4,760	2,944	1,581	57,281	2,421
8	Steel Fixer	84,786	4,674	6,273	8,760	6,680	4,935	116,108	4,908
9	Painter	58,327	3,032	3,146	4,995	3,233	2,516	75,249	3,181
10	Technician	95,569	6,229	9,366	12,719	10,250	8,651	142,784	6,035
11	Mechanic	81,820	3,169	4,142	6,358	4,406	3,705	103,600	4,379
12	Cable worker	2,932	35	96	50	70	78	3,261	138
13	Driver	267,078	18,467	17,984	21,182	14,830	11,626	351,167	14,843
14	Operator	32,966	1,504	2,433	3,707	1,829	3,709	46,148	1,951
15	Surveyor	5,769	163	183	237	185	128	6,665	282
16	Fitter	13,737	884	974	1,475	1,141	1,547	19,758	835
17	Programmer	1,523	583	404	354	371	443	3,678	155
18	Designer	327	181	277	564	104	46	1,499	63
19	Rigger	1,144	277	74	97	156	118	1,866	79
20	Draftsman	847	106	62	594	113	63	1,785	75
Total Professional and Skilled		1,236,825	68,169	80,320	110,284	81,406	64,967	1,641,971	69,404
21	Laborers	1,104,353	41,074	46,726	73,318	66,650	54,735	1,386,856	58,621
	Total Emigrated	2,341,178	109,243	127,046	183,602	148,056	119,702	3,028,827	128,025

Source: Bureau of Emigration and Overseas Employment

[46] Approximately 2,500 engineers registered in all disciplines with the PEC during 2005

173. *Taking into account emigration, competing jobs from other sectors such as housing, industry and manufacturing, and from small infrastructure projects, the net available pool of civil engineers for large infrastructure projects is estimated to be approximately 2,000 only.*[47] The demand-supply gaps for civil engineers are estimated to be between 3,000 to 5,000 engineers during the MTDF period, as shown in Chart 18.

Chart 19: Civil Engineers are in Short Supply



174. Similar proportionate shortages of adequately skilled workers and civil diploma holders have been reported by the industry stakeholders'. The emigration statistics show that each year on average 60,000 trained workers, foremen, surveyors, quantity surveyors, technicians and others find jobs overseas and this trend is clearly increasing each year. Assuming a typical four year contract, even if half of them return each year, a significant number of skilled workmen are still proceeding abroad each year. The total number of workers trained each year in technical and vocational institutes in related fields is estimated to be around 75,000,[48] while the demand for skilled workers for the selected MTDF projects alone is estimated at 60,000. It is clear, that there are significant gaps in demand and supply of technical manpower.

175. Besides the numbers, the skills of the available cadre of civil engineers and workers are of concern. Stakeholders have identified deficient training arrangements and a mismatch between education curriculum and required job skills as the primary issue in HR. The shortage of required skills and personnel can be attributed to shortage of quality institutions, poorly qualified technical training staff and non-competitive compensation.[49]

176. Increasing construction activity in the regional countries continues to draw skilled

[47] Out of 19,500 civil engineers, 10 percent are assumed to be not available in the work force (due to emigration, deaths, and women engineers who may not pursue a career after marriage). Of the remaining 18,000, 2/3rd are assumed to be employed in other sectors not related to infrastructure (such as housing, manufacturing and industries) leaving 5,000 to 6,000 for infrastructure works of all types. Out of these, 2/3rd are estimated to be engaged on the much larger portfolio of small projects, leaving a balance of approximately 2,000 engineers for large infrastructure.

[48] Source NAVTEC: There are 1,522 technical and vocational training institutions having approximately 300,000 students. 25 percent or about 75,000 estimated to be in related fields each year.

[49] NAVTEC survey, 2006, reports that courses need to be aligned with market needs, there is a lack of market data, wide gap between institutions and industry needs, low enrollment and completion rates, 10~30 percent teachers are under qualified, capacity, quality and governance issues in institutions, and low quality of output.

workers and engineers from the available pool of adequately qualified HR. It can be therefore, concluded that the critical shortage of skilled staff will continue over the next few years.

3.7.3 Major Challenges for Planning and Policy Makers

177. Having established that demand-supply gaps exist in construction materials, equipment and HR, there are clearly numerous challenges to deliver the planned infrastructure projects under the MTDF. The resource gaps in materials and equipment can be comparatively more easily addressed through appropriate policies and planning in the short to medium term, however, the real issue to manage would be the HR related constraint.

3.8 International Case Studies –The United Arab Emirates (UAE), China and Malaysia

178. Several regional countries were considered for carrying out international case studies to learn from their experiences in developing large infrastructure including Malaysia, China and the UAE. Due to time constraints, only the UAE could be taken up for a detailed review, however, the team did benefit greatly from the case studies on the construction industry of Malaysia, China and France. These were carried out as part of the study on the Indian Road Construction Industry.[50]

179. The selection of the UAE as a case study was due to the fact that it is one of the countries in the region that has had rapid success in scaling up infrastructure in a short period of time. Also, the GoP is seeking to attract participation of investors from the UAE into domestic infrastructure projects. The study[51] also briefly considers the potential impact of the infrastructure development boom in the UAE on the Pakistan infrastructure implementation capacity in terms of competition for skilled resources viz. consulting firms and construction services.

180. Dubai, proved to be an interesting choice for a case study, and the lessons learnt help understand why the often exemplified process of rapid development in Dubai cannot be applied in Pakistan. But at the same time, it showed what can be done to perhaps attract international consulting and construction firms to Pakistan. The UAE economy has benefited from an outward-oriented development strategy, based on an open trade regime and unrestricted capital outflows, a deregulated and competitive business environment with low taxes, a well-developed physical and institutional infrastructure and a relatively open and unrestricted labor market, which has resulted in an impressive economic growth and diversification of the UAE's economy. Particularly in the case of infrastructure project implementation, key success factors in the UAE include:

- High commitment from the government and effective decision making
- High liquidity due to "petrodollars," therefore, availability of finances
- Relatively well defined strategy and action plan
- Pace of implementation due to effective organization and project management

[50]" Indian Road Construction Industry, Demand & Supply Issues, Constraints on Capacity, Enhancement & Recommendations" (Draft), The World Bank, 2007.
[51] For details refer Technical Note 8: International Case Studies – The UAE, China and Malaysia

181. The study points out that while government agencies and private sector in the UAE have been very successful in implementing various large projects in the past, however, capacity constraints are becoming evident in construction and infrastructure implementation due to the very large size and scale of projects envisaged for completion over the coming years. Therefore, as in the case of other regions with expanding demand but constrained capacity, the way forward is likely to be an increasing focus on private sector participation as well as on newer models and formats in which the projects will be implemented.

182. Valuable insight was gained at a workshop held in Dubai with key players in infrastructure development which included construction and consulting firms, financial institutions and Dubai Municipality officers.[52] Dubai being a principality can be considered to be run as a "country with one Chief Executive Officer (CEO)." The CEO with absolute powers has a clear vision of what he wants, "a state of the art, world class, development" and operates in a command and control environment like one big company. The will of the CEO is translated directly through the government machinery, there is no compromise on quality and it is a delivery-oriented driven system.

183. The key to attracting interest in the development works was stated to be the approach of "clustering of development projects" where projects have to satisfy a diverse set of interests, and relying on "demonstration effect," as it was envisaged that success shall breed success. For example, the Jebel-e-Ali project served as a key to attracting new developers. These three factors, such as CEO with absolute powers, clustering of projects and the demonstration effect provided the impetus for rapid growth in Dubai. Success of a few major initial projects and the credibility established as an overall fair system, with an absence of even small scale corruption, ensured that liquidity of finance roaming the world was attracted to Dubai along with professional management and entrepreneurship.

184. If the two factors – of clustering projects and depending on demonstrating viability of planned projects coupled with continuity of policies is ensured; then mega development projects would ensure interest from qualified developers and investors.

185. Lessons from Dubai include what is different and would not work in Pakistan such as:

- Absolute monarchy – single ownership
- Land and sea created as Dubai's owner's resources. For example, land acquisition procedures in Pakistan do not allow "directives" to be implemented as in the case of Dubai
- No personal or corporate taxes
- Supply-side economics - no project finance is provided by financial institutions, except in real estate. The government of Dubai provides complete project financing. The government borrows on its books for public sector projects as it considers itself as efficient as the private sector
- No subsidies to the poor, however, health or education facilities are taken care of by the state as only 15 percent of the population of Dubai are nationals.

[52] Final discussions held on 15th March 2007, at International Finance Corporation (IFC) with: Mr. Ramesh Murthy, Head of Project finance, Mashreq Bank; Abhimanyu Jalan, Partner (Legal), Clyde & Co.; Wale Shonibare, Director, KPMG; M. Mohiuddin, Director, ETA Ascon; Supriya Sen, Chief Investment Officer, Fortune Private Equity; Chiragh Shah, Director Strategy/Business Development, Dubai International Financial Centre (DIFC); Ajay Malik, Investment Officer, IFC; Hussein Lootah, Acting Director, Dubai Municipality

- No accountability for project failures. As the project managers have complete freedom to "deliver," the outcome of failure requires sacking of the project managers and failures have to be rectified as soon as possible. There are no extra contractual watch-dogs
- No accountability for investment, but transparency is maintained

186. Although, Dubai has developed a strategic plan up to 2015, this does not imply that public infrastructure development has been fully planned. Master Plans are visionary and living documents. There are numerous examples where infrastructure put in place is deemed outdated and replaced as may be required. Emphasis is on implementation and administrative capacity through professional project management. Box 5 summarizes the lessons learnt about infrastructure delivery in the UAE and the anticipated challenges.

187. In the case of countries like Pakistan, given the international contractor's traditional concerns such as country perceptions, security, inherent competitiveness disadvantage vis-à-vis local contractors, domestic preference clause, and the relatively small size of contract packages, transparency issues and corruption, the local regulatory laws as well as client's project management quality, the contractors came up with responses that the returns in Pakistan's construction and infrastructure sector would have to be much better than comparable projects available in the region. Hence it is envisaged that given the apparent capacity constraints faced by local contractors and the large volume of projects, projects in Pakistan would have to be more attractive financially with substantial risk mitigation policies to gather sufficient international investor and construction industry interest.

188. The experiences of Malaysia, China, and the UAE helped in understanding the processes involved in developing the capacity to undertake large scale infrastructure projects. Common lessons are that a strategic long-term vision and integrated master plan; ensured funding; sustained efforts to build up required human capital; and providing an enabling environment for local as well as international consultants, contractors and investors to work in the country proved successful. Strong government support in terms of HR development; streamlining procedures, policies and regulations; supporting trade associations; facilitating timely payments; and enacting reforms through appropriate legislation in financial sectors to encourage lending for infrastructure are essential. Policies have to be kept under constant review to face the new challenges for infrastructure development due to the ongoing massive development in the region.

189. All key elements of the industry must be planned for, developed and coordinated. Such as manpower, materials, plant and equipment, technology, finance and management. Global trends are towards closer integration of construction activities and smart partnering among stakeholders through design build contracts, turnkey projects, BOT contracts, private financing initiatives and public-private partnership arrangements. The summary of development processes in the regional countries is shown in Table 10.

Box 5: Lessons from the UAE

A closer look at the UAE reveals what policies and regulatory frameworks have enabled it to implement large infrastructure projects, such as airports and metro. The UAE is a suitable country for comparison to Pakistan as it is located in the region and furthermore Pakistan is actively seeking investors from the UAE to participate in infrastructure projects. The construction sector in the UAE is booming both in the infrastructure and real estate developments. *Rapid increase in demand has exerted pressure on the availability of materials, labor and capacity for project implementation.*

The *public sector in the UAE is an atypical one as it acts like corporate business house which rewards its mangers and provides incentives like the private sector.* And more importantly markets are allowed to function with limited price interventions and distortions. In comparison to other regional countries the public sector in the UAE has a greater capacity to plan and assess infrastructure works. Better quality in output and performance is demanded and enforced by the client. *The Government enhances its capacity by liberally employing foreign technical advisors.*

In planning infrastructure projects the UAE government has prioritized transport infrastructure based on current trends and future projections. Projects are designed and deliberated based on data and latest software tools. Furthermore, the *financing of these large projects are done through appropriate and innovative financial structures that include funding agreements and financial models adapted to the unique capital, investment and real estate market. Historically, most projects have been self financed or through public funds but increasingly the government realizes the benefits of partnering with the private sector.* Given the rapid rate of infrastructure development, market liquidity is a concern which can be addressed through longer-term debt maturities. An upcoming avenue of financing is Islamic bonds (for example *Ijrah* facility- an Islamic compliant leasing agreement), however these remain under utilized due to the inadequacy of capital markets. Other developments on the financial side include financing through Japanese banks and the mix of long and short-term loans.

The biggest bottleneck however remains the availability of contractors and skilled engineers and professionals. Even though infrastructure development has been mushrooming, the supply of professional contractors has remained static. As a result many tenders made through the traditional procurement methods do not attract sufficient bids. *Capacity constraints are felt all along the supply chain.* Subcontracting services along with material prices have consistently been on the rise. *Given excess demand for consulting and contracting services, clients have developed new contract and procurement arrangements to overcome supply constraints and mitigate price and quality risk.* Some examples of these new contracts include advance payment arrangements and guaranteed maximum price instead of the traditional fixed price, lump-sum model. Both negotiated and partnering contracts are being employed. Due to improved opportunities, new entrants from the Far East, Europe and S. America have also entered the market.

Present regulatory laws prefer local investors to foreigners. As concerns the regulatory environment, *key success factors include high commitment from the government, high liquidity due to petro-dollars, well defined overall strategy cum action plan and comparatively better pace of implementation and project management.* However, in order to partner with the private sector greater transparency, less government involvement and political disruption along with legislation protecting foreign direct investment, which guarantees repatriation of funds is necessary. Lastly, means for providing better project and financial information will help further boost the industry.

