

CHAPTER 1

INTRODUCTION

1.0 Background of the Study

The Construction industry plays a key role for governments in both growing and mature economies. The sector creates new jobs, drives economic growth, and provides solutions to address social, climate and energy challenges. The construction industry has important linkages with other sectors, so that its impact on GDP and economic development goes well beyond the direct contribution of construction activities.

While most other industries have undergone tremendous changes over the last few decades, and have reaped the benefits of process and product innovations, the Engineering & Construction sector has been hesitant about fully embracing the latest technological opportunities; as a result, its labor productivity has stagnated accordingly. This unimpressive track record can be attributed to various internal and external challenges: the persistent fragmentation of the industry, inadequate collaboration with suppliers and contractors, the difficulties in recruiting a talented workforce, and insufficient knowledge transfer from project to project, to name just a few.

Multiple global megatrends are shaping the future of construction. Consider just two developments: first, 30% of global greenhouse gas emissions are attributable to buildings; second, the population of the world's urban areas is increasing by 200,000 people per day, all of whom need affordable housing as well as social, transportation and utility infrastructure. Such trends pose challenges but also offer

opportunities; either way, they require an adequate response from the industry as a whole (World Economic Forum, 2014).

1.1 Global Economic Crisis, its Influence in Infrastructure Development

In recent years, the world has suffered a multitude of crises. Financial and economic turmoil have disrupted the world economy through loss of income, jobs, and social stability. Intense natural disasters have devastated entire communities from Haiti to Japan, leaving a trail of fatalities and economic losses in their wake. Concerns about global warming have grown, as have fears about the spread of deadly contagious diseases. (The World Development Report 2014 (WDR 2014), Risk and Opportunity—Managing Risk for Development)

In many ways, 2012 turned out better than had been feared, with none of the worst case scenarios facing the global economy materializing — namely a Eurozone breakup, hard economic landing in China, the U.S. toppling over the fiscal cliff, or a large-scale escalation of Middle East tensions (AECOM Middle East – Construction Handbook 2013). The scenario as above is stated by various news articles as given below:

CNBC on Friday 31 January 2014 in their news article, “Mapping the risk of a China ‘hard landing’” stated that ‘Rising debt and over-investment in construction are promoting concerns that China’s economy could experience a sudden slowdown. A “hard landing” for the world’s second-largest economy would have global repercussions. What are the risk and who’s most vulnerable?’.

Janet Hook, Carol E. Lee and Corey Boles (2013) in their article published in The Wall Street Journal on January 1 2013 having the headline “U.S. Budget Compromise Deal Reached” states that ‘President Barack Obama and Senate leaders Monday reached a New Year’ budget agreement that would let income-tax rates rise for the first time in nearly 20 years, maintain unemployment benefits for millions of people and blunt the impact off spending cuts that were looming as part of the fiscal cliff’.

Similarly Matt Egan (2013) had published his article in FOXBusiness on 30th January 2013 with the title, “Eurozone Breakup Fears Vanish amid ECB Resolve” stating that ‘Less than nine months ago, credible investors around the world were bracing for a calamitous breakup of the debt-ridden Eurozone that would send the global economy into recession. Today, Europe is hardly on investors’ radar screen, morphing into a near-afterthought as some believe the worst of the continent’s sovereign debt economic hurdles loom, the European Central Bank’s pledge last summer to do whatever it takes to keep the embattled currency bloc intact was instrumental in sparking the dramatic turnaround. “The ECB has been a game changer. The Eurozone crisis in its current form has ended”, said Jan Randolph, director of sovereign risk at HIS Global insight, who warned the crisis could yet reemerge’.

As per AECOM (2013) the above events have raised confidence in the global outlook and expectations of firming economic activity have gathered pace since the turn of the year, despite the fact that 2013 started with many of the economic and political issues remaining unresolved.

In these times of contraction in the spending for infrastructure projects in most parts of the world due to the economic slowdown, the Infrastructure / Construction sector in the Middle East envisaged a minimal impact. This is visible from the reports as reported in the following journals and detailed below.

