

## 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)<sup>58</sup>.

### 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

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<sup>58</sup> 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).

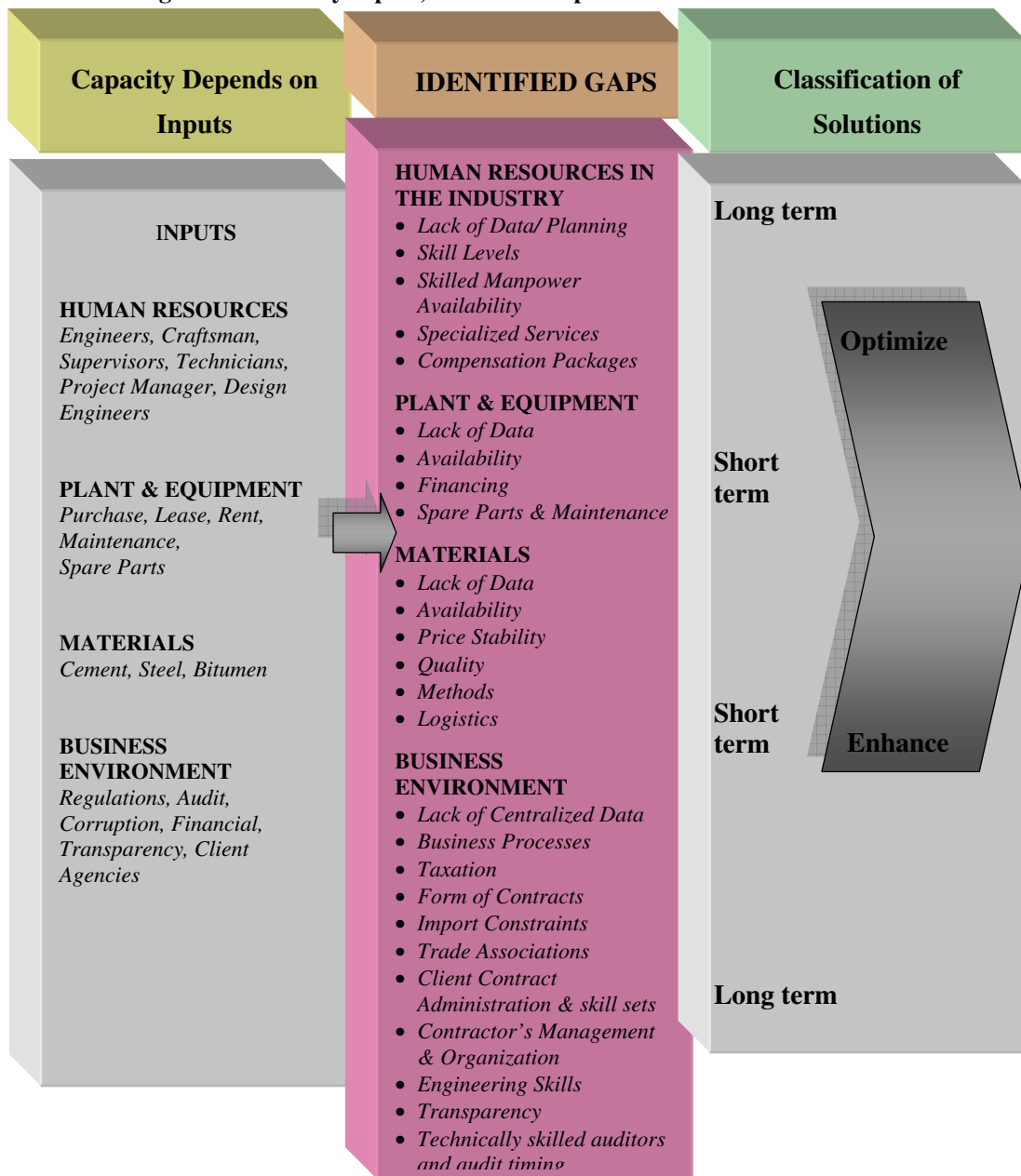
226. The Pakistan construction industry and stakeholders are well aware of the challenges faced as evidenced from the publications in PEC (1990). While issues, constraints and recommendations are also well documented in reports of Qamar et al. 1989 and the World Bank, from time to time.