Table 10: Lessons from Regional Countries

Group	China	Malaysia	UAE
Planning	• Develop a good effective master plan for an integrated highway network and link it through regular economic plans. Master plan developed with consultation through international experts, research institutions, academics and line agencies and kept updated. • Ensure that the plan formulation involves all stakeholders (provincial governments) as they are responsible for administrating the construction process. • National level integration of all plans	• Develop a good, integrated master plan for infrastructure development. • Master plan provides a framework for the private sector to plan business development and investment	• Development of an integrated master plan, kept updated • Mega development projects planned for the long term
Funding	• Moved from relying exclusively on investment by the central, provincial, and local governments, to funds provided with interest, bank loans and other financing mechanisms. • Adopted "build with a loan and repay through charging tolls" policy • Tolling rights are transferable • Banking sector reforms carried out to facilitate loans for infrastructure • Established special fund for infrastructure construction through state bonds • Encouraging private sector investment in infrastructure	• Initially through government funding, and switched to private sector when financial crisis hit the Asian economies. • Moved to BOT • Currently all three forms are used, State, BOT and private sector investment	• State funding - The Dubai government provides complete project financing. The government borrows on its books for public sector projects as it considers itself as efficient as the private sector. • Self financing arranged by CAA, RTA and others through banks and consortiums • Banks give loans against contracts, Bonds being used to raise finance • Mix of long and short-term loans and bond financing on recent infrastructure projects.
Policy	• Implement policies to facilitate implementation of plan.	• Recognize required changes in policy and implement changes to support the implementation of the overall plan.	• Policies in place to facilitate infrastructure development, policies under constant review to ensure meeting new challenges for development
Land Acquisition	• Green field development is the fastest and most productive method of constructing a new national network due to the lack of interference from existing network. Land is considered nationally owned, acquisition not a problem.	• Green field development was found to be the most advantageous with the least social problems. • Land acquisition completed before start of project	• Land acquisition is not a problem being a Kingdom, however, essentially green field development taking place.
Building Highway Industry Capacity	• International consultants and contractors brought advanced technology, improved project management techniques and modern, high tech equipment. International staff responsible for management and technical expertise, JVs formed. • Ten years of capacity building 1988-1998 through sustained investment in development and proactive support • Supply chain was improved through institutional reform and privatization initiatives, smaller companies taken along in the development process • Training of professionals, operators and technicians through foreign equipment manufacturers at overseas facilities and through on the job training with foreign collaboration • Moving from imported machinery to local manufacturing though joint ventures and licensing • Long term plans and commitment instilled confidence • Materials and equipment supply company set up	• Use the international highway construction community for guidance, technology transfer and capacity building – 1980's through late 1990s. • Active support for development of construction industry infrastructure and supply chains • Divide large projects into appropriate packages to allow smaller domestic contractors the opportunity to subcontract and build supply chain. • Sustained development has built capacity Training of professionals, operators and technicians through foreign equipment manufacturers at overseas facilities and through on the job training with foreign collaboration • Plant hire companies established in the private sector	• Older equipment is difficult to import • custom duty on equipment 0 to 5% maximum • Leasing of equipment available • No personal or corporate taxes • Sustained development plans • Reliance on international professionals, skilled workers and labor. • Project management consultants engaged

Group	China	Malaysia	UAE
Regulations and Legislation	• Central ministry of construction as regulator • Developed appropriate regulations and legislation to support and enable the development of the industry and for overall policies to be implemented. • Develop clear and transparent regulations for industry. • 1998 -Construction Law enacted covering procurement, delivery of works, supervision, safety and quality, procedures etc., • 2003 – Procurement rules for bidding and tendering introduced • Credit guaranty system for small and medium enterprises set up to facilitate financing - special industrial and technological bonding companies set up to encourage banks to lend to the sector • Appropriate agencies are established to administer policies. • State owned enterprises function as corporations and commercial undertakings, politically independent. • Allowed foreign stakeholders to own shares in domestically owned enterprises including state owned enterprises • BOT regulations are weak and need to be strengthened	• Establish one government organization to administer regulations. Must have dialogue with industry. • Established the Malaysian Highway Authority specifically to manage the expressway program. • Accountability and management is clearly designated • Develop regulations but these should not be too cumbersome. • Private Management Act introduced in 1981 for BOT and private sector financing • CIDB set up as regulatory body in 1996 • Set up Human Resources Development Fund through legislation (PSMB Act) in 2001– Demand driven training and re-training grants for the industry, promote and stimulate manpower training, domestic or overseas	• Road and Transport Authority regulate the industry – only one trade license required. • No personal or corporate taxes • Role limited to hiring of consultants and contractors • Department of quality assurance to monitor quality • Cost escalation clause being introduced to reduce risk • 51% local ownership of all foreign companies • Minimum wages enforced • Flexible labor policy • Free trade zones
Trade Associations	• Support and encourage the growth of trade associations. Ensure open dialogue with government. Encourage self regulation by industry. • Establish one trade organization (or group of associations) to be voice of industry. • Inputs from trade associations while forming policies	• Trade associations encouraged and supported to build the capacity of the industry through training, seminars, international symposiums, and advice • Encouraged self regulation & sharing of information within the industry • One trade organization developed as main voice	
Procurement – Design Build, Turnkey, BOT and alternative contract arrangements for operation and maintenance	• Transparent bidding procedures , FIDIC adopted • BOT not too successful because of the lack of an adequate legal framework. 60% of expressway toll roads built and managed by provincial governments, the rest 40% built either through BOT or by provincial governments and then given to concessionaire to operate and maintain. • Government wants to buy back concessions to reduce tolls. • Moving to increase design-build/turnkey procurement • Be open to different contract arrangements. Currently exploring Private Financing Initiatives.	• FIDIC adopted • From traditional bidding, to BOT/concessions and back to BOQ based bidding. • BOT was used extensively but now believe that the change from totally public to totally private was too fast. • Criticism about the "irritation" of tolls by the public • Experimenting with Private Financing Initiatives	• For state projects FIDIC used • Contracts are not standardized across public and private sectors. • Pre and post qualification both are used • Normally lowest evaluated bid procedure • Traditional procurement methods are attracting fewer bidder, negotiated contracts and partnering arrangements being pushed as well as design build and turnkey contracts
Dispute Resolution	• Adjudicators and DRB followed by Arbitration. Not normally a problem due to team approach. Vital to complete projects with minimal delay. • Team approach to resolving problems at site level and no delays in issuing instructions, Site staff has authority to make decisions, no second guessing by others. • Decisions of adjudicators/DRBs are normally respected	• Historically not a problem but a new adjudication act is being considered. • Project level staff makes on site decisions to avoid delay in project addition to asset base • Team approach to resolving problems	FIDIC clauses followed

Table 10 continued

3.9 Local Case Studies – Systematic Constraints

190. Local case studies[53] for projects in different sectors helped document the bottlenecks which occurred during various processes involved in construction of infrastructure projects. Identifying such processes enabled a better understanding of the capacity constraints in planning, design, programming, procurement, contract administration, financing and budgeting, execution and other stages in a project life-cycle. The case studies also helped validate the feedback regarding capacity constraints obtained from the first focus group discussions.

191. The final selection of projects consisted of two highway projects, a motorway project, a port dredging project and an international airport project. Documentation related to each project was obtained from the concerned implementing agencies which included project background information, history, current progress reports, reasons for delays, time extensions and others. All projects were delayed by several years incurring large variations in cost and claims. The issues faced by the stakeholders in these projects were typical and representative of the projects planning, design and implementation experience in Pakistan.

192. The case studies clearly demonstrate the presence of deep-rooted systematic problems related primarily to procurement, lack of planning and inadequate financing and funding for projects. During implementation, lack of institutional capacity to make timely decisions and arrange timely payments to contractors was a major constraint. Problematic areas identified from the case studies include:

- Inadequate client capacity to plan, procure, program, administer and manage projects
- Imbalanced conditions of contract
- Flawed procurement procedures (pre-qualification, bid evaluation, negotiations and re-negotiations with the lowest bidder) causing major delays
- Mismatched project funding needs and actual availability of funds
- Commencement of projects without ensuring that required funds and financing arrangements are in place
- Delay in making running payments
- Insufficient time given for detailed design and subsequent variations in contract due to inadequacies in design
- Poor and inefficient dispute resolution mechanisms
- Problems in land acquisition
- Limitations in available local resources
- Limited capacity of local contractors
- Poor international bid response in mega projects

3.10 Response to International & Local Bids

193. One of the concerns expressed in discussions with stakeholders was the poor response to recent tenders under both International Competitive Bidding (ICB) and Local Competitive Bidding (LCB) procurement procedures. As a measure of the level of interest from international and local contractors on infrastructure works in the country, response to recent tenders was

[53] For details refer Technical Note 9: 'Local Case Studies'

analyzed.[54] The evaluation helped understand the possible underlying reasons for the lack of participation by international contractors and the limited response by the local industry to the current construction demands.

194. ADB started Road Sector Development projects in all four provinces in 2005-06 which included contracts to be awarded under both ICB and LCB procedures. The response to tenders was found to be poor from international companies for projects in all four provinces of Pakistan. Although tendering was open to both international and local companies, most companies that submitted bids have been local. Across the four provinces, bids were won in all cases by companies that bid the lowest. There was minimum weightage on evaluation of the technical capacity of the lowest bidder.

195. In Balochistan, there were two ICB contracts tendered, out of 9 pre-qualified bidders, only 6 collected bidding documents. For the first package only three bids were received, while for the second package five bids were received. Only one foreign contractor participated in joint venture with a local firm and work was awarded to a local contractor who had bid the lowest price in both contracts.

196. Under the Asian Development Bank (ADB) Punjab Road Sector Development Project, two projects were prepared. For the first project, comprising three packages, bidding was open to pre-qualified large local firms and international contractors. However, only 3 out of 6 international firms collected bidding documents. All three submitted bids and each of the three firms were subsequently awarded one package of works each.

197. For the second project, comprising four packages, eight international and local firms were pre-qualified. Even for this project, the response remained dismal. For packages 1, 3 and 4, only two bids were received (one local and one Chinese firm), while for package 2, only one bid was received. Three of the contracts were won by the Chinese contractor and the fourth by a local contractor, all being awarded on the basis of the lowest cost bid.

198. For contracts of lower value which do not qualify for international tendering under the thresholds set by the ADB,[55] local contractors had responded and submitted bids in the first round of tendering during 2005. However, for the works offered during early 2006, the response as ascertained from Sindh and Balochistan reveals that there is a poor response from contractors. In several cases, contracts had to be re-advertised as bid prices received were higher than the estimates by up to 35 percent.

199. The poor bid response from both local and international contractors in Punjab was most unexpected since it has a comparatively risk free environment as compared to the other three provinces. From the data, it can be inferred that there is either limited interest from companies both local and international, to bid for projects in Pakistan or there are capacity constraints in the industry. The high level of construction activity in regional countries and the negative country image could be a factor for the poor response from international firms. Since very few local firms qualified for participation in the ICB tenders, generally the same limited pool of four or five companies repeatedly bid for projects across the country, and the lowest bidder always wins the contract.

[54] For details refer Technical Note 10: 'Response to International and Local Bids'
[55] LCB procedures are adopted for contracts of estimated cost < US$ 3 million

200. A lack of response to bids and the high prices being quoted can be considered as indicators of supply and demand gaps. The contractors' capacity to do work is being tested by the current market situation, where there is ample work and the contractors are in a position to choose the works they are really interested in. In such circumstances, the short-term implications are clear – contractors will demand high premiums for less attractive work and response to bids for work in difficult remote areas with higher risks shall remain especially poor. In a market driven economy, it will take some time until the demand-supply situation achieves stability, while for the short term, the clients will be faced with accepting higher bid rates in order to deliver upon their development goals and also accept the risk that the limited pool of contractors may not be able to deliver.

3.11 Focus Group Discussions

201. Consultations with stakeholders (federal and provincial government representatives and the major clients, contractors and consultants) were made an essential and integral part of the study methodology, and feedback through focus group discussions was obtained at all critical stages.[56] The objectives of the focus group discussions were to ensure stakeholders active participation and ownership in the study; to obtain concurrence on the framework for the study and the technical analyses to be carried out; get feedback on findings and achieve consensus on the way forward.

202. A total of four focus group discussions were held. The first focus group discussion identified the issues and broad themes for the study. Consensus was reached on the areas which should be researched in the assessment of infrastructure implementation capacity. The issues identified formed the basis of developing a detailed questionnaire which was implemented by Gallup Pakistan. In the second focus group meeting, the preliminary results of the literature review, stakeholders' survey and technical analyses were presented to representatives from the government, findings and the way forward were discussed and written comments and suggestions solicited. The third and fourth focus group meetings were held with consultants and contractors respectively, to solicit their views and comments on the findings.

203. *Generally a lack of confidence within clients, contractors and consultants existed in terms of the existing capacity of stakeholders to deliver the planned infrastructure under the MTDF.* The open discussions with the stakeholders validated the results obtained from the perceptions surveys and the technical analyses, and concurred with the complex issues and challenges faced by the construction industry.

"In this day and age, if we don't like to "change" and rise to the emerging trends and challenges, than we expose our selves to becoming "irrelevant." This is true in consultancy as well, but it is not irrelevant to the client either. A lack of policy and vision to support our own institutions has resulted in a lack of capacity. So much so that we are sitting here and pondering the question whether or not, Pakistan has the capacity to handle its own large infrastructure projects," said a participant in one of the focus group meetings.

204. While valuable suggestions encompassing a wide ranging "reforms agenda" were provided in the focus group discussions, which can remove a number of constraints faced by the industry, there were no solutions offered which could be implemented to provide increased

[56] For details see, Technical Note 11: 'Focus Group Discussions'

capacity over the short-term period, as the systematic weaknesses in the business environment, a lack of adequately skilled HR, limitations of client agencies capacity, absence of financing and credit available to the industry and other constraints cannot be addressed within an immediate or short-term time frame. One of the focus group participants highlighted the complexity of the issues as:

"What plagues Pakistan above all is lack of respect for law. Despite presence of rules, these are not followed. Decisions to cut short systems and procedures for quick fix and ad hoc solutions results in the absence of a sound monitoring mechanism; this has produced a culture relying on uneducated, ad hoc and in a number of cases corrupt approach to deal with development projects. The result is a non-professional output. Our capacity to undertake numerous projects particularly of large magnitude is, therefore, limited and needs to be supplemented."

205. However, resolving such issues is critical for enhancing local capacity and strengthening the industry. The lead has to be provided by the government through appropriate demand side interventions. A long-term commitment from the government for sustained development of the construction industry by pursuing policies which address the specific needs of the industry and promote growth, is essential.

206. Clearly, besides taking measures to develop the local construction industry, innovative methods of procurement and delivery mechanisms will need to be considered in order to meet all of the MTDF infrastructure development goals.

4 FINDINGS – TAKING STOCK

207. Developing infrastructure requires more than just allocating finances. It requires vision, strategic planning, human and physical resources, complementary institutions and a conducive business environment. There is no doubt that infrastructure investments will pave the path for future growth and poverty reduction in Pakistan. In order to ensure that the GoP meets its MTDF goals and delivers on the much needed major infrastructure, it must take stock of the current bottlenecks and pay heed to the concerns of the stakeholders. In fact it just might need a major reengineering of the traditional construction industry processes employed by GoP to deliver mega projects.