LINK Global Economic Outlook (June 2013) published by United Nations Department of Economic and Social affair states that ‘Since mid-2012, oil exporting countries benefitted from record-high oil prices with the Brent price averaging \$111 per barrel (pb). Oil output further rose in Iraq, but several Gulf Cooperation Council (GCC) countries, especially Saudi Arabia, significantly scaled back their production during the last quarter of 2012 in order to resorb excess supply in the oil market. Saudi economic activity was nevertheless underpinned by the expansion of domestic demand and a dynamic real estate sector. Public and private investments bolstered growth in Qatar. Economic

activity grew more modestly in Bahrain and the UAE as the financial and real estate sectors gradually recovered.

PwC Survey Report (2014) on Middle East Capital Projects & Infrastructure Survey June 2014 states that ‘A strong economic environment and political incentives to increase spending continue to provide a positive backdrop to regional infrastructure development plans. We are seeing this translate into a marginal increase of confidence in the industry compared to our previous survey in 2012 with 75 percent of our respondents expecting to spend more on projects than they did last year. The majority (over 40 percent) expect that increase to be greater than 25 percent’.

This is further firmed up by KPMG’s Global Construction survey 2013, many of the multinational companies are focusing for international expansion in the middle-east region with American firms are focused foremost on the Middle East.

Accordingly, further review on the infrastructure development, related to the construction projects in the Middle East countries, boosting their economic activity; had provided more insight on specific country in the Middle East region.

Kingdom of Saudi Arabia was a leading market for the construction activities in GCC / Middle East. However, after the 2008 global slowdown, the dynamics in the construction market in GCC had changed. This has been further substantiated by Ahsan & Gunawan (2010) highlighting that the construction industry in the UAE has developed greatly as compared to the rest of the Middle East, most specifically Saudi Arabia.

In 2011, United Arab Emirates (UAE), recorded the region’s highest construction project value, amounting to USD 319.1 Billion accounting for 51.1% of the total value of the top 100 projects in the GCC and Kingdom of Saudi Arabia follows with a project valuing USD 218.9 billion, as published in ConstructionWeekOnline.com (2nd January 2013). According to Middle East Economic Digest (MEED) in their GCC Power of Construction 2013 publication,

had stated that “In terms of contract awards, UAE replaced KSA as the GCC’s largest construction market in 2012”. With the success of the Expo 2020 in Dubai - UAE, with the theme of “Connecting Minds, Creating the Future”, the World Expo in Dubai in 2020 would be the first to be held in the MENASA (Middle East, North Africa and South Asia) region, had attracted an increased budgeting / project proposal for new construction projects in UAE.

1.2 Significance of UAE’s Construction Projects

UAE is considered as one of the quickest developing economies in the Middle East; Leaders have always been visionary in terms of development for the people and the country there has been major investment in the construction sector (Ghias ur Rehman, 2015). Consequently, UAE plays a significant role in the construction market, in the Middle-East region, being one of the most rapidly growing economies, experiencing enormous investment in the construction industry from both public and private enterprises in recent years. Also taking into contemplation the favorable government policies of UAE, projections of attraction of more overseas companies to the country’s construction section is envisaged. (Constructionweekonline.com / article 20183, 2013). This results in an optimistic forecasts for the UAE’s construction sector for the next few years which is based on an economic recovery, its safe haven status, a liberal investment climate, as well as a buoyant infrastructure project pipeline as part of the country’s strategic Vision 2021 (Abdul Basit, 2015). This provides a platform for UAE to be considered having the strongest market opportunity in 2016, which was reflected by the response collected from various survey respondents and quoted in ME Construction NEWS (2016) & Zawya Projects (2016).