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

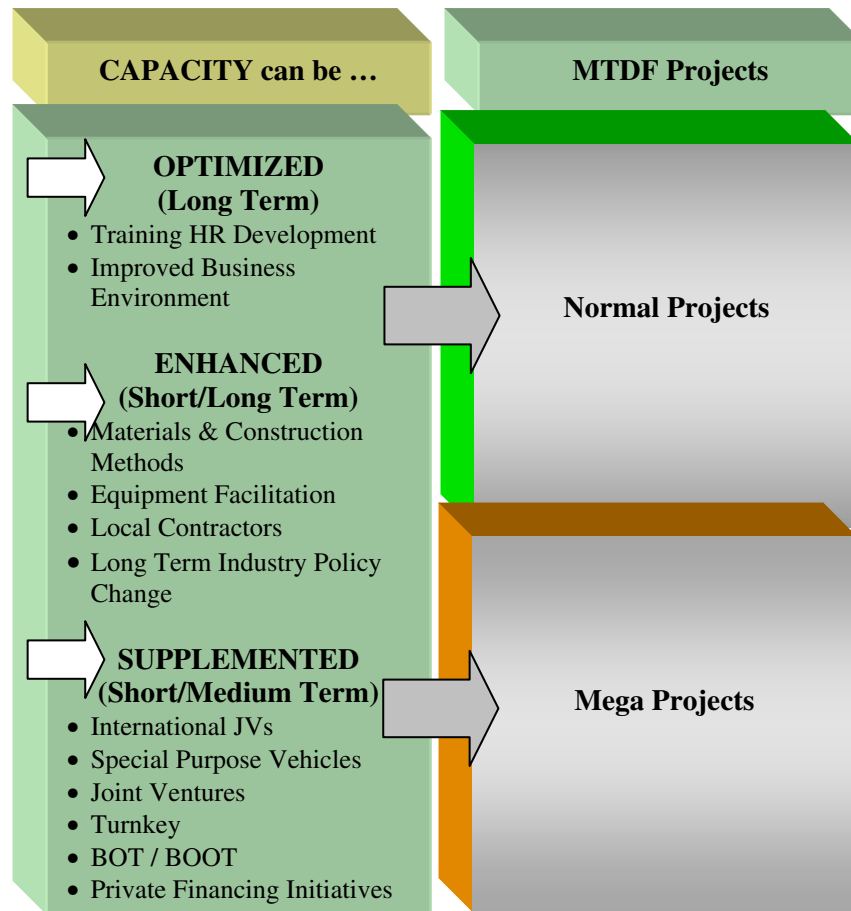
the planned large infrastructure projects. However, considering the unique nature of the industry and the supply chains involved, the large infrastructure projects cannot be viewed in complete isolation from smaller projects. The existing gaps in the quality and quantity of inputs available to the industry 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)

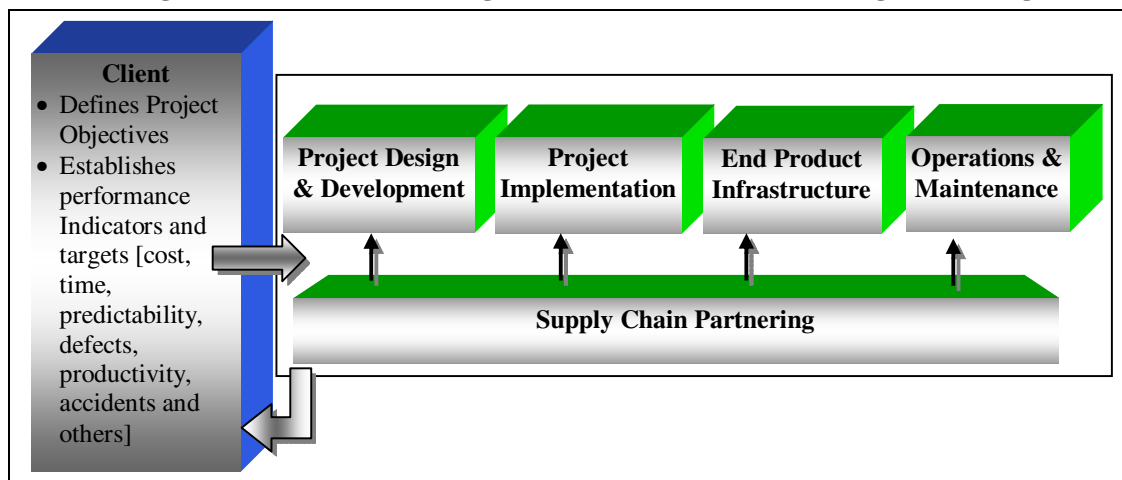
233. Given the constraints identified in the local industry (clients, consultants and contractors) it is recommended that the GoP considers such arrangements for all mega projects planned under the MTFD, especially the multi-purpose dam and irrigation projects, large motorway projects and other complex 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<sup>59</sup> 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<sup>th</sup> to 1/12<sup>th</sup> 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

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<sup>59</sup> 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

241. Medium to long term<sup>60</sup> 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. PPRA 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 monitoring capacity of these bodies.

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.

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

<sup>60</sup> 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<sup>61</sup>.

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.

#### 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).

<sup>61</sup> 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.

### Box 10: Best Practices - Infrastructure Equipment Bank

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.

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 Bank 1984). 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

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

- 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.

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