Table 11: GDP Growth and Construction Sectors Share

Country	GDP Growth (%) 2005	Construction Sector's Share in GDP (%)
India	8.8	7
China	10.2	6
Pakistan	6.2	2
Malaysia	5.2	3
UAE	8.4	7
Singapore	6.6	4
Indonesia	5.6	6
Bangladesh	6.7	8
France	1.2	6

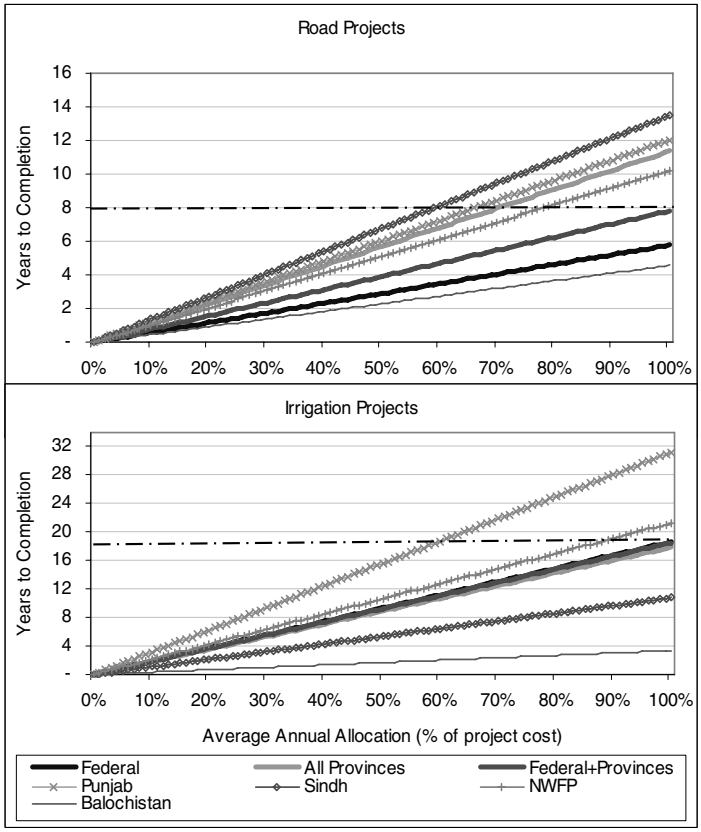
208. A vibrant, efficient construction industry can be a significant contributor to economic growth and development. Pakistan's construction sector has been contributing not more than 2 percent to the Gross Domestic Product (GDP) while, in other regional countries the industry contributes 5 to 10 percent or more to the GDP. The sector has often been used to stimulate economic activity in countries because of the numerous forward and backward industry linkages. In Malaysia, for example, during the financial crisis during the late 1990s, the construction sector was used to jump-start the economy through demand-side interventions. The sector has been clearly neglected and remains underdeveloped in Pakistan and sector inefficiencies are costing the economy dearly.

209. The government plans a sizeable amount of investments in infrastructure over the next decade; MTDF envisages a total investment of Rs2162 billion for federal PSDP. This planned PSDP expenditure during 2005-2010, is roughly three times the development expenditure during 2000-2005. Rs993.2 billion (or nearly half of the PSDP for 2005-10) will be invested in the improvement of physical infrastructure alone, compared to an investment of about Rs278 billion during the past five years. An additional Rs405 billion investment in roads, airports, ports and power projects is expected from public and the private sector. However, it is believed that *industry stakeholders will be unable to deliver without institutionalizing reforms.*

4.1 Bottlenecks faced by Pakistan's Stakeholders in the Construction Industry

210. The major gaps lie in the ability of the government to plan for the long-term and implement such plans and appropriately budget for the projects taken up in the development portfolios. The allocation of funds is not made as required for timely completion of the projects and funds that are allocated are not released by the federal government or by the provincial finance departments as per the requirements of the project implementation schedules. Most funds allocated to a project are released in the last quarter of the financial year. Federal and provincial allocation rates for projects have been low enough to imply an average completion time of 6 and 12 years for road projects, respectively, and 18 years for irrigation projects (refer Figure 19).

Figure 19: Average Completion time for Projects



211. In addition, the client agencies are weak and lack capacity in procurement, project administration and management of their own sectoral portfolios and projects. Resulting in delays in decisions, payments made to consultants and contractors and rampant interruptions in overall projects implementation.

212. Contractors also suffer from a lack of professional management, and access to credit and financing. They often operate equipment and machinery which is old, with inadequately trained operators resulting in low productivity. There are demand-supply gaps in construction material resources and the industry has to face rapid escalation in prices which is not adequately compensated for, or in many cases with no compensation at all. Similarly, consulting firms are weak and lack the required technical skills to take on major infrastructure projects, are poorly compensated for intellectual inputs, and are given unrealistic time to carry out detailed designs which results in sub-optimal designs and incorrect cost estimates. Both contractors and consultants have to accept contracts which are biased towards the clients and also face unfair competition from state-owned enterprises and parastatal firms. This distorts market competitiveness and hampers private sector growth. The industry suffers from a shortage of adequately qualified, trained professionals and skilled HR at all levels and amongst all stakeholders. A continuous brain-drain of qualified personnel to regional countries exacerbates the demand-supply gaps in human resources.

213. Given the current status of the industry, the stakeholders will most likely fail to deliver. Constraints are rooted in deficient regulations and a restrictive business environment. Current policies and regulations have created fundamental structural impediments that are a powerful barrier to entry and cause severe market distortion. The delivery system stifles process innovation and motivation to improve and invest in HR development, instead the systems and the environment they create actively foster inefficiency and corruption. Capacity problems are compounded by shortages and quality of factor inputs and uncontrolled price escalation and supply shortages are a reality of doing business. The gap between demand and supply for quality inputs is steadily growing. Table 12, shows the main constraints identified from perception surveys, validated through technical analyses and focus group discussions and their impact on the industry.

214. The government as a client and policy maker is the most effective “change-agent”. The government’s dominant role should be to create and maintain a conducive business environment,

act as a facilitator and provide for sustained investment in development. But achieving better value is ultimately a shared responsibility for which the governments, clients, contractors and consultants have to work in partnership. Development is a continuous process for which concurrent work on short-term and long-term reforms is essential.

Table 12: Constraints and Impacts on the Industry

Constraints	Impact
Business Environment	
Inadequate planning, project preparation and portfolio management Inefficient procurement practices and imbalanced contracts Weak contractor and consultant capacity	• More projects are approved than funds available; results in slow and mismatched release of funds, insufficient time provided for detailed planning and design, resulting in poor quality and incorrect estimates • Lack of transparency and corruption, delays in procurement • Restricts investment in institutional growth and development because of -Incorrect project cost estimates -poor rates due to least cost based award criteria -Complex and time consuming prequalification system -Inequitable tendering -Price based bid evaluation -Costly guarantee requirements -Disproportionate risk and responsibility placed on the contractors/consultants with little or no accommodation for arbitration, escalation etc. -Lack of standardization -Weak enforcement • Poor project management and control, low efficiency • Lack of quality control in design and construction • Poor work environment
Weak client implementation capacity	• Flawed project design, delay in project roll-out • Lack of clarity about conditions of contract and interpretation of specifications • Delayed payments to service providers • Delayed settlement of disputes; corruption
Lack of financial facilities	• Impeded cash flows resulting in delayed progress because of -Insufficient mobilization advance from clients and early/rapid deductions against advances -Costly guarantee instruments; reliable insurance guarantees not available and those available, generally unacceptable to clients -Highly collateralized and costly credit facilities for working capital and term finance; limited or non existent facilities for lease and purchase of equipment
Use of public sector companies	• Special concessions to public sector firms distort competition and discourage private sector firms from investing in building capacity
Weak Regulatory Framework	
Underdeveloped and weak institutions	• Slow development of the industry; no institution dedicated to the development of the industry -PEC's role is limited to employment of qualified engineers by contractors/consultants -Low quality of construction output and frequent delays and cost over-runs
Lack of technical knowledge of auditors	• Delays in audits are common, create an opportunity for corruption

Complex and time consuming reporting requirements	• Entry barriers for incorporation of companies
Tax regime	• Impedes cash flow • No incentive for development of corporate structures • Lack of proper books of account by the industry
Multiple enlistment /registration requirements	• Varying criteria and costly fees are a drain on cash flow and create market distortion
Weak dispute resolution mechanisms	• No recourse for speedy resolution of issues
Incompatible government and Lender regulations	• Lack of coordination, delays in procurement and funding, conflict in country law and Lender stipulations
Complicated and costly bonding/ guarantee requirements	High cost of doing business: bid bonds (2-5 percent), performance bonds (5-10 percent), retention money (up to 10 percent); mobilization advance bank guarantee (equal to amount of advance; 20 to 25 percent) - interest charged on advance are an upfront cost that distorts competition and creates an un necessary barrier to entry for consultants and contractors
Weak client institutions	• Delayed payments restrict cash flows
Corruption and lack of transparency	• Estimated at between 10 to 15+ percent of contract value, corruption has a major impact on quality and productivity. Estimated US$1.6 to 2.3 billion loss in the infrastructure component of MTDF.
Human Resources	
No integrated human resources planning; low caliber of available human resources and lack of quality training & educational facilities; poor work environment; inadequate salaries and unclear career paths	• Shortage of adequately qualified professionals and trained personnel at all levels • Brain Drain
Equipment & Machinery	
Affordability; machinery not available at the right price and underdeveloped rental lease market; duties and taxes are not rationalized; registration system flawed	• Ageing equipment pool with very low productivity, average age 14+ years; statistics on equipment and machinery available in the market are not compiled.
Shortage of spare parts; lack of qualified maintenance facilities and operators	• Low productivity and high machinery down times
Construction Materials	
Uncontrolled escalation and market instability; lack of current data on prices	• Sharp rise in project cost and greater business risk
Multiple quarry regulations	• Create artificial and temporary shortage and delay implementation
High and increasing transportation costs	• Increasing and uncompensated cost of inputs
Substandard quality of materials	• Low quality of construction outputs
Uncertain supply of key inputs	• Shortages in bitumen, cement and quality steel

215. The common thread apparent from the surveys and analytical work conducted is the ubiquitous shortage of professionals and skilled HR at all levels. Low quality of HR available to clients is limiting their capacity to plan and implement quality infrastructure projects in an efficient and timely manner. Consulting and contracting services also suffer from HR constraints, which restrict the quality of output delivered. Poor project management results in rampant delays and financial leakages. These, coupled with a poor business environment and regulatory framework further exacerbates capacity problems. In order to overcome these challenges and meet the targets that the GoP has set for itself in the coming years, it is crucial that institutional reforms geared at improving the business and regulatory environment coupled with eliminating resource constraints faced in terms of human, financial and physical resources are put in place and innovative approaches for implementation of mega projects are adopted.

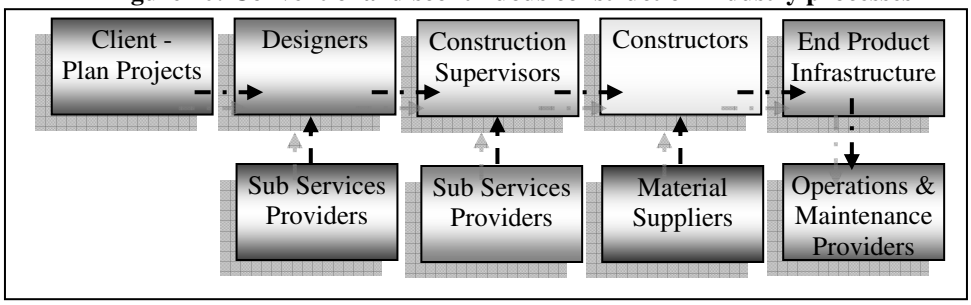
216. While thinking about immediate solutions the team realized from all the stakeholder interactions, the perception surveys, and the team's own analytical approach, that the delivery of large infrastructure is constrained by the traditional relationships and processes. This is precisely why when solutions were offered by the stakeholders, these were geared towards solving the business environment for each of the three traditional players by addressing the rules and regulations that govern their inter-relationships rather than focusing on delivering the end product efficiently within time and cost.

4.2 Conventional industry relationships and processes are the real bottlenecks

217. If Pakistan wants to deliver on the planned critical mega infrastructure, there is an urgent need to re-engineer the construction industry and the processes typically followed in delivering such mega projects. Construction efficiency is presently constrained due to the segregated processes through which they are generally planned, designed, constructed, operated and maintained. These processes reflect the fragmented structure of the industry which contributes to a contractual and confrontational culture promoting inefficiencies.[57]

218. The generally sequential process adopted in the industry is due to separate teams being engaged for designing, supplying inputs, constructing and for operations and maintenance of infrastructure. This typical process is followed with the aim to minimize risks to constructors by precisely defining through specifications and contracts what each of the players in the process is supposed to do. However, this strategy is now recognized to be inefficient and does not protect well the client's interests. It acts as an effective barrier in using the skills and knowledge of suppliers and constructors effectively in the design and planning of projects. These segregated processes are illustrated in the following figure with discontinuous relationships between all players and a built in lack of ownership of the end product.

Figure 20: Conventional discontinuous construction industry processes



"Rethinking Construction", The Report of the Construction Task Force, Department of Trade and Industry, UK, 1998[57]

219. The conventional processes require procurement of a new team at each stage of the process and for every project a client implements, in the belief that selection of new designers, constructors and suppliers competitively on a least cost basis for each project provides value to the client. Contrary to this belief, repeated selection of new "teams" inhibits learning and the development of the construction industry. The team found that while current stakeholders in Pakistan's construction industry feel that the total number of contractors available is a constraint, a similar study in UK in 1998, found the reverse that rather the very large number of contractors, working in a segregated environment, is a constraint to the development of the industry.

220. Processes need to be explored which focus on delivery of the end product, especially large mega infrastructure projects at cost, in time, with quality and functionality.

5.0 RECOMMENDATIONS

221. The findings show that the challenges facing Pakistan are not any different from those faced by other developing countries. These challenges have been documented to include a lack of adequate education and training (insufficient HR); a lack of government commitment; absence of long-term vision and planning for the industry; ineffective planning and budgetary procedures; fluctuations in work load; defective contract documents; corrupt contracting procedures; a lack of protection against adverse physical conditions; delays in payments to contractors; problems of bonding and insurance; absence of adequate credit (a lack of financial resources); restrictions on imports; foreign exchange constraints; unfair competition from state-owned contractors and consultants and problems relating to availability of equipment and spare parts; delays, cost overruns and miscommunication of information (Brooksbank 2002; Fox & Skitmore 2004; Kirmani 1988; Kirmani & Baum 1991; PEC 1990; Sultan and Kajewski 2003; Ogunlana & Butt 2000; Qamar et al. 1989; The World Bank 1984, 2000, 2003, 2004, 2006a, 2006b and 2006c; and others)[58].