UAE Construction industry was expected to show sustainable growth in the next few years according to the Dubai Chamber of Commerce and Industry study. Taking into consideration the construction industry as a percentage of UAE’s GDP, the construction industry had contributed 10.6% in 2008 and 10.3% in 2011

with expected contribution ranging between 11.1% and 11.5% for the year 2015 and 2021 respectively; with IMF's prediction of GDP growth rate of 4.4% in 2015 (a raise from 3.3% in 2011). Thereby, signifying the revival of construction industry, in general (Constructionweekonline.com / article 20183, 2013).

Contrary to all the improvements and developments happening to the construction projects in UAE, it was also to be noted that there is a need to look into the details related to the successful implementation of these projects. As per the survey carried out by Al-Hajj and A. Sayers (2014), it has been noted that 34% of projects in UAE are performing poorly in terms of time and budget.

The following section will provide further insight into the performance of the construction projects.

1.3 Apprehension in Performance of UAE's Construction Projects

A common characteristic of construction projects is that it is dynamic and has a high level of uncertainty. This results in a cyclical argument, where cost and time overruns are accepted as inevitable, and are considered by some to be a global phenomenon affecting all the various construction project participants (Sambasivan and Soon 2007). Ghaleb J. Sweis, (2013) also had analyzed and stated that 'Time overrun is a very frequent phenomenon and is almost associated with nearly all projects in the construction industry. This trend is more severe in developing countries where time and cost overruns sometimes exceed 100% of the anticipated cost of the project'.

On the global perspective, the percentage of underperformance projects account for 77% as per *KPMG report "Global Construction Survey 2013"*. The report also specifies that the Main causes of underperformance are "Project Delays" and "Poor Estimating practices".

As per the EC Harris’s report titled Middle East Major Construction Programmes – Mitigating the Delivery Risk (November 2013) states that “History has shown that major programmes are often subject to scope change, delay and, in the worst cases, contract dispute. Estimated costs and values at launch are likely to rise over time as risks materialize, delays occur, material and labour costs rise and may no longer be available. Many of the major programmes have been formally announced, but have not yet started on site and therefore spend patterns could well shift over time. The ability to ‘shoulder’ workload over the critical 2014 to 2019 period will enable some clients to reduce their exposure to extreme market conditions – albeit at the cost of delayed delivery”.

Similar trend is also reported in the region by PwC (2014) in their report, “Building Beyond Ambition 2014 - Middle East Capital Projects & Infrastructure Survey” duly providing a detailed comparison on the schedule performance of the sector in 2012 & 2014, which states that ‘95% of the projects suffered delay as per 2014 survey compared to 90% in 2012’. The details of the break-up of the delays with the comparison of 2012 and 2014 are given in Fig. 1.1.



Fig. 1.1 – Comparison of construction project delays (Source: PwC report, 2014)

In Deloitte GCC Power of Construction 2013 – Meeting the challenges of delivering mega projects, it was stated that ‘the contingency amount allocated in the budget for unforeseen conditions / events is often a fixed percentage of the total project cost and usually turns out to be insufficient for covering the risks associated with the project’. This is obvious from PwC (2014) report on, “Building Beyond Ambition 2014 - Middle East Capital Projects & Infrastructure Survey”, providing a detailed comparison on the cost performance of the sector in 2012 & 2014, which states that ‘71% of the projects were over budgeted as per 2014 survey compared to 63% in 2012’. The details of the break-up of the cost variance, in comparison to 2012 and 2014 data are as given in Fig. 1.2.



Fig. 1.2 – Comparison of construction project cost variance (Source: PwC report, 2014)

The Middle-East region’s trend in the performance of construction projects, which includes UAE, is also visible as specifically to the UAE construction projects.

The UAE has witnessed a special set of circumstances which made the construction industry grow very fast. Many factors such as tight construction time, unique architectural designs, multinational work forces, and international

consultants and designers created specific impacts on projects progress. The projects experience mild to extensive delays and thereby exceed the initial time and cost estimates. This problem is more evident in the traditional type of contracts in which the contract is awarded to the lowest bidder. This procurement strategy is adopted by majority of projects. The Latham Report (Latham, 1994) suggested that ensuring timely delivery of projects is one of the important needs of clients of the construction industry. These over the budget cost & delayed completion of the projects became a common problem for construction projects in UAE (Ismail AAM, 2014). While there are problems in the construction project, there are also successful projects.

