

PROJECT MANAGEMENT CHALLENGES IN IMPLEMENTING FOREIGN FUNDED WATER SUPPLY AND SANITATION PROJECTS IN SRI LANKA

Nishan Weeraratna* and L.D. Indunil P. Seneviratne

Department of Building Economics, University of Moratuwa, Sri Lanka

ABSTRACT

National Water Supply and Drainage Board (NWSDB) is the principal authority providing safe drinking water and facilitating the provision of sanitation to the nation. Therefore, it is the responsibility of the NWSDB to ensure that the projects undertaken be completed within the prescribed period of time and budget to the prescribe quality in order to assure quality water and an uninterrupted availability of water supply.

Most water supply and sanitation contracts do not meet set cost or time targets as a result of improper assessment of project management challenges. The majority of time and cost overruns are attributable to either unforeseen or foreseen project management challenges for which uncertainties were not properly accommodated. The normal practice is not to have proper review or retrospect at the end of the projects. However, the project management challenges still prevail in the industry as lessons learned but as tacit knowledge.

Identification of the project management challenges was done through a comprehensive literature review and a questionnaire was developed to assess the importance and the severity of the effect of each challenge. Relative importance of the challenges were identified analysing the collected data.

The key project management challenges in implementing foreign funded water supply and sanitation projects are related to human resources and should be addressed as a developing nation. National policies shall be introduced, modified, altered and diversified towards building skilled human resources, which is the demand of the future world.

Additionally, findings will provide an opportunity to both the NWSDB and the contractors to forecast possible critical scenarios and identify common pitfalls so as to eliminate the avoidable and highlight them to the management to avoid recurrences of such phenomena.

Keywords: *Human Resource; Project Management; Project Management Challenges; Water Supply and Sanitation.*

1. INTRODUCTION

Based on the present estimates, one sixth of human population lack access to any form of safe water supply within one kilometre from their homes. (Davison, *et al.*, 2005) Women and their children are the ones who travel for miles every day to collect drinking water for their families. This task takes hours to complete which could be time they spend learning in schools or starting small businesses to help support their families.

Water demand has been on the rise all over the world. Population growth, rapid urbanisation, and overall expansion in economic activities are major causal factors underlying such increases in water consumption. The urban and regional demand for freshwater in Sri Lanka had grown significantly over the last decade (Hussain, *et al.*, 2002).

National Water Supply and Drainage Board (NWSDB) being the principal water and sanitation facility supplying authority in Sri Lanka has a responsibility to supply water and sanitation facilities to meet the social aspiration of the people in terms of safety, reliability and effectively.

Economically, a water supply project in a community provides safe drinking water to women and children; giving them more time, freedom and incentive to help their families grow healthier and produce a productive members to the community. Socially, it is an indication of social status development of the

*Corresponding Author: E-mail - asknishan@gmail.com

particular community. Political interest in water supply is also not negligible. Finally the commodity that is being sold by the NWSDB is water. Since there's always a gap between the demand and the supply NWSDB focuses on timely completion of all the water supply projects.

However, there is enough evidence that the water supply and sanitation projects undertaken by NWSDB in the recent past have suffered heavily due to delays and cost overruns and as a result the public at large has suffered. Focusing on each project's challenges and learning from them will help to build a more capable and successful project management capability which avoids time and/or cost overruns and finally the nation benefits it by several means. The purpose of this study is to identify the project management challenges in implementing foreign funded water supply and sanitation projects in Sri Lanka. It is worth to study, analyse and understand the project management challenges, and thereby identify the probable modification to the existing practice to successfully implement water supply and sanitation projects in Sri Lanka.

Project management is a skill that takes time to develop in a person or in an organization. Construction Project Management is needed to look at the needs and risks, communicate the plans and priorities, anticipate problems, assess progress and trends, get quality and value for money and change the plans if needed to achieve objectives (Smith, 2002). A successful project owes all its credits to the Project Management and the evidence is obvious when the service (result of the project) meets all its expectations. Balancing all the elements of a complex project - time, money, scope and people - is the job of the Project Manager. Excellent project management training is essential to successfully dealing with the unexpected challenges that are unique and significant to the projects.