Box 6: Project Cost Underestimation—Global Truths!

Flyvbjerg, Holm, Buhl, "*Underestimating Costs in Public Works Projects Error or Lie?*", 2002 based on a sample of 258 transportation infrastructure projects worth US$90 billion and representing different project types, geographical regions, and historical periods, found with overwhelming statistical significance that the cost estimates used to decide whether such projects should be built are highly and systematically misleading.

- In 9 out of 10 transportation infrastructure projects, costs are underestimated.
- For rail projects, actual costs are on average 45 percent higher than estimated costs.
- For fixed-link projects (tunnels and bridges), actual costs are on average 34 percent higher than estimated costs.
- For road projects, actual costs are on average 20 percent higher than estimated costs.
- For all project types, actual costs are on average 28 percent higher than estimated costs.
- Cost underestimation exists across 20 nations and 5 continents; it appears to be a global phenomenon.
- Cost underestimation appears to be more pronounced in developing nations than in North America and Europe.
- Cost underestimation has not decreased over the past 70 years. No learning that would improve cost estimate accuracy seems to take place.
- Transportation infrastructure projects do not appear to be more prone to cost underestimation than are other types of large projects.

Underestimation cannot be explained by error and is best explained by strategic misrepresentation, which is lying. The policy implications are clear: legislators, administrators, investors, media representatives, and members of the public who value honest numbers should not trust cost estimates and cost-benefit analyses produced by project promoters and their analysts.

222. In addition, two decades old Pakistan specific papers (Ogunlana & Butt 2000; PEC, 1990; Qamar et al. 1989; The World Bank 2000, 2003, 2004, 2006a, 2006 b, 2006c) provide an insight into the Pakistan construction industry, its business environment and the problems which have persisted and recommendations put forth. Over time, some of these recommendations may

[58] For bibliography details see Technical Note 1: 'Development of the Construction Industry- A Literature Review'

have already been tried with varying degrees of success, but past efforts to initiate reforms were not adhered to, resulting in the situation being faced today.

223. The literature review shows that sustainable development of the construction sector requires a long-term commitment from the government. The impetus for change has to come from the demand-side as many of the key factors requiring significant improvement are related to the role of the government itself. Over time, the government together with other industry players will have to shift from being just an external player and move towards self improvement and taking responsibility (Fox et al. 1999; Hindle 2000). Fox et al. (2002, 2004) state that it is critical that the government looks at developing a long-term vision and policy for the industry supported by a coherent strategy that focuses on thinking and behaving the best, and institutionalizing a learning culture. In addition, other factors cited are development of techniques and technologies supporting high production performance, availability of basic resources and infrastructure and improvement in financial and HR (Fox et al. 2002, 2004; Kirmani & Baum 1991; Ofori 2002; The World Bank 1984).

224. Due to the unique and fragmented nature (Kajimo-Shakantu et al. 2004; Ofori 2002) of the industry stakeholders, a comprehensive and holistic approach is needed to bring about desired cultural change to support reforms (Kikeri et al. 2006; Kirmani 1988; Ofori 2002; PEC 1990; The World Bank 1984). Stakeholders both within and outside of the industry all have their roles to play, these include construction clients, consultants, contractors, designers, educators/trainers, government officials, professional bodies, quasi-government officials, researchers, material suppliers plant suppliers, construction lawyers, trade unions and information providers, among others (Fox et al. 1999, 2002 and 2004).

225. Amongst regional countries, development of the industry in Singapore, Malaysia and China over the past two to four decades provides a good reference on a holistic and comprehensive long-term approach to change the business environment and culture. Singapore recognized the importance of the sector and a need for continuous development through a strategy addressing HR, materials, technology, corporate development, improved documentation procedures, procurement, contracts, operating environments, payment chains, trade associations and institution building. The efficacy of a central body specifically for construction industry development in developed and developing countries is cited extensively (Kirmani 1988; Ofori 2000, 2002, 2004, 2005/2006; Widdekkara 1999 and others).

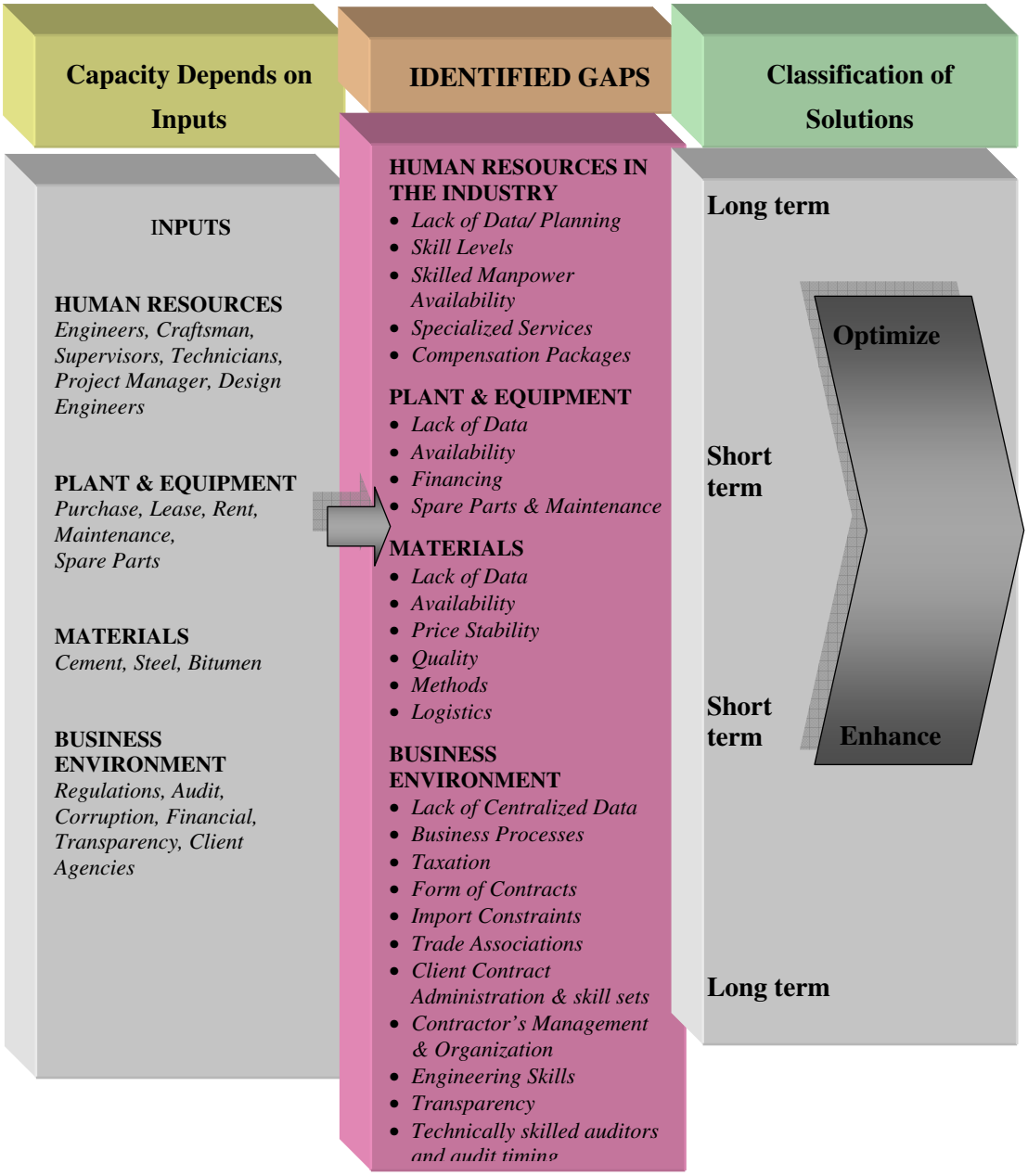
226. The Pakistan construction industry and stakeholders are well aware of the challenges faced as evidenced from the publications in PEC (1990). While issues, constraints and recommendations are also well documented in reports of Qamar et al. 1989 and the World Bank, from time to time.

227. Infrastructure development holds the key to Pakistan's future growth. The infrastructure development sector is greatly benefiting from the government's ambitious infrastructure drive but much is still required to be done to ensure that adequate capacity is available to ensure the achievement of targets set. Recognizing the enormity of the challenge, the GoP should improve infrastructure industry related policies through enhancing public-private partnerships; bringing about regulatory reform; improving upon governance and removing corruption and focusing on developing the required pool of skilled HR. Changing mindsets and improving capacity of government are tasks that require immediate attention, the way GoP conducts business and the culture of government agencies has to be modified.

228. The thrust of the current study was to assess the implementation capacity for delivering

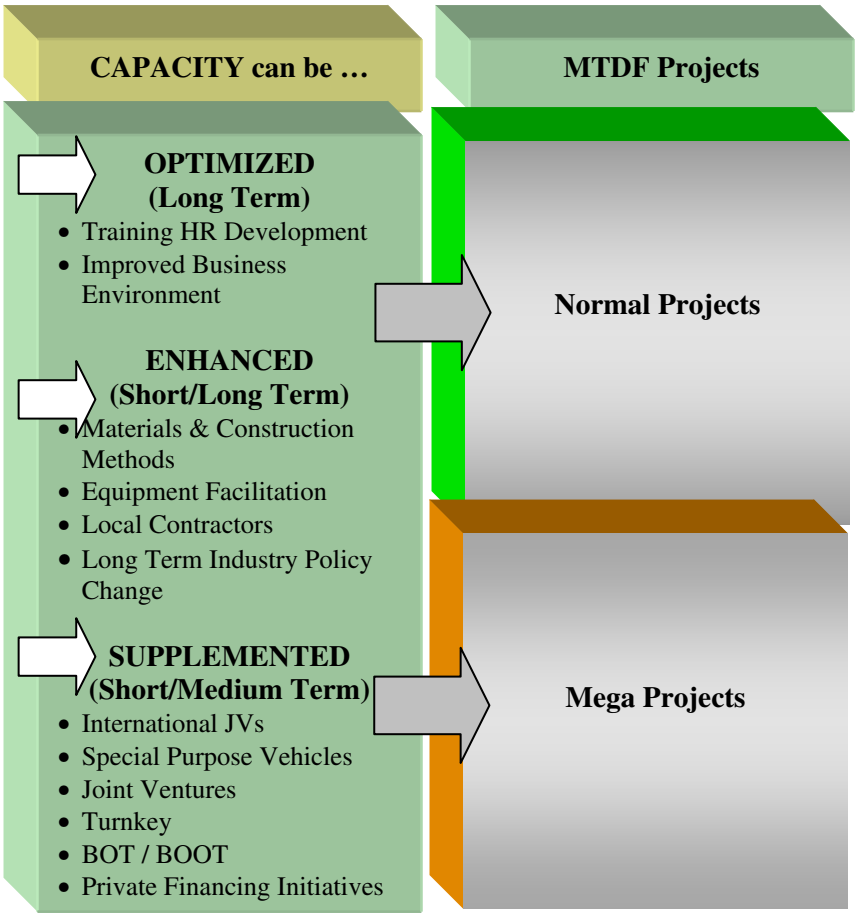
the planned large infrastructure projects. However, considering the unique nature of the industry and the supply chains involved, the large infrastructure projects cannot be viewed in complete isolation from smaller projects. The existing gaps in the quality and quantity of inputs available to the industry have to be addressed and solved to ensure delivery of both through appropriate measures. Figure 21, illustrates the four thematic areas and the identified gaps. The solutions to remedy the shortfalls can be classified as being either short-term or long-term. Short to medium term measures are needed to assist the GoP in delivery of mega projects and also contribute towards enhancing local capacity, while long-term sustained measures and committed policy and industry reforms are required to optimize and build up the capacity of the local industry over time.

Figure 21: Industry Inputs, Identified Gaps and Classification of Solutions



229. Short, medium and long-term measures would accordingly help the GoP in delivering both "normal" and mega infrastructure planned under the MTDF by optimizing, enhancing and supplementing local capacity as illustrated in Figure 22. However, given that the crunch faced is imminent, delivery of planned projects in the MTDF will remain a challenge.

Figure 22: Optimizing, Enhancing and Supplementing Capacity to Deliver Projects



230. It is clear that the GoP needs to act now to curtail market distortions and stimulate growth by carefully implementing interventions for structural change. The international case studies and the literature highlight the effectiveness of demand-side interventions and the need for a sustained long-term holistic approach for the development of the industry. The interventions can be broadly categorized as:

Policy Interventions

- Adopt long term planning at all levels
- Provide strong government support for the industry by establishing robust, high level liaison between government and industry, investing in strengthening and promoting trade associations
- Use procurement to drive behavior and improve transparency

- Policies backed with legislative and regulatory measures have to be proactively pursued to promote the use of least evaluated cost methods of procurement instead of least cost. The method of lowest bid selection is universally recognized to be the greatest barrier to improvement
- Introduce policies to develop the small to medium sized industry stakeholders as these players deliver a major portion of the actual physical works in partnership with large contractors
- Set targets, select relevant performance indicators for the construction industry and monitor and evaluate change on a continuous basis
- Improve charge rates for professional services and the construction rates in the industry
- Remove undue restrictions on import of materials and equipment
- Promote excellence in education and technical training and institutionalize linkages between academia and the industry to ensure relevance of curriculum
- Redefine the role of institutions, establish an organization dedicated for the development of construction industry in accordance with international best practices
- Pursue a quality driven agenda using end product specifications
- Ensure collection and dissemination of industry relevant statistics such as demand and supply forecasts of materials, equipment, and HR along with future infrastructure development goals

Financial interventions

- Develop and provide financing support which meets the specific needs of the construction industry. Lack of access to financial resources is as a major impediment faced by the industry and also acts as a barrier to entry for many potential new participants
- Invest in capacity building of all stakeholders
- Provide support through grants for training and education of all stakeholders
- Reward achievement of predefined goals; apply penalties to short-falls under specific contractual provisions.