The construction projects are generally considered as successful when these are completed and delivered within the required period, defined budget, as per the required specifications and attaining the stakeholder's satisfaction. Takim & Akintoye (2002) stated that a project is considered as successful if it is fulfilling the functionality, has been profitable to the contractor, there were no claims, and it was fit for the purpose. Ashley et al. (1987) highlighted a project success as not only fulfilling the requirements but exceeding the expectations which are generally referred in terms of cost, quality, time, safety and owners satisfaction. Further, Sanvido et al. (1992) states that projects are considered successful, if the goals and objectives are met. Chua et al. (1999) recommended a hierarchical model for construction success are the key objectives of cost quality time considered as key measures that contribute to the objective which is project success. In order for a project to be successful, there should be various factors influencing the project, which are critical for the project.

Al Otaibi et. al. (2013) state that 'Many authors have emphasized the need of defining the critical success factors (CSFs) that are used in improving the performance of projects and significantly leading to successful project delivery (Chan et al., 2001; Cooke-Davies, 2002). The studies involved different construction projects, for instance: general construction projects (Ashley et al.,

1987; Savindo et al., 1992; Chua et al., 1999), and design-build projects (Chan et al., 2001). However, there is no apparent consensus among researchers on CSFs on construction projects (Toor and Ogunlana, 2009). Scholars have advocated that CSFs should be related to one another with underlying connected relationships (Johnston et al., 1999)’.

These critical success factors are the challenges that are to be addressed in the construction project to achieve the success, which are being further detailed in the subsequent section, specific to the Middle East region which comprise UAE within it.

1.4 Challenges in Construction Projects - Middle East Region and UAE

There are many challenges posed by the construction projects to their stakeholders in achieving the project objectives, which upon properly addressing from the initial stage and acting upon based on the response plan without impacting the project constraints become the projects critical success factors.

In Global context, as per KPMG report “Global Construction Survey 2013”, the top challenges in construction project are as given below.

Invest in People - As they move into sometimes unfamiliar areas, it is essential to have sufficient skills and sector knowledge.

Enhance Management of Mega Projects- The scale of infrastructure projects is increasing, and companies have to step up accordingly, as a US executive notes: “We must have the right people in the right location to participate in mega-projects that result from new opportunities, as energy costs decreases. This includes transportation and construction of power plants, and large-scale manufacturing. The key to success is how these projects are obtained and managed. We will have to acquire companies that already have the people and experience in key markets.”

Risk Management: Many of the controls appear to be in place. Now it is time for contractors to make sure that people are fully aware of and observing these procedures, and that management has an enterprise-wide view of risk. One executive from a US firm summed this up by stating: “We need to get more people to follow the process. We have invested heavily in risk management for more than a decade now in a formal way. Our emphasis continues to be to intensify training and communication about risk.” Another respondent from the Asia Pacific region agrees that it is all about the people: “We must ensure people think of risk management as a fundamental part of the construction process and have it top of mind at every stage of work.”

A similar trend is also noted in the Middle-East region, where PwC report “Building Beyond Ambition 2014 - Middle East Capital Projects & Infrastructure Survey” identifies the following as major challenges:

People and culture – In a region that predominately relies on transient expatriate talent, being able to retain people is equally as important as attracting them in the first place. This is particularly important for technically complex and long term projects that require highly specialist skills, such as nuclear power plants. As an example, the top ranking factor in attracting and retaining talent in the energy, utilities and mining sectors was compensation and benefits; career progression was a clear second. Given the long-life span of many of these projects, being able to offer expatriates opportunities to develop and progress in their roles should become an increasingly important part of retention strategies. The top three countries where the availability of skilled resources is considered the biggest external challenge are the UAE, Qatar and Bahrain. Given that the UAE and Qatar are among the most active project markets in the region, this was expected, however, it is surprising that Saudi Arabia does not feature higher on that list as the Kingdom embarks on a thorough reform of its labour market.