The discipline of project management is about providing the tools and techniques that enable the project team to organize work to meet time, cost and quality constraints in water supply and sanitation sector.

1.1. SCOPE AND LIMITATION

There are a few types of water supply and sanitation contracts in Sri Lanka. Foreign funded projects, local funded projects, community based projects, rural water projects and rain water harvesting projects are some of them. Since these different types of projects have particular project management challenges relate to each category, studying all the projects does not produce a reliable outcome. Hence, it was decided to focus on foreign funded contracts because they are the large scale projects having a massive impact on the sector. Further the major plants, where latest and challenging technology is applied, are the plants constructed with foreign funds.

The foreign funded projects are international and public – private combination projects which are the most challenging to manage. This is the speciality has led to choose foreign funded projects for the research.

2. LITERATURE REVIEW

Numerous studies on project management challenges were available in the literature on the project management sector. A wide variety of tools and techniques have been employed to evaluate project management challenges in these studies.

Most of the available past studies are those that deal with project management challenges in the context of developed economies, principally from the US. There are only a very few studies dealing with project management challenges in the developing economies. This important research area has largely been neglected in the past.

The study by Perera (2010), investigated the causes and effects of delays in construction of water supply projects with respect to the importance and the severity of the effects. Further, Premanath (1994) examined engineering management and time extension claims for NWSDB, using a questionnaire survey.

According to the previous researchers there are various adversarial relationships among the parties involved in the construction projects at the construction stage, where there are lot of uncertainties come into effect. Further as per their view there exist certain facts that may affect the cost, quality or duration of the projects. Those causes can be identified as the project management challenges that should be addressed by an effective project manager.

The project management challenges could be identified by referring arbitration proceedings, meeting minutes, letters, site log notes, variation orders, extension requests and various other documents maintained at site level. But considering the confidentiality of such records, lack of support from relevant authorities/officers and not maintaining the records for long period after the construction (most of the records are destroyed or misplaced once the construction period concludes) it was very difficult to gather data for this type of research from the site sources. Therefore, most of the researchers left with only one solution in extracting data using questionnaire survey with the participation of the professionals and the expertise in the project management field.

So far, no studies have been carried out on project management challenges in implementing foreign funded water supply and sanitation projects in Sri Lanka. The present study attempts to fill this gap by systematically analysing the project management challenges in implementing water supply and sanitation projects in Sri Lanka. The results of this study will enhance the understanding of the factors influencing the time and cost overrun and deficient quality, and certainly be useful future to project teams in water supply and sanitation sector and the government.

2.1. PROJECT MANAGEMENT CHALLENGES

Ford (2004) has identified unrealistic deadline, communication deficit, scope changes, resource competition, uncertain dependencies, failure to manage risk, insufficient team skills, lack of accountability, lack of engagement of customers and end-users during the project and unclear definition vision and goals as top ten project management challenges in construction projects.

Bee and Bee (2000) has identified that the people challenge plays a vital role in project management. They discussed the people challenge from the team forming for the project up to the winding up of the project. They believe that addressing and meeting the people challenge of project can make a significant difference in the industry.

The effect of people challenge in the industry is also highlighted by Bittner and Gregorc (2010). A team, a group, a project team or a community is not sustainable in the long term without the willingness practice, experience and learn together. Each individual must adapt and be able to fit into the team, but must also bring along his/her own strengths and show personal commitment in order to shape the group and keep it vibrant (Bittner and Gregorc, 2010).

Wirick (2009) revealed the challenges faced by the project managers in the field. He especially focused on the state sector project management challenges which were very useful for the study because the NWSDB itself is a government statutory board.

Engineering generally and the construction industry in developing countries are sufficiently different from those in the developed industrialised world. The range of types and size of construction companies is different, the environment in which they operate is different, the resources that are employed may be different, and the way projects are funded is different (Smith, 2002). In his studies Smith (2002) has highlighted the project management challenge in construction industry in developing countries. It should also be taken into account that there are particular challenges in managing projects in developing countries that are not recognised as challenges in developed countries like corruption.