Legislative and regulatory interventions

- Decrease the cost of doing business by reducing overlapping and redundant legislative requirements, all legislative and regulatory policies should be harmonized across all levels of government; federal, provincial, local and district
- Legislation targeted to promote growth of the industry such as through reforms in the banking and insurance sector which address requirements of collateral for the industry
- Review the regulatory framework and establish new or strengthen existing bodies to regulate the industry
- Regulations regarding registration of construction equipment and machinery should be framed to allow proper classification, assessment and collection of reliable statistics
- Protect the payment chain through appropriate legislative and regulatory measures
- Establish tax laws and related policies to stimulate growth with incentives to promote entrepreneurial private sector ownership
- Streamline audit procedures to ensure timely audits and increase the skills of auditors

- Create a legislative environment conducive to good management of industry risk through balanced contracts, providing for adequate and full compensation for escalation in prices, and efficient dispute resolution mechanisms
- Rules that deter the participation of foreign companies should be amended
- Parastatal organizations should be fully privatized and a level playing field provided to all stakeholders
- Increased flexibility in the nature of contracts should be introduced to facilitate innovative approaches to delivery of projects

5.1 Implementing Large "Mega" Infrastructure Projects

231. Pakistan faces complex and deep rooted problems in the construction industry ranging across all facets of the project cycle from planning, design, budgeting, financing, business environment, procurement, HR, adequate machinery and equipment, materials, professional project management and institutional capacity of all stakeholders and implementation capacity of the construction and consultancy industry. This holds especially true in the case of complex mega projects. A prime example is the Neelum hydropower project which has been lingering for almost eight years due to a lack of allocations in PSDP funding and other technical reasons.

232. The findings in this report indicate that for immediate implementation of the time critical mega infrastructure projects GoP needs to create ring-fenced project specific implementation teams. Whether these teams could be in the public or the private sector is a question that can be debated for example, China used public sector driven teams whereas Malaysia used private sector teams. Given the country environment, GoP could opt for autonomous public sector project specific entities run on private sector principles with HR drawn from both private and public sectors. Due to the established paucity of appropriate HR in the country, GoP should explicitly open these entities to international sourcing. Critical to this project delivery vehicles concept is the recognition that these entities will automatically shut down once the project has been "delivered." Creating a Special Purpose Organization (SPO) has the following advantages:

- Operates under a specific charter granting it responsibility for all aspects of the project
- Project manager is responsible to the client for all project procurement and execution, and may even include detailed design
- SPO is responsible for on-time delivery and within projected costs
- SPO is typically a joint venture arrangement run by a professional project management firm which in turn engages firms or a consortium of firms comprising financiers (could be public/GoP), consultants and contractors
- SPO has a limited life span - terminating upon completion and delivery of the project
- SPO may also be made responsible for operation and maintenance of a project for a limited time or even on a Build Own Operate and Transfer (BOOT) or on other basis
- Specialists inputs as needed are the responsibility of the project managers
- Local personnel are provided training in specialized skills (for example in the Mangla dam project, 20,000 workers were trained)

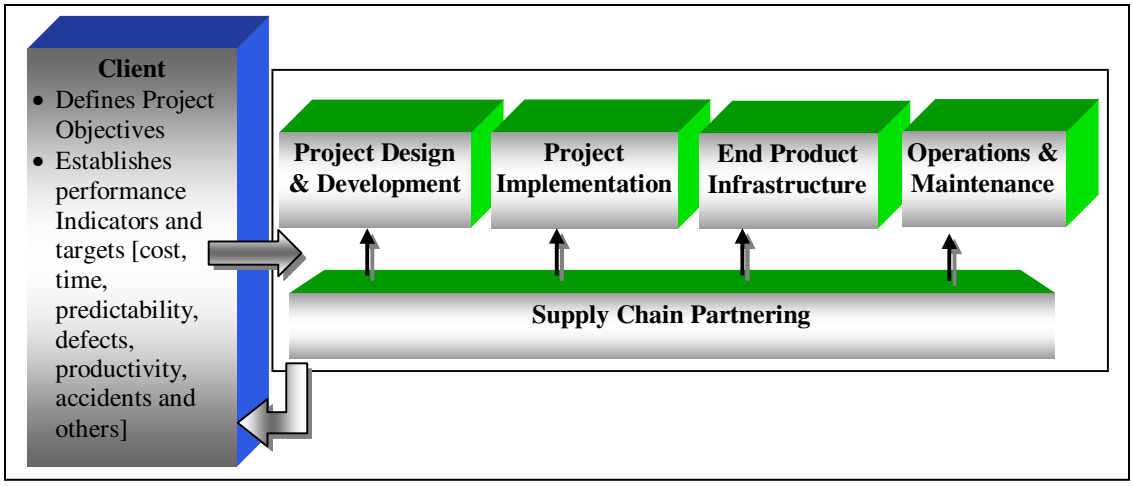
233. Given the constraints identified in the local industry (clients, consultants and contractors) it is recommended that the GoP considers such arrangements for all mega projects planned under the MTDF, especially the multi-purpose dam and irrigation projects, large motorway projects and other complex infrastructure related projects. The GoP should ensure professional project

management companies are attracted to Pakistan through fair and balanced terms of contract with measures built-in for risk mitigation and transparency.

234. The use of project specific SPO for mega infrastructure delivery elevates the traditional client-consultant-contractor relationship and forms a team where the three act together in the interest of the project, while still being within fiduciary, environmental and social safeguards.

235. Partnering and framework agreements, which are becoming increasingly used by the best firms in place of traditional contract-based procurement and project management, should be used. There is a need to integrate the process and the team around the end product. The most successful enterprises do not fragment their operations – they work back from the customer's needs and focus on the product and the value it delivers to the client. The process and the production team are then integrated to deliver value to the client efficiently and eliminate waste in all its forms. Concentrating on the needs and functionality of the end product leads to a view of construction as a much more integrated process. The overall process can then be subdivided into four complementary and interlocked elements: product development, project implementation, integrated supply chain, and production of the end product as illustrated in the following figure.

Figure 23: Recommended Integrated Construction Process through Partnering



236. It is recommended that teams of designers, constructors and suppliers work together through a series of projects, continuously developing the product and the supply chain, eliminating waste in the delivery process, innovating and learning from experience. Many major and experienced clients internationally are doing this through partnering arrangements and are consistently improving on performance levels measured by well defined indicators. The challenge for the GoP is to develop means to procure these integrated teams to deliver the mega infrastructure while meeting or exceeding the performance indicators set by the users/public and dramatically increasing efficiency and quality.

237. GOP needs to establish frameworks under which it will deliver say Bhasha, Kalabagh, Karachi Mass Transit, or other large infrastructure projects and procure teams based on 'framework' agreements. Further work needs to be done urgently to assemble and procure these framework agreements after deciding on a list of urgently required mega-projects for which public financing is available.

238. In order to attract professional managers, construction firms and consultants, a proactive

approach through packaging of these SPO 'frameworks', and road shows similar to the ones undertaken for privatization of large public sector corporations should be pursued along with dissemination of information through web portals. A few demonstrative success stories in attracting international stakeholders will go a long way in developing interest in large infrastructure projects in Pakistan.

239. Concurrently with the targeted efforts to deliver large infrastructure projects through SPO 'frameworks', it is essential for the GoP to take steps which lead to improving the existing business processes, developing HR, and removing the bottlenecks and constraints faced by the industry. Measures are however required in parallel for enhancing and optimizing capacity, and these need to be implemented in both the short and long term.

5.2 Short-Term Recommendations

240. Interventions[59] which could be implemented in a relatively short-term period (0~3 years) include:

- *Minimizing enlistment, pre-qualification procedures and requirements* which should be unified for all executing agencies. Efficient prequalification procedures should be developed which eliminate incompetent contractors, reward competency and provide opportunities for fair competition. Prequalification requirements should be simplified with a focus on technical and managerial capability instead of "works in hand" or "projects completed" criteria.
- *Improve transparency in procurement through complete implementation, and enforcement of procurement rules* in all agencies. Procurement on the basis of least evaluated bid criteria should be enforced.
- *Project cost estimates* should be based on market rates instead of "scheduled rates." A price review committee comprising ACEP & APCA representatives should be formed to review and set prices of construction inputs on a quarterly basis which should be published for industry wide distribution. The committee can also have the mandate to determine escalation in material prices and rates. The engineers' project costs estimates should be realistic with appropriate allowances for profit.
- *Balanced Contracts must be introduced,* FIDIC guidelines should be adopted in letter and spirit in contract documents. Stakeholders should be imparted training in use of FIDIC documents.
- *Improve charge rates and construction rates.* Increasing salaries and pay structures will not only motivate existing workers to perform better but also attract better qualified people. At present, professionals are paid $1/6^{th}$ to $1/12^{th}$ compared to the remuneration paid in regional countries. There should be an immediate increase in current contract rates to rectify and reverse brain-drain. Charge rates could be fixed as par with regional countries on PPP basis.
- *Provide Financial Liquidity:* The clients should provide mobilization advance of at least 30 percent of project costs and recoveries designed according to the planned financial cash flows. Up to 75 percent of the running bill could be paid in advance immediately as an ad hoc payment while the interim payment certificates are being processed.
- *Streamline Audit Procedures:* The role of auditors is at present perceived to be a negative

[59] Recommendations are drawn from the extensive literature review and stakeholders feedback through surveys and focus groups discussions.

one. It is essential that a new generation of auditors who have a specialized understanding of construction sector should be developed. Special audit procedures should be formulated for engineering projects. Auditors should be trained and "certified" in FIDIC contract documents, and should not indulge in auditing technical merits and demerits of engineering decisions. Audits should be carried out in a timely manner during the duration of the project.

- *Establish tax laws and related policies that will stimulate growth of the industry*. Presently multiple, high, at source tax deductions restrict cash flows and impede progress. Presumptive tax for construction companies could be reduced from 6 percent to 1 percent of gross annual turnover (as laid down by National Housing Policy, 2001). However, presumptive tax should not be the only tax mechanism available; contractors should be encouraged to maintain detailed books of accounts and file annual returns for payment of tax liabilities. This will enhance the credibility of the construction industry, encourage a corporate culture and instill confidence in the banking sector to offer financial facilities.
- *Duties and taxes should be rationalized* on spare parts, plant and equipment in order to encourage import of new equipment and lower the cost of doing business. Duties and taxes on construction materials should be reduced to make cost of inputs comparable with regional and international prices, import of required construction materials should be allowed to bring stability in the market and break existing cartels.
- *Enhance Technical Capacity:* The GoP should proactively establish and fund short-term training programs for professionals in the private and public sector. Training could be through international seminars in regional countries and professional conferences (FIDIC, Asphalt Institute, AASHTO, Structural/Bridge Design, Project Management) on infrastructure. Linkages of government, academia and private sector stakeholders with forums such as "The International Council for Research and Innovation in Building and Construction (CIB)" which hold triennial international conferences on development of construction industry should be developed.
- *Linkages between academia and industry should be proactively developed* in order to ensure curriculum enables entry level professionals to have required set of skills.
- *Public-Private sector cooperation:* Simplify the process to allow suitably qualified professionals in public sector to take on private sector short-term consultancy work.
- *Strengthen dispute resolution mechanisms:* Construction Ombudsmen may be appointed at federal and provincial levels to deal with construction related disputes if arbitration fails.

5.3 Medium to Long Term Recommendations

Box 7: Best Practices - Industry Development Organizations

Singapore has taken the lead in demonstrating the effectiveness of a dedicated agency established to promote and develop the construction industries knowledge base, training and management development, promoting partnerships, best practices corporate culture, efficiency, effectiveness, professionalism, and global competitiveness. The government of Singapore recognized very early on that construction industry plays a key role. It developed a long term strategic plan and vision for the industry to change it from the three D's to the 3 P's (i.e, from "dirty, dangerous and demanding" to one which is "professional, productive and progressive"). Decades of concerted and focused approach has now paid dividends – a world class construction industry is now forming, industry exports have risen from about S$118 mil in 1984 to S$2.5 bil in 2004 to over 35 countries.

Besides Singapore, dedicated industry development agencies are established in almost all developed nations (UK, Australia, Hong Kong, Japan, Canada, etc.) and in several developing countries such as India, Iran, China, South Africa, Malaysia, Tanzania, and Korea. Extensive networking between such organizations, government representatives, academia, professional bodies, and trade associations on a regular basis through conferences and technical working groups is allowing development of an understanding of global issues and challenges and best practices.

241. Medium to long term[60] recommendations include institutional, legal, regulatory and financial reforms, and development of HR. These are focused on changing the business environment and pursuing a reforms agenda.

5.3.1 Institutional Reforms

242. The strengthening of existing institutions in the public/private sector is a prerequisite for the objectives of fostering growth and developing capacity. Institutions of the government such as PPRA and PEC should be restructured and adequately funded and staffed so that they are able to competently regulate and develop the construction sector. PRRA and PEC, should in addition to being regulatory bodies, be in tune with the domestic needs of the sector and the stakeholders. Technical Assistance should be sought on defining the roles, implementation procedures and processes, and for enhancing the institutional and monitoring capacity of these bodies.

243. At present, there is no institution in Pakistan dedicated to the development of construction and consulting firms. Trade associations need to be strengthened and provided with representation in chambers of commerce and institutional counterparts in the government. Regular meetings of the trade associations could be attended by government representatives to develop close liaison. Associations can serve as a forum for discussing issues and needs of the stakeholders and relaying them to the government, while concurrently maintaining professional standards in consulting and contracting services. By treating these associations as important partners in the industry the government should encourage them to implement their stated objectives such as encouraging transfer of technology and facilitating joint ventures, in advocating policy formulation and strategic planning. In the long run, the trade associations can assume the role of self regulation of the industry.

244. A dedicated organization like the Construction Industry Development Board (CIDB) on the pattern of CIDB-Malaysia and in other countries should be established to specifically address issues such as planning and forecasting of demand, providing training and development of professional management skills for the industry. Such a board could function in collaboration with PEC and the academia, to offer continuing education programs aimed at upgrading and

[60] Medium-term taken as 3~5 years and long-term 5+ years

keeping current the knowledge base in the industry, and also provide the linkages between the trade associations and the government in developing policies and strategies. For a sector having the potential of contributing upwards of 6 percent to the GDP, a separate organization for developing the industry is needed as per best international practice.

5.3.2 Legal and Regulatory Reforms

245. Clear principles should be laid out that apply uniformly to all projects and stakeholders. Rent-seeking activities thrive when the government is the regulator, operator, owner and also the financier of infrastructure projects. Hence in order to minimize corrupt practices, the designing bidding, execution and operation of projects should be carried out in a fair and transparent manner. *Clear* and *consistent* regulatory mechanisms are crucial in ensuring this aspect. Presently, the regulatory framework is not only incomplete but also ambiguous and complicated. This leaves room for discretion and manipulation. Under this framework corruption and inefficiency thrives. Delays caused due to complicated procedures and fraudulent practices are common place.

Box 8: Best Practices- Responsive Industry Regulation

A major phenomenon in Singapore's construction industry in the light of a severe decline in construction demand and output was a spate of disputes on payments between clients and main contractors, and between main contractors and subcontractors, as well as suppliers. The Security of Payment (SOP) Act 2004, aims to facilitate cash flow in the construction industry by upholding the rights of parties to a construction contract to seek progress payment for work done, and providing a framework for quick and less expensive resolution of payment disputes through adjudication. The Act was formulated after consultation by the Building and Construction Authority (BCA) and the Ministry of National Development (MND) with the industry and major public sector client agencies. It is based on the features of similar statutes from Australia, the UK and New Zealand.