Decision Making – The organisations responsible for delivering major programmes are formed quickly and lack the capacity to administer change

effectively. Governance structures centralise decision making and generally vest limited authority in project teams. Governance was top challenge in 2012. Organisations delivering complex and iconic projects need to rethink how they govern and oversee project delivery, building delivery units that are agile, empowered and able to make decisions effectively. Failure to do so risks these projects being mired in delays and disputes.

Risk Management - Contracts generally transfer most of the risk to the contractor and contracts are adversarial in nature, so changes and issues tend to lead to protracted arguments between owner and contractor around culpability, impact and compensation. Risk Management was 2nd top ranked challenge in 2012.

An AECOM Global Construction Sentiment Survey (2012) states, ‘In the Middle East region clients are faced with the challenge of project teams not delivering projects within budget and schedule. Quality of work has also been cited by clients as a major concern, which has partly been explained by poor project management in some parts of the industry’.

Furthermore, as per PwC report : “Delivering the Middle East’s Mega Projects 2012 Capital Projects and Infrastructure Survey” it was noted that “Accuracy of cost and cost forecast” as one of the improvement priorities.

Ren et al. (2008) highlighted in their study on Dubai project, stated that ‘in mega projects they are several interrelated requirements which become the critical part of the project’, posing huge challenges. Few of those critical factors are as detailed below.

Specialist requirement: Such projects need involvement from specialist resources (manpower, equipment’s, tools etc.) that develop state of the art engineering and technology. Projects with such needs are expected to be hit by delays due to special requirements and are not very well planned because of which they end up in litigations, claims and major cost over runs. Also, in some cases projects have

been kept on hold for longer periods of time, posing huge challenge to the stakeholders.

Supply and Demand Issues: One of the major issues was over commitment from stakeholders, promising to execute, but were not able to deliver, due to various limitations. There were many agencies involved in projects who agreed for execution (design, engineering, construction) but due to their limited resources, they could not honor their commitments.

Multicultural Resources: UAE is a multicultural society, where people come from all walks of life with different backgrounds, cultural values, religions, traditional norms, customary habits and then they are put together to work on one project. Thinking progressively, this will create a positive and competitive environment but sometimes this is the only reason for major issues.

Higher Expectations from Limited Resources: Such specialist projects have higher level of finishes as high-end quality of material is used but specific specialist resources are very limited and this creates issues of delays in the projects.

Unrealistic Project Durations: Proposing and accepting unrealistic project durations have always been an issue in this environment.

Project teams (design phase) generally take excessive time to conceptualize the plan and design projects but when it comes to execution and deliveries the durations are cut short and become critical. Once unrealistic and wrong estimated durations are considered for the projects, they will always end up in delays and put the firm's reputation in stake.

Language Barriers: Arabic language is the preferred language UAE, being the national language. Due to the multi-cultural mix, several languages are existing and every one prefers to use their own medium of communication, which in several ways creates bottlenecks in the project execution.

Clients Decision Making: Owner is considered as the key stakeholder in any project and has maximum authority, being sponsor the projects financially. Clients have the authority and power to introduce changes at any given time regardless of impacts on the project. Making final decisions on time from Client is one of the major issues.

Local Authority Requirements: Local rules and regulations play an important role in the completion of projects on time. There are unexpected changes every now and then in the local rules and regulation for approvals etc. There are many examples in the UAE, where projects are complete, but cannot be handed over, since service connections are not yet done by the concerned authorities.

As per Al-Hajj and A. Sayers (2014), the top challenge as observed in the UAE construction project is “practical use of established Project Management technique”.

In the presence of such complex circumstances, it is normal to have late project deliveries which lead to many associated contractual problems making it more difficult for the apprehensive project related teams.