The challenge in international project settings revolves around the fact that the projects are usually made up of multiple organisations, thus involving multiple organisational cultures involving several ethnic or country based culture. So the issues are actually cross cultural in nature and involve multiple issues (Dinsmore and Benitez, 2010). Dinsmore and Benitez (2010) listed out a set of project management challenges that should be addressed by a project manager who manages an international project.

Private sector project managers like to assume that their work is more demanding than projects in public sector. They assume that their projects are more complex, subject to tougher management oversight, and mandated to move at faster speeds. Although private sector projects can be tough, in many cases, it is easier to accomplish results in private sector than in the public sector (Wirick, 2009). In his findings Wirick (2009) has pointed out the public sector project management challenges.

2.2. CATEGORIES OF PROJECT MANAGEMENT CHALLENGES

The identified project management challenges were categorised into eight categories as follows;

- Design related project management challenges
- Administrative related project management challenges
- Organisational and organisational related project management challenges
- Resource related project management challenges
- Geological related project management challenges
- Communication related project management challenges
- Financial related project management challenges
- Other project management challenges (as safety, health, disputes, etc.)

These challenges effect time, cost and the quality of the construction which discourage all the parties contributing to the construction. Further the general public suffer the most with the interruption of potable water supply and at worst even having no access at all to the potable water supply.

3. METHODOLOGY

In attempting to analyse the project management challenges in foreign funded water supply and sanitation projects in Sri Lanka, this research employed an inductive quantitative research methodology through a combination of critical literature review and a process of questionnaire surveys.

The aim of the research was to analyse the project management challenges in implementing foreign funded water supply and sanitation projects in Sri Lanka. As the nature of the profession, the Project Managers in the construction field are really engaged with tight schedules. Therefore it was decided to use a well-structured, self-administrated type questionnaire and deliver it by hand, e-mails, and fax, which are the most reliable and the most economical and the rapid communication mediums available. The use of e-mail and fax helped to gather data from the respondents spread throughout the island and helped to increase the rate of response. Structured interviews that were based on the questionnaire were also used for collecting data from senior level Managers as they rarely respond to the questionnaire with their busy schedules.

The outcome of the literature reviews were filtered, since it is focused only on foreign funded water supply and sanitation projects. For the filtration, Delphi method was selected with a panel of expertise as the appropriate technique to finalise the research questionnaire for the survey. The success of Delphi method depends on the careful selection of the panel of expertise. Since the information solicited requires in-depth knowledge and sound experience about foreign funded water supply and sanitation projects, members for the panel of expertise were selected from among the senior management of NWSDB, who are expertise and professionals in water and sanitation sector construction. Real situation was addressed by appointing a panel of experts because they are the most qualified and the most experienced personnel in the industry who had gained wealth of experience by managing water supply and sanitation projects in Sri Lanka. All the twelve members of the panel of expertise have more than 20 years of experience as professional managers in water supply and sanitation sector.

The questionnaire was developed to assess both the importance of these project management challenges and their effects to the projects, from the view point of clients and contractors.

3.1. SAMPLE SELECTION

Stratified sampling technique was used as the data analysed based on the designation of the company of the respondents (Project Managers). The population was sub-sampled and these sub samples collectively presented the total sample. The participants were professional managers who were/are engaged in foreign funded water supply and sanitation projects in Sri Lanka. Professional qualification and the experience in water supply and sanitation projects of the participants discussed in Data Analysis.

There were 46 respondents from the client/consultant category while there was 33 from the contractor category and the total sample consisted with 79 respondents.

3.2. DATA ANALYSIS METHODOLOGY

The ranking of the project management challenges in implementing foreign funded water supply and sanitation projects in Sri Lanka from the viewpoint of the client/consultant and contractor was done using the three indices frequency index (FI), severity index (SI) and the relative importance index (RII).

4. DATA ANALYSIS

Considering the qualification of the sample selected, 100% of the sample's client professionals had BSc or higher educational qualification and 70% of the sample's contractor professionals had BSc or higher educational qualifications. As a whole 87% of the sample bear BSc or higher educational qualification. Further 100% of client professionals, 64% contractor professional and 85% of the total sample bear more than five years of experience in water supply and sanitation sector.