The SOP Act applies to all parties in the construction industry with written contracts for the works or the supply of goods or services for projects in Singapore. The key features of the SOP Act are: a) the rights to payments for work done or supply of goods or services, which makes the normal "pay when paid" clauses in contracts unenforceable; b) adjudication instead of arbitration and litigation and; c) the rights to suspend work and place lien on uninstalled materials, if not paid after adjudication (Ofori 2004).

246. *Specifically, regulations pertaining to procurement, contracts and the level of competition in construction services need to be revised.* All stakeholders have expressed grave dissatisfaction with public procurement procedures. Prequalification and procurement procedures need to be defined in a clear, coherent manner. Greater professionalism should be instituted in procurement to inculcate good governance practices, standards of capability, performance and behavior. The adoption of more integrated approaches to procurement including non-price factors in evaluation, the adoption of life-cycle costing and moving in the direction of concessions i.e. design build-operate contracts, and the selection of consortia for 'programs' of projects, rather than a single project is advised.

247. *PPRA jurisdiction should be extended to cover all provinces.* Also room for adhocism and one-time exceptions should be minimized by comprehensive regulation. In order to increase transparency and keep procedures unbiased, standardized documents should be used at all stages of procurement starting from request for proposals to bidding. Private and state-owned enterprises should be treated equally. Guidelines for the selection process should be developed which deemphasize the current trend to apply the least-cost-criterion. Benchmarks to monitor and measure quality of output need to be established. A price quality method for procurement such as the one used by Singapore should be adopted to address the adverse impact of price based

tendering[61].

Box 9: Best Practices - Effective Trade Associations

Imparting Training: The literature provides example of the Contractors Association in Korea (CAK), which has been instrumental in the development of the construction industry by establishing institutes such as the Construction Workers Training Center (CWTC) and by designing training policies and methods (Kirmani 1988).

The Construction Industry Training Center (CITC) managed by the Chamber of Construction of Mexico is an independent industry financed organization which was set up to provide contractors with an industry wide facility for training construction personnel in compliance with Mexican laws (World Bank 1984).

Development of Equitable Contracts: The Peruvian Chamber of Construction (CAPECO) is a good example of a well-established and respected trade association. It has assisted in overcoming the trend to apply one-sided contracts for public works construction. It also collaborated with the government and the trade unions in the running of a technical training institute for the construction industry vocations (World Bank 1984).

Medium for Collaboration of all Stakeholders: The Government of Singapore encouraged and supported the formation of the Construction Industry Joint Committee (CIJC) in 2000, to formalize co-operation among key organizations in the construction industry embracing clients, various design professionals and contractors. It comprises the Presidents of nine professional institutions and trade associations in Singapore's construction industry. The ideas behind the formation of CIJC was to create a forum for discussing issues of common interest and to provide a single voice on opinions, needs and aspirations of the government and other relevant parties. It is making its expected contribution in the development of the industry by meeting regularly to discuss issues related to the construction industry (Ofori 2004).

248. *Contracts should be fair and protect the rights and stipulate the obligations of both parties.* Contracts in Pakistan are vague, one-sided and in many cases obsolete, as pre-independence formats continue to be used. Disproportionate risk and responsibility is placed on the contractors/consultants with little or no accommodation for arbitration and escalation. Poor contract structure leads to delays in making payments, delays in decision-making, overruling of the engineer's decisions, inadequate cost estimates; claims and other such related issues. Contracts should include price escalation clauses to hedge the risk faced by contractors. Furthermore, provisions against delays in payments should also be factored into contract documents and regulations strengthened to protect the payment chains.

249. *Increased flexibility in the nature of contracts should be introduced.* The UAE for instance, has attracted foreign consulting and engineering firms by offering a wide range of contracts that help limit exposure to risks and allow for more flexibility. Clients have developed new contract and procurement arrangements to overcome supply constraints and mitigate price and quality risk. Examples of updated contracts include advance payment arrangements and guaranteed maximum price instead of the traditional fixed price, lump-sum model. Both negotiated and partnering contracts are also being employed.

250. *Rules that deter the participation of foreign companies should be amended.* In fact, projects should be advertised in international markets to attract a larger international audience. This will help bridge the human resource and skills gap present in Pakistan in the short run. Greater participation from abroad will also help bring in latest technology and knowledge spillovers will take place in the local economy. Simultaneous improvements in the local business environment will help attract foreign bids.

[61] A price quality ratio between 80:20 and 60:40 (with safety having 10 percent of the quality points) is used to reflect both quality and feasibility concerns.

251. *Within the domestic market, the GoP should not differentiate between public and private sector consulting and contracting firms.* A bias in favor of public sector firms, to the extent of often awarding large contracts without inviting any competition whatsoever, results in inefficient pricing and dissuades the private sector from investing in corporate development and forming joint ventures with foreign companies. The use of parastatals creates a general feeling of discontentment and discourages participation of a wider set of firms in projects with the government. In the short to medium term framework, the GoP should move towards complete privatization of parastatal and state-owned enterprises.

252. *Regulations regarding registration of construction equipment must be reviewed* to ensure proper documentation of machinery and compilation of statistics.

253. *All legislative and regulatory policies should be harmonized* across all levels of government; federal, provincial, local, and district etc.

Box 10: Best Practices - Infrastructure Equipment Bank

SREI Infrastructure Finance Limited is the leading National Infrastructure Equipment Finance and Infrastructure Project Finance Company. It is amongst the largest Non-Banking Financial Institutions (NBFIs) in the country with an asset base of more than US$ 890 million (Rs. 4000 crores). SREI is the only infrastructure financing company from India to get listed on the London Stock Exchange.

Having prudently identified India's infrastructure sector as its principal growth area, SREI has built a unique business model, which revolves around financing of infrastructure, construction and mining equipment, infrastructure projects and renewable energy systems. In order to serve its customers better, SREI also offers: distribution of insurance products (life and non-life), investment banking and services, venture capital, foreign exchange services and retail financing services through its subsidiaries. In addition, through its associate concern Quipo Infrastructure Equipment Ltd. (QIEL) set up in 2002, SREI has pioneered the concept of renting of construction equipment in India under the brand name of Quipo which is India's only end-to-end equipment rental company serving infrastructure projects across the country. Multilateral investors such as IFC Washington, FMO Netherlands, Swedfund International AB Sweden and an international equipment manufacturer, Ingersoll Rand, together hold more than 54 percent of Quipo's stake.

Quipo provides state-of-the-art equipment on rent for whole range of Construction, Telecom and Oil Gas requirements along with value added services such as trained operators to run and service the equipments and on site repairs and maintenance. With tailor-made solutions suited to specific needs, Quipo enables the customers to focus on their core competence i.e. construction and project management and leads to increased mechanization in the specific industry and superior quality of infrastructure. A key service provided is information pertaining to equipment such as availability, equipment mix, optimum utilization, accessibility, sourcing imported equipment, pooling of equipment, consultancy, application advice and method engineering. A facility for depositing idle equipment from construction companies and contractors to ensure revenue for equipment owners is also provided.

In 2005, Quipo signed an agreement with Henry Butcher (a division of the Go Industry Group- one of the largest industrial asset management companies covering Asia-Pacific, Europe, and America) for the joint venture called Henry Butcher International Valuers & Auctioneers (India) Limited. The 50:50 joint venture provides infrastructure and industrial asset valuation and auctioning services. It is likely to be of immense benefits to asset reconstruction companies working as a catalyst for realizing cash out of non-performing assets.

5.3.3 Financial Reforms

254. *Lack of access to financial resources has been reported as a major impediment faced by contractors in the construction sector and also acts as a barrier to entry for many potential participants in the construction market.* Financing is required for working capital, investment in new equipment and purchase of materials. In Pakistan, like in many other developing countries, the financial sector lacks the expertise to assess construction enterprises as borrowers. The construction sector is considered high-risk based on some past experiences and no provisions

have been made to mitigate this risk factor or reassess it. This situation can be rectified by accompanying loans from Development Financial Institutions (DFIs) with technical assistance to establish the system and train the banking sector to accurately evaluate construction sector borrower's credit worthiness.

255. *Financial leasing should be made easily accessible to contractors.* Leasing is a practical way to acquire expensive machinery by smaller civil works contractors. Lending institutions with the assistance of chambers of commerce and contractors' associations should develop a credit rating system for contractors in order to provide loans at best possible rates to credit worthy organizations. The possibility of forming a "Construction Development Bank" should be explored further. Countries like China, Mexico and India, have successfully experimented with such a specialized financial institution and the example of SREI/QIEL is quite illustrative of what can be accomplished. Failures in the past in such efforts have occurred but were due to poor execution of the intervention and to a great extent due to a lack of required technical support and training for the financial sector.

256. In the case of small and medium sized firms, to achieve long term success more innovative approaches are recommended including guaranteed cash flows, contract clauses which facilitate cash flows, establishing of revolving funds, use of escrow accounts, along with technical support to improve management and technical capability.

257. At present, costly guarantee requirements are expected of contractors. Insurance and corporate guarantees should be acceptable instead of Bank guarantees. Although insurance bonds as a guarantee are acceptable in theory, in practice the government agencies accept only bank guarantees due to the poor past experiences with insurance companies and bonds. Government should ensure that insurance sector is strengthened and regulated to meet the bonding and guarantee requirements of the infrastructure industry to reduce the cost of doing business, and legislation to provide acceptance of insurance bonds for the industry is enacted.

5.3.4 Human Resources

258. The key challenge for Pakistan is the availability of adequately qualified and skilled human resources which are essential for sustained growth and development of the capacity of construction industry to undertake large volumes of work with acceptable standards of quality workmanship. A shortage of professional and adequately skilled personnel in the industry (amongst clients, contractors and consultants) in developing countries both in the form of management and for field operations has been widely cited across the reviewed literature (Consulting Engineering Services 2006; Datta 2000; Fox et al. 1999; Kirmani 1988; Kirmani & Baum 1991; Materu 2000; Ofori 2004; Qamar et al. 1989; Sultan and Kajewski 1999/2003; The World Bank 1984, and 2006b; and others).

259. Qamar et al., (1989) have highlighted that efficient management of resources viz. human, financial, material and equipment is a prime quality required in a successful contractor. Pakistani contractors are in general weak in resource management. Moreover, they have yet to make systematic efforts to secure joint ventures with foreign contractors to promote transfer of technology that can enable addressing this weakness. Largely, non-professional managers and insufficiently qualified technical personnel head contracting firms in Pakistan. Even though PEC byelaws make it mandatory to employ graduates, however, most contractors fail to do so. This imposes severe limitations on capacity as well as the quality of work. Apart from technical

weaknesses they also lack skills for risk management, marketing, financial control, work organization and quality control. The above mentioned contractors' inadequacies are further compounded by the dearth of trained operators of machinery, professional engineers and skilled tradesmen.

260. The literature cites a lack of importance given to development of good technical expertise and management skills in developing countries and the need to focus on training (Datta 2000; Fox et al. 1999; Kirmani 1988; Milford 2000; Murray et al. 2000; Rashid and Mulk in PEC 1990; Qamar et al. 1989; Sultan et al. 1999/2003; The World Bank 1984, 2006b). The central issue for the development of a country's construction industry is the growth of human capacity to manage risks.

261. For the enhancement of HR development, the literature puts forward the following recommendations:

- Salary incentives such as rewards and bonuses should be introduced to motivate people to learn and improve on their work (The World Bank 1984).
- An apprenticeship in building construction should normally be complemented with academic training in skills that are regarded as necessary to read and interpret modern construction documents, and in the basic management skills for potential foremen (The World Bank 1984).
- Needs of the construction industry for training owners, managers and workers should be assessed and institutions developed for meeting those needs (Kirmani 1988; Materu 2000).
- Encourage and promote sub-contracting to provide small contractors with employment and experience gained through working with the more experienced contractors (Kirmani 1988) and even through joint ventures with smaller firms (Murray 2000).
- Collaboration of domestic firms with experienced foreign firms on long-term basis should be encouraged to ensure transfer of technology (Kirmani 1988; Kirmani & Baum, 1991; Materu 2000).
- Contractors' associations should be motivated to encourage contractors to train their technical staff at various vocational training institutes (Kirmani 1988, Ofori 2004; Materu 2000).
- Promote excellence in the education of engineers, technicians, scientists and allied professional. Curricula should cover technical subjects that are important to the national economy, business professional management (FIDIC 2001).
- Senior officers in peer groups, in particular, should be introduced to the concept of general management and be encouraged to train their own staff in the skills required for the delegation of responsibilities (The World Bank 1984)
- Promote continued learning - It is essential that technical competence be rewarded with appropriate incentives. Promotion to a higher level must be conditioned with learning of further management skills, for example, a manager should be able to coordinate work of his estimator, site manager, accountant, and the people in charge of personnel, equipment, and supplies and reach a decision on a bid price after collating and analyzing their information (The World Bank1984). Upgrading, retraining, acquiring multi-skills and continuous learning are necessary (Datta 2000; Ofori 2004; Sultan et al. 1999/2003)
- Employers of contractors as well as contractors associations should encourage construction companies to hire professional managerial staff to improve overall management at construction firms (Kirmani 1988).

- Employers of contractors should be encouraged to post consultants (other than "the engineer") for the specific purpose of training contractors on the job in the areas of construction planning and organizational and overall management (Kirmani 1988; Qamar et al.1989).
- Curriculum in universities and technical institutes should be revised keeping in view the industry needs at all levels; construction engineering should be introduced as a subject (Rashid in PEC 1990).
- Consultants need to be adequately compensated (Kirmani & Baum 1991; Jafri et al. in PEC 1990; Ali in PEC 1990; George in PEC 1990; The World Bank 2006c).
- The integration of technological infrastructure, and in particular public/private sector interactions, including the possibility of "extension services" supporting capacity building within the construction industry (Milford 2000).
- Structured technical collaboration and joint industry activities between the local domestic industry and international players, or between the established formal sectors and the emerging sectors (Devapriya et al. 2002; Milford 2000).
- Formal and structured feedback mechanisms and systems should be developed within the contractors' and other stakeholders organizations to enable learning through project experiences in planning, design, implementation, and contract administration (Datta 2000; Ogunlana and Butt 2000; Siddiqi in PEC 1990).

262. For delivering the MTDF planned infrastructure, the professionals and technical staff required is in the thousands. The government needs to take steps to enlarge the available pool of skilled HR at the outset, and concurrently increase the level of skills. This can be accomplished by adopting the following measures.