One of the major suggestions to counter the challenges posed has been reported in PwC report (2014), which states ‘In order to overcome the challenges that the Middle East capital projects and infrastructure sector face, Governments and Government agencies need to shift from the current typical mind-set of viewing infrastructure projects as one-off capital costs. Instead, more emphasis should be placed on long-term operations and maintenance costs and who will be responsible for them’. For achieving this necessary ‘Production-sharing agreements’ shall be made. There are many successful examples of how government bodies in the region have used this approach to deliver projects on time and on budget. The energy and water industry in particular uses contract forms (Independent Power Plant and Independent Water Power Plant) to foster an approach where the state and private sector are incentivised to work together in a

long term offtake arrangement. Since its first use in Oman in 1994 the Independent Water and Power Plant (IWPP) has become an extremely successful model that has been replicated throughout the region. It has been responsible for bringing in billions of dollars of private investment and the involvement of some of the world's most experienced power companies.

As per BMI Power Report (2014) on UAE's power sector, Bullish short- and long-term trends continue to support our forecasts for the UAE's power market. Booming economic growth across the UAE has led to massive increases in the demand for electricity, putting pressure on the existing power infrastructure and confronting the local authorities at both federal and emirate levels with the need to prioritise generating capacity expansion programmes. Expectations for a steep increase in demand over the next decade (some forecasts suggest that domestic demand will more than double by 2020), coupled with limitations on how much and how fast traditional resources can be brought to market, as well as concerns about climate change, have prompted various initiatives aimed at expanding capacity and identifying alternative means for producing the power needed to fuel the emirates' economy. Although we question whether targets will be met with the anticipated speed, expansion is undoubtedly the name of the game in the UAE's electricity market, being part of the Power Sector.

1.5 Significance of Power Sector as part of UAE's Construction Projects

As per KPMG report "Global Construction Survey 2013", Power and Energy sector has been placed as the most popular new market sector. It states that 'Power is undisputedly the dominant new sector, which is consistent with the increase in economic activity and global quest for greater energy security, fueled by cheap prices for gas. Power stations are being built around the world for coal, nuclear, gas and renewables'.

As per MEED Yearbook (2015), in the Middle East region, ‘the Power sector is the second highest planned sector’. This priority for the power sector follows the global trend.

As per Business Monitor International, the Energy & Resource sector comprising the power sector is placed second with 19% of the construction project value in the UAE, which is second to the Commercial construction sector. (Deloitte, 2013), as shown in Fig. 1.3