The responses to the questionnaire were analysed from the clients', contractors' and overall perspectives based on frequency of occurrence and the severity of the effect to the project. The score for each project management challenge was calculated by summing up scores assigned to them by the respondents and then the three indices related to frequency of occurrence, severity of the effect to the project and the importance were calculated using the three ranking indices stated under methodology.

4.1. DISCUSSION OF RESULTS

First, the results obtained by analysing the project management challenges in implementing foreign funded water supply and sanitation projects in Sri Lanka were discussed and compared the client, the contractor and overall perspective. Then the results obtained by the analysing the severity of the effect to the project due to the identified project management challenges were discussed. The importance of the fifty identified project management challenges in implementing foreign funded water supply and sanitation projects in Sri Lanka depended on both the frequency of occurrence of particular challenge and the severity of its effect to the project.

4.2. FREQUENT PROJECT MANAGEMENT CHALLENGES

The Frequency of occurrence of a project management challenge is a significant aspect, which used to determine the importance of the particular project management challenge. The client ranked inefficient and improper planning and scheduling by the contractor (with FI 66.5%) as the most frequent project management challenge in implementing foreign funded water supply and sanitation projects in Sri Lanka while the contractor highlighted shortage of skilled resources (with FI 66.1%). Furthermore as a big picture shortage of skilled resources (with FI 66.1%) could be identified as the overall frequent project management challenge in implementing foreign funded water supply and sanitation projects in Sri Lanka. This supported the finding of Haughey (2009) at the perspective of client. The project teams should focus on efficient, proper and realistic project planning of the projects.

The contractor's and overall view of most frequent project management challenges complied with the world trend of scarcity of skilled manpower. This was shown by the reports by Wang (2010), and Hanim (2010). Wang (2010) postulated that the global economic crisis is another reason for the occurrence of labour shortages. Sweis *et al.* (2008) also indicated that shortage of manpower including skilled, semi-skilled and unskilled labour causes delays in construction projects. This is further supported by Sambasivan and Soon (2007) who conducted a study in Malaysia and found out that labour supply is ranked number seven out of twenty eight causes of construction delay.

Table 1: Most Frequent Project Management Challenges

Client Perspective	Contractor Perspective	Overall Perspective
Inefficient and improper planning and scheduling	Shortage of skilled resources	Shortage of skilled resources
Political influence	Lack of motivation for human resources	Employee turnover
Shortage of skilled resources	Shortage of staff with required qualification	Shortage of labour power
Shortage of labour power	Employee turnover	Lack of motivation for human resources
Employee turnover	Shortage of staff with required experience	Political influence
Financial difficulties of the contractor	Shortage of labour power	Equipment breakdown
Delays in commissioning other related projects	Equipment breakdown	Shortage of staff with required qualification
Poor communication and coordination among parties	Organisation's rules which delay decision/control	Shortage of staff with required experience
Equipment breakdown	Financial difficulties of the contractor	Inefficient and improper planning and scheduling
Lack of motivation for human resources	Cash flow problems	Financial difficulties of the contractor

4.3. SEVERE PROJECT MANAGEMENT CHALLENGES

The results of the analysis showed that the clients' ranked ineffective and improper planning and scheduling by the contractor (SI = 66.1%), shortage of skilled resources (SI = 55.7%), shortage of labour power (SI = 54.8%), political influence (SI = 53.5%), employee turnover (SI = 51.3%) as the top five project management challenges which could cause severe effect to the foreign funded water supply and sanitation projects in Sri Lanka. Shortage of skilled labour resource (SI = 67.9%), shortage of staff with required experience and qualification (SI of 63.0% each), shortage of labour power (SI = 59.4%) and employee turnover (SI = 57.0%) has identified as the challenges which had severe effects to the project by the contractor. In overall view, shortage of skilled resources (SI = 60.8%), shortage of labour power (SI = 56.7%), employee turnover (SI = 53.7%), shortage of staff with required experience (SI = 50.1%) and ineffective and improper planning and scheduling (SI = 49.6%) caused the severe effects to the projects. In the overall analysis, four out of top five severe project management challenges were human resource related project management challenges. However, this finding tallied with the finding of Saleh (2010).

Table 2: Most Severe Project Management Challenges

Client Perspective