263. In order to enlarge the pool, appropriate skilled personnel can be imported from regional countries to fill the numbers and skill gap. This could be a temporary stop gap measure; however, keeping in mind the wage differentials, this strategy will be more costly for contractors and consultants when compared with hiring locally.

264. Another possibility is to reverse the trend of brain-drain, which could potentially increase the supply of locally available engineers by a thousand and technical staff by 3,000 or more, each year.

265. The most viable option is to increase enrollment of students in higher education and technical and vocations institutes leading to professional, vocational and administrative careers in the construction sector and at the same time, arresting and reversing the brain-drain by providing better employment opportunities, increasing local salaries and benefits.

266. Besides restructuring the local salaries, one option in this respect would be to put in place policies which offer Pakistanis' with foreign experience wages equivalent to regional countries, such as the UAE, and those Pakistanis' who have a foreign nationality, expatriate wages should be considered.

267. Ultimately, higher salaries and other benefits will have to be the first step in attracting HR into the industry. Once the incentives to enter the industry are in place, the recommendations made pertaining to training and enhancing skills can be used to upgrade the skills of fresh graduates and existing engineers and technical staff to implement large infrastructure projects in Pakistan.

Box 11: Best practices - Developing Human Resources

- Employers pay for training: Some countries, for example, Belgium, France, Germany and Italy require employers to pay part or full remuneration to workers who take leave for further training.
- Transfer of technology: A good example is of Korean contractors, who worked mostly as sub-contractors for large American companies after the Korean War, and were thus eventually able to transfer technology. Joint venturing arrangements with foreign firms which have a well defined training component for local firms have been most successful.
- Structured on the job training: The strategy followed by Guy F. Atkinson Company, a large contractor working on the Mangla Dam project in Pakistan, was very successful in training 20,000 workers. The key elements of this strategy were selection of workers with potential, enrolling them as trainees, giving initial briefings on the project and the goals of the company, imparting instructions using small scale models, giving field training with instructors, and finally allowing production under normal supervision. The same company on the Guri Dam project in Venezuela again used this successful model.
- Institutional support: The Building and Construction Authority (BCA) Singapore, provides opportunities for practitioners at all levels to upgrade their skills. It administers the Construction Industry Training Institute (CITI) which offers trades-level training and certification. The CITI also offers several certificate courses and also runs a number of diploma programs.
- Continued professional development: A recent development in Singapore is the introduction of a mandatory requirement for registered architects and engineers to satisfy a minimum requirement of continuous professional development.
- Holistic approach: The Tanzania CRB approach combines registration, regulation, and promotion of contractors along with provision of training at all levels, education in construction business management and skills up gradation**.**
- Human Resource Development Fund: In the context of best practices, the Malaysian experience of Human Resource Development, being emulated widely, is worth mentioning. The Human Resource Development Fund (HRDF) was set up to facilitate and encourage employers in the private sector to systematically retain and upgrade the skills of the work force in line with their business plans and national development. The trust fund is exclusively for training purposes of private sector employees. 100% expenses are paid in most cases. Training need are identified by the private sector themselves and provided through approved private sector training firms, the firms themselves (on the job and/or off the job), can be local or overseas. The trust fund is managed by the private sector.

268. To increase the skill sets, training of current employees in the construction sector should be conducted within Pakistan and abroad. Foreign training should be considered for specialized fields where it is not available in the country and for providing broader training in fields where more experienced personnel can benefit the most. Distance learning programs can also be adopted for such purposes. Examples of training options (of a duration not less than six months) to explore, include:

- Universities in US, UK, Australia, Singapore, DELFT Holland, AIT Bangkok, and others. Courses to match our needs and specialities in each university
- State Highway Departments in the US, Ministry of Communications, Water and Irrigation Ministries, Electricity Boards, Organisations handling dams where construction work is going on and training can be provided on active projects
- Some of the foreign consultants, contractors working in Pakistan can train within their organisations in or out of Pakistan as a part of their contract
- World Bank, USAID, ILO, ADB, Japanese Assistance Programme and others can help with placements
- A combination of university courses combined with field training

269. Within Pakistan, engineering universities and other professional schools can offer training programs geared towards meeting the needs of this sector and enlarging the pool over the long-term. Where teachers are not available, foreign staff can be recruited and training of trainers programs be started. Programs in training institutes like NAVTEC, TEVTA, CMTI and others should be expanded and established in all provinces for developing diploma holders and skilled workers. Existing laboratory facilities at WAPDA, Road Research Institute Punjab, NTRC and others could be geared for training of technicians at a mass scale. Similarly, skilled equipment operators and mechanics can be trained with the collaboration of equipment manufacturers and

suppliers as was done in China and Malaysia. In addition, the example of the HR Development Fund in Malaysia which provides for industry demand driven training could be emulated to promote skills training. All these measures will have to be taken to enhance the manpower pool and upgrade the skills on an emergent basis.

270. The quality of engineering and technical education has to be revamped and made applicable to the needs of the construction sector. It is safe to say that training is required almost in all fields and at all levels. To quote only one area, highways, consultants need to be trained and equipped in these subjects:

- Survey of alignment with modern methods of survey including aerial and ground survey with the use of modern equipment: Correct alignment can save large sums of money by staking out the most economical routes, identifying soils, locating construction materials and identifying bridge locations, estimating costs before getting into detailed field surveys.
- Geometric design of roads and highways: For ordinary roads or high speed highways, CAD can help geometric design. This ultimately helps safe and functional utility in short-time frame when coupled with advanced survey tools. Some software offers design of allied structure, drainage and quantity calculation
- Soil analysis and structural design of pavement: It offers identifying soils, correct and economical design of pavements for durability, coupled with field control, material's testing, it can avoid costly mistakes
- Field training of maintaining and using construction equipment for soil transportation, compaction and handling of various materials during construction
- Concrete bridges and culverts at design as well as construction planning and supervision stage. Prefabrication, use of pre-stressed design and industrialised construction can reduce time, cost and improve quality
- Project planning helps consultants, contractor and client's precious time and increases their profits

271. Similar training is required almost in all other fields, be these transmission towers or design and construction of dams. Consultation with stakeholders and reviews of the nature of future projects will determine what exactly is needed. Fresh graduates should be required to undertake training prior to getting accreditation from PEC and mid level career exams could be introduced to cultivate a culture of learning. Motivation could be provided through an appropriate incentives program designed in consultation with the trade associations, regulatory bodies and client agencies.

272. In tackling the human resource problem it is critical to focus not just only on the human resources requirements of consultants and contractors but of the client as well. The fastest way to improve the quality of infrastructure output is from the demand side. If the client specifies a higher quality of work the standards of infrastructure services and outputs will certainly be improved. The government with its dual role of a client and policy maker is the most effective agent of change but in order for this to happen, managerial and professional capacity of the client has to be enhanced. Specialized training to appropriate personnel in relevant areas and exposure to international best practices and successful infrastructure experiences in the developed and developing world should be provided. To provide an incentive for learning, one option could be to link the promotion of civil servant technocrats to the next higher grade with the completion of prescribed technical continuing education and project management courses and public expenditure management training. Revising the remuneration scales and perhaps monetizing the

perks of civil servants could also prove to be an incentive to attract better qualified staff.

273. There is need to train a very large number of engineers, junior engineers, skilled and administrative staff. To work out the cost of training at different levels within Pakistan and abroad seems premature at this stage. It can be a lengthy and complex exercise. At this stage, a simplified way would be to relate cost of training to the size of the infrastructure program at hand. The aggregate size of the program for 2005-2010 is approximately Rs1,400 billion and a half percent of this program will be Rs7 billion or approximately US$117 million. If funds are allocated according to this low percentage figure, it would work out to be almost US$23 million annually for the next 5 years.

274. This figure will give a start to the training program and can be modified as it develops. Investment will promote excellence in education and training and trained manpower would produce results far in excess of the investment. A detailed and comprehensive program of education and training will be necessary in consultation with the stakeholders. Lack of trained manpower in Pakistan has been the result of years of neglect. This opportunity should be cashed with a sense of urgency and immediacy. Trained manpower available before the planned infrastructure program gets fully launched will be of great benefit.

5.4 Postscript

275. It is only through measures like the above that the GoP can move towards realizing its ambitious development goals. It appears from the assessment that the targets are challenging and their achievement would most likely extend beyond the planned MTDF period. However, the government must persevere and start on the construction industry reforms agenda immediately, with a firm commitment, long-term holistic planning and a detailed strategy in order to achieve its goals of sustained GDP growth.

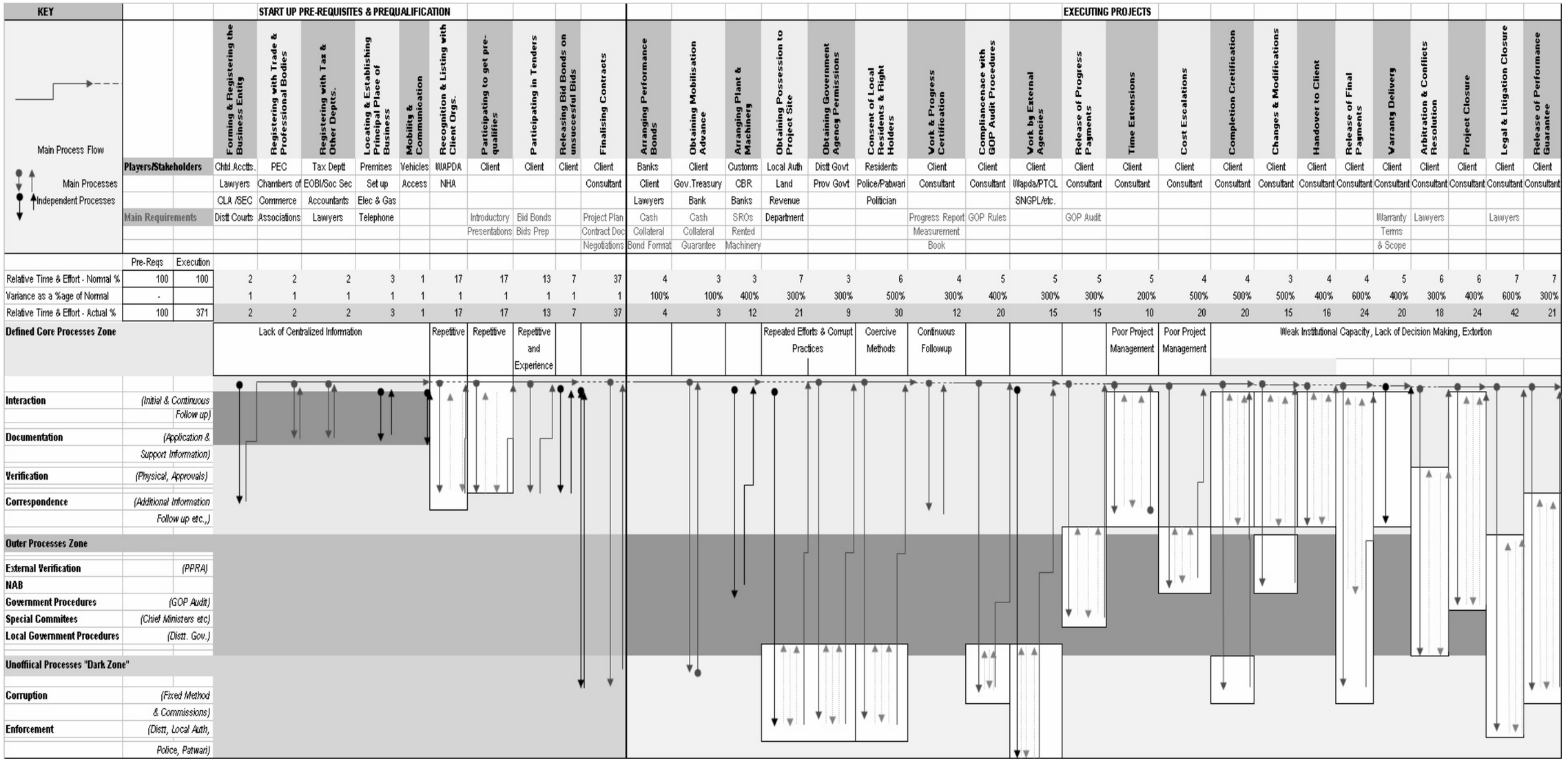
276. The study has identified areas in which the GoP needs to carry out further work, detailed assessments and research such as:

- Rationalizing construction related taxes and tariff structures
- Create a best practices project specific delivery organization (GoP could use Diamer or Bhasha Dam as an example) using an integrated construction process
- Centralizing data on HR availability and future demand for better planning and management
- Streamlining and facilitating import of construction equipment
- Studying procedures to assist in improving cash flows on projects
- Researching and adopting best practices for technical support, financing and credit facilities for the industry
- Institutional arrangements to provide long-term sustainable development of the industry