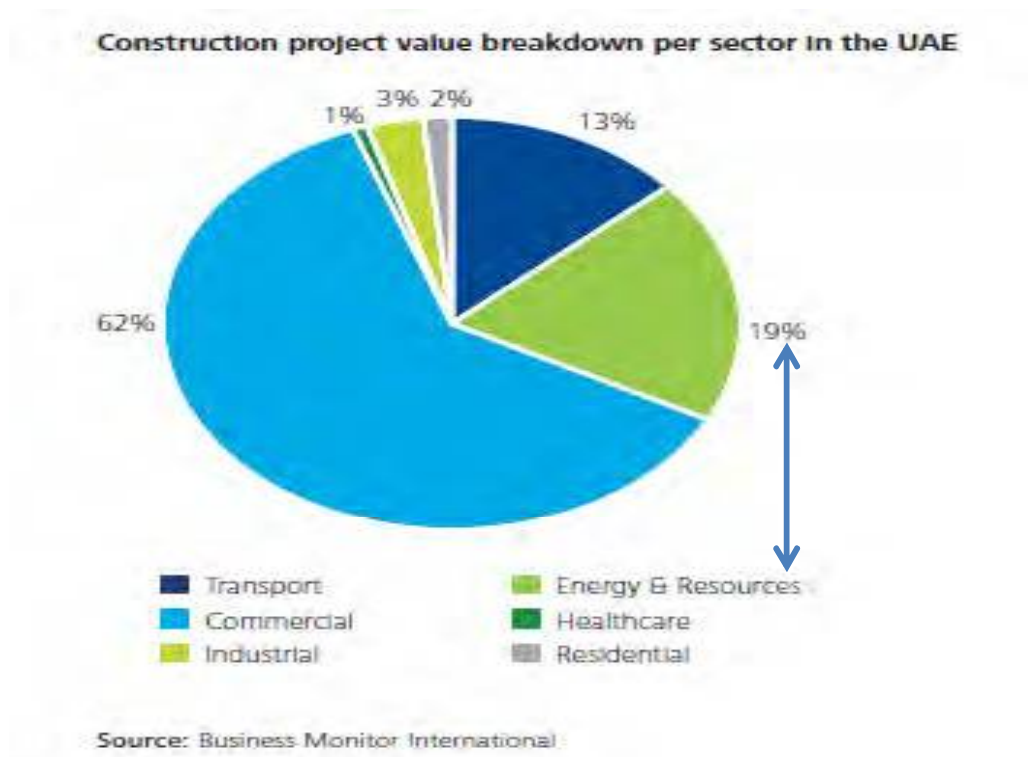


Fig. 1.3 – Construction project value breakdown per sector in the UAE (Source – Deloitte, 2013)

Furthermore, as per Deloitte GCC Powers of Construction (2013) report “Nuclear Power Project in Abu Dhabi – UAE” has been plagued by project delays and cost inflation. The cost estimate has risen by a staggering USD 10 Billion since its initial announcement, taking the total to USD 30bn.

Construction industry in UAE has been developing and producing for more than four decades in all areas and directions, horizontally and vertically. Landmark projects are announced every now and then and completed, giving an alternative perspective to the construction industry all over the world. However, these construction projects are mired with delays in schedule and cost overrun. There are huge number of critical success factors impacting the project and the challenge faced by the various stakeholder is on how these factors are to be handled as early as possible, to achieve a positive outcome, rather than reviewing them upon occurrence and impact being a lesson learned. The governance of the projects by the stakeholders; management of these projects by the project team and proper implementation of the associated risk management practices will provide a platform to make a project successful. While considering the overall scenario of the construction sector globally and looking in to the Middle East region and subsequently narrowing down to the UAE, it has been noted that the power projects are going to be predominant in the construction sector due to their undoubted requirement for the economic development. However, these power projects are having their share in the construction sector's constraints resulting in the cost overrun as well as schedule delays.

The above interprets a necessity for a comprehensive study on the ways to overcome these limitations put on construction projects due to improper governance and improper risk management, which tends to be the critical item by various observations.

Business Problem: Improper Governance and improper risk management is leading to project delays and cost inflation in power projects in UAE.

1.6 Chapter Summary

Construction projects are notorious for being over-budgeted, late and saddled with scope creep, as well as for poor communication protocols and inadequate controls around scope management & change management.

Preparing and tracking a construction project schedule is not an exercise for the faint-hearted. It takes place in an environment that can quite literally change in a blink of an eye. Close monitoring of schedule progress and a rigorous enforcement of change management controls are extremely important to maintenance of a workable project schedule. In addition to the typical issues related to resources and budget, a partial list of the constantly shifting constraints that must be juggled in order to maintain a construction project schedule include a host of enterprise environmental factors such as: weather, geography, geology, environmental and other regulatory constraints, and numerous stakeholders representing a wide diversity of interests in the project, making the task more difficult.

Construction project budget is commonly subject to cost-cutting initiatives at all levels, and these are being cut to the bone in the current economic climate. Even the thin margins that do exist require assiduous attention to costs and resource requirements at a fairly granular level of detail. Baselines for cost accrual including the reserves, cost disbursement and other resource expenditures, in addition to earned value, must be created and careful monitoring of actuals against baselines mandated.

It is crucial that the stakeholders have to take a proactive approach from the moment the construction project commences. Project management plans, even for relatively modest construction projects, should exhibit a level of detail greater than present practices.

This implies that there should be a detailed study on the project governance and risk management of power projects in UAE as being impacted to its cost and

schedule adversely, resulting into a business problem taken up further as core of this research.

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