ANNEX I: Graphical Representation of Business Processes

ANNEX II: Impact of Delays on Project Cost – A Water Reservoir Case Study

ANNEX I: Graphical Representation of Business Processes



ANNEX II: Impact of Delays on Cost–Water Reservoir Case Study

		Activities	Arranging Performance Bond	Release of Mobilisation Advance	Finalising Project Schedule	Handover of Project Site	Obtaining Physical Possion of Site	Negotiating with Local Owners & Rightholders	Obtaining Approvals of Local Gov.& Deptts	Work Progress Stage 1	Worm Progress Certification 1	Release of Payment 1	Work Progress Stage 2	Work Progress Certification 2	Release of Payment 2	Work Progress Stage 3	Work Progress Certification 3	Release of Payment 3	Obtaining Time Extension Acceptance	Obtaining Delay Cost Escalation Agreement	Work Progress Stage 4	Work Progress Certification 4	Release of Payment 4	Final Completion Certification	Handover to Client	Release of Final Payments	Release of Delay Claims
Project Value	271.0	Planned Months	1	1	1	2	2	2	3	4	6	7	9	10	11	13	14	15	16	16	18	19	20	21	22	23	24
Planned Duration (Months)	24	Delay factor - months	**0**	**0**	**2**			**12**	**6**	**0**	**3**	**3**	**0**	**2**	**4**	**0**	**2**	**3**		**8**	**0**	**2**	**2**	**6**	**7**	**10**	**36**
Executed Duration (Months)	72	Completed Month	1	1	2	3	4	12	15	16	18	21	23	25	29	31	33	36	44	45	47	49	51	56	63	72	108
Capital Inputs		**A. CASH OUTFLOWS**																									
Plant & Machinery	25.0	**25.0**		6.0									12.0				7.0										
Site Buildings	0.2	**0.2**				0.2																					
Motor Vehicles	2.5	**2.5**			1.5				1.0																		
Computer & Office Equipment	0.2	**0.2**		0.2																							
Performance Guarantees	0.5	**0.5**	0.5																								
	28.4	**28.4**																									
Direct Materials	150.0	**150.0**						20.0		10.0	10.0	10.0	30.0	5.0	5.0	5.0	20.0	5.0	5.0	15.0	10.0						
Cement, Sand, Steel.																											
Clay, Steel Piping																											
Direct Overheads	50.0	**50.0**			0.1			0.3	0.7	2.5	1.5	1.5	3.5	2.5	3.5	4.5	5.5	5.0	3.0	4.5	3.5	3.0	3.0	1.0	0.5	0.2	0.2
Fixed Overheads	10.0	**10.0**			0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.5	0.5	0.5	0.8	0.8	0.8	0.8	0.6	0.6	0.6	0.5	0.5	0.5	0.2
Project Cost	**238.4**	**238.4**	0.5	6.2	1.7	0.3	0.1	20.5	1.9	12.7	11.8	11.8	45.8	8.0	9.0	10.0	33.3	10.8	8.8	20.3	14.1	3.6	3.6	1.5	1.0	0.7	0.4
Dark Zone -Corruption Expenses		6.7	-	0.7	-	-	-	-	-	0.1	-	0.3	-	-	0.2	0.6	1.0	1.0	-	-	-	0.1	-	-	-	1.6	1.1
Tax Deducted at Source (Final Liability)		19.8	-	1.6	-	-	-	-	-	0.3	-	0.9	-	-	0.6	1.8	3.0	3.0	-	-	-	0.3	-	-	-	4.8	3.4
Total Project Cost		**264.9**	**0.5**	**8.5**	**1.7**	**0.3**	**0.1**	**20.5**	**1.9**	**13.1**	**11.8**	**13.0**	**45.8**	**8.0**	**9.8**	**12.4**	**37.3**	**14.8**	**8.8**	**20.3**	**14.1**	**4.0**	**3.6**	**1.5**	**1.0**	**7.1**	**5.0**
		B. PROJECT CASH INFLOWS																									
Mobilisation Advance @ 10%		**27.0**		27.0																							
Progress Payments	1	**5.0**								5.0																	
	2	**5.0**										5.0															
	3	**10.0**										10.0															
	4	**10.0**													10.0												
	5	**30.0**														30.0											
	6	**50.0**															50.0										
	7	**50.0**																50.0									
	8	**50.0**																								50.0	
	9	**5.0**																				5.0					
Final Payment	10	**30.0**																								30.0	
Release of Retentions																											
Project Claims paid (Claim Rs. 100 M)		**30.0**																									30.0
Totals		**302.0**	-	27.0	-	-	-	-	-	5.0	-	15.0	-	-	10.0	30.0	50.0	50.0	-	-	-	5.0	-	-	-	80.0	30.0
LESS: Deductions																											
Retentions & Other Deductions		**-**		(2.7)						(0.5)		(1.5)			(1.0)	(3.0)	(5.0)	(5.0)				(0.5)				(8.0)	27.2
		-	-	(2.7)	-	-	-	-	-	(0.5)	-	(1.5)	-	-	(1.0)	(3.0)	(5.0)	(5.0)	-	-	-	(0.5)	-	-	-	(8.0)	27.2
CASH BOOK																											
	302.0	Cash Inflows	-	24.3	-	-	-	-	-	4.5	-	13.5	-	-	9.0	27.0	45.0	45.0	-	-	-	4.5	-	-	-	72.0	57.2
		Net Cash Inflows	(0.5)	15.8	(1.7)	(0.3)	(0.1)	(20.5)	(1.9)	(8.6)	(11.8)	0.5	(45.8)	(8.0)	(0.8)	14.6	7.7	30.2	(8.8)	(20.3)	(14.1)	0.5	(3.6)	(1.5)	(1.0)	64.9	52.2
		Month Opening Cash Balance	-	(0.5)	15.3	13.6	13.3	13.2	(7.3)	(9.2)	(17.8)	(29.6)	(29.1)	(74.9)	(82.9)	(83.7)	(69.1)	(61.4)	(31.2)	(40.0)	(60.3)	(74.4)	(73.9)	(77.5)	(79.0)	(80.0)	(15.1)
		Month Closing Cash Balance	(0.5)	15.3	13.6	13.3	13.2	(7.3)	(9.2)	(17.8)	(29.6)	(29.1)	(74.9)	(82.9)	(83.7)	(69.1)	(61.4)	(31.2)	(40.0)	(60.3)	(74.4)	(73.9)	(77.5)	(79.0)	(80.0)	(15.1)	37.1
UNCOMPENSATED ADDITIONAL COSTS OF DELAYS																											
1. Fixed overheads, during sl ow down, 150,000/month @ 48 months																											(7.2)
2. Delayed major procurements @ 10%/annum								(2.0)					(6.0)				(5.0)			(5.6)							
3. Fiinancing costs on capital invested (@ 10%/annum)			(0.0)	-	-	-	-	(0.1)	(0.1)	(0.1)	(0.2)	(0.2)	(0.6)	(0.7)	(0.7)	(0.6)	(0.5)	(0.3)	(0.3)	(0.5)	(0.6)	(0.6)	(0.6)	(0.7)	(0.7)	(0.1)	-
4. Opportunity costs machinery & equip (@ 20%/annum for 32 months)																											(13.3)
5. PV of delayed project claims - released 3 yrs after project close																											(9.0)
Totals			(0.0)	-	-	-	-	(2.1)	(0.1)	(0.1)	(0.2)	(0.2)	(6.6)	(0.7)	(0.7)	(0.6)	(5.5)	(0.3)	(0.3)	(6.1)	(0.6)	(0.6)	(0.6)	(0.7)	(0.7)	(0.1)	(29.5)
TOTAL FINANCIAL COST OF DELAYS																											**(56.5)**
LOSS ON PROJECT																											**(19.3)**

ANNEX III: Focus Group Participants

1st Focus Group Participants - February 7th 2006

Dr. M. Akram Sheikh, Deputy Chairman, Planning Commission
Lt. Gen. Mohammad Zubair, Chairman, ERRA
Riaz Ahmad Khan, Special Secretary, Ministry of Water & Power
Maj. Gen. Farrukh Javed, Chairman, National Highway Authority
Tariq Hameed, Chairman, WAPDA
Farooq Chaudhry, Port Consultant
AVM Mohammad Safdar Khan, Acting Director General, Civil Aviation Authority
A.G.Usmani, Chairman, APCA
Tauqir Sultan Awan, Zonal Head, APCA
Sabir P. Chohan, Ex-MD, NESPAK
Shahid Beg, Managing Director, Railcop
Sarfraz Ahmed, Managing Director, Progressive Engineering
S.U. Qureshi, Hitech Engineering
Ahsan Siddiqui, Engineering Associates
Zaheer Mirza, Chairman, ECIL
Brig. (Rtd.) Aftab Ahmad Siddiqui, CEO, Infrastructure Development (Pvt.) Ltd.
Manzoor Rehman, Sr. Project Implementation Specialist Infrastructure, ADB
Anjum Ahmad, Sr. PSO Specialist, WB
Isfandyar Khan, PSO Specialist, WB
Simon Thomas, Transport, WB
Hiam Abbas, Transport, WB
C. Rastogi, Transport, WB
Hasan Zaidi, Transport, WB
Fatima Idrees, Gallup Pakistan
Uzma Sadaf, Procurement Specialist, WB
Khalid Khan, Gallup Pakistan
Jamshed Khan, Gallup Pakistan

2nd Focus Group Participants, Government & Private Sector - 8th May 2006

Dr. Akram Sheikh, Deputy Chairman Planning Commission
Dr. Asad Shah, Member Planning, Planning Commission
Lt. Gen. Mohammad Zubair, Head of Infrastructure Management Unit (IMU), Planning Commission
Lt. Gen. Nadeem Ahmed, Deputy Chairman, Earthquake Reconstruction and Rehabilitation Authority (ERRA)
Tariq Hamid, Chairman, WAPDA
Gen. Mehboob ul Muzaffar, Registrar, Pakistan Engineering Council
Maj. Gen. Farrukh Javed , Chairman, National Highway Authority
AVM Pervez Nawaz, DG, Civil Aviation Authority, CAA
AVM Mohammad Safdar Khan, Deputy DG, Civil Aviation Authority (CAA)
Riaz Ahmad Khan, Special Secretary, Ministry of Water & Power
Eng. Ahmed Ghazal Usmani, Chairman, All Pakistan Contractors Association (APCA)
Tauqir S. Awan, Zonal Head, All Pakistan Contractors Association (APCA)
Zaheer Mirza , President, Engineering Consultants International (Pvt) Ltd. (ECIL)
Brig. ® Aftab Ahmad Siddiqui, CEO Infrastructure Development Consulting Company
Ahsan Siddiqui , Deputy Managing Director, Engineering Associates (EA)

Sabir P. Chohan, Ex Managing Director NESPAK
Shahid Baig, Managing Director, Railcop
Farooque A. Chaudhry. Port Consultant
Suleman Ghani, Chairman, P&D Board, Planning & Development Department, Government of Punjab
Ghulam Sarwar Kherro, Additional Chief Secretary, Planning & Development Department Government of Sindh
Ghulam Dastagir Khan , Additional Chief Secretary, Planning & Development Department Government of NWFP
Qayyum Nazar Chengezi, Additional Chief Secretary, Planning & Development Department Government of Balochistan
Arif Nadeem, Secretary Irrigation & Power Department, Government of Punjab
Shujah Ahmed Junejo, Secretary Irrigation & Power Department, Government of Sindh
Khalid Hussain Gillani, Secretary, Irrigation & Power, Government of NWFP
Abdus Salam Khan, Secretary Irrigation & Power Department, Government of Balochistan
Sqd. Ldr (R) Ahmed Yar Khan, Secretary, Communcation & Works Department, Government of Punjab
Syed Faisal Saud, Secretary, Works & Services Department, Government of Sindh
Riaz Ahmed Khan, Secretary, Work & Services Department, Government of NWFP
Qamaruddin Baloch, Secretary, Communication & Works Department, Government of Balochistan
Khalid Javed, GM Power, WAPDA
Mushtaq Chaudhry, Member Water, WAPDA
Iftikhar Rasul Zia, GM CSC, NTDC, WAPDA
Dr. I.B. Shaikh, Chief Engineer, Advisor and Chairman Federal Flood Commission, Ministry of Water & Power
Usman Akram, Chief Engineer Irrigation (Sargodha Zone), Irrigation & Power Department, Government of Punjab
Mazhar Ali Shah, Additional Secretary, Irrigation & Power Department, Government of Sindh
Mohammad Naeem, Deputy Secretary, Irrigation Department, Government of NWFP
Rehmatullah Bhettani, Additional Secretary, Irrigation Department, Government of NWFP
Mohammad Iqbal Khokar, Chief Engineer (Highways), C&W Department, Government of Punjab
Ali Javed Naqvi, Regional Head Operations, Prime Commercial Bank
Shafiq A. Musavi, DG (M), Works and Services Department, Government of Sindh
Saleem Raza, Project Director, Foreign Aided Projects, C&W Department, Government of Balochistan
Manzoor Rehman, Sr. Infrastructure Specialist, ADB
Syed Tanvir H. Bukhari, Chief T&C, P&D Division, Government of Pakistan

3rd Focus Group Participants, Consulting Firms – 23rd May 2006 (Morning)
Chaudry Ghulam Hussain, Managing Partner, NDC, Lahore
Karim Khan, Managing Partner, BAK, Peshawar
Ahsan Siddiqi, Dy. Managing Director, Engineering Associates, Karachi
Asim Osmani, Director & CEO, OCL, Karachi
Umar Farooq, Manager Contracts & Coordination, ACE, Lahore
Waqar Ahmad Farooqi, Chief Business Development, ACE, Lahore
S. Manzer Hussain, Director & CEO, ACE, Lahore
Hussain Tariq, Director, EGC, Lahore
Javed Khizar Hayat, VP, NESPAK, Lahore
Tariq Mehdi, VP (Power & Mechanical), NESPAK, Lahore

Mumtaz Akhtar, General Manager, BARQAAB, Lahore
Abid Ibrar Hussain, MD, Pisces Consulting, Islamabad
Zaheer Mirza, Chairman, ECIL, Karachi
Aized H. Mir, Managing Director, ACC, Islamabad

4th Focus Group Participants, Construction Firms – 23rd May 2006 (Evening)
Ahmad Ghazal Usmani, Chairman APCA, and CEO, Usmani Associates.
Mohammad Yunas Khan, Secretary, APCA
Khadim Hussain, CEO, SACHAL Engineering Works Ltd.,
Syed Ashfaq Hussain, CEO, KARCON (Pvt) Ltd.,
Sikandar Hayat Khattak, CEO, S. Zaman (Pvt) Ltd.,
Khawaja Saad Masud, Mohandisin-e-Masud Builders (Pvt) Ltd.,
Tauqir Sultan Awan, CEO, Hajvairy Associates (Pvt) Ltd., and Zonal Head APCA
Shahid Rafiq, Director, Habib Rafiq (Pvt) Ltd., and other APCA members

Amer Zafar Durrani, Aized H. Mir, Hasan Afzal Zaidi, Dr. Zafar Raja, Hiam Abbas, Huma Waheed, Ermeena Malik, Abid Abrar Hussain, Mehreen Tanvir, Nazifa Sheikh, Supriya Sen, Shaukat Javed, Sohail Abidi, Ahsan Siddiqi, S. M. Zakir, Abdul Majeed, Z. M. Malik, S. Bukhari, O. Mansoor, Khalid Mirza, Dr. Akram Sheikh, M. Saeed Khan, Asad Ali Shah, Riaz Ahmad Khan, Tariq Hamid, Riaz Ahmad, Maj. Gen. Farrukh Javed, Farooq Chaudhry, Air Marshal Parvez A. Nawaz, Shahid Beg, Sarfraz Ahmed, S. U. Qureshi, A. G. Usmani, Sabir Chohan, Brig. (Retd.) Aftab Siddiqi, A. H. Siddiqi, Zaheer Mirza, Lt. Gen. ® Muhammad Zubair, Ramesh Murthy, Abhimanyu Jalan, Wale Shonibare, M. Mohiuddin, Supriya Sen, Chiragh Shah, Ajay Malik, Hussein Lootah, Asif Faiz, Cesar Augusto Querio, Fabio Galli, Giovanni Casartelli, Fang Xu, John Carter Scales, Richard Scurfield, Shahzad Sharjeel, Usman Qamar, Uzma Sadaf, Mazhar Malik, Unjela Siddiqi, Huma Ajam and all the focus groups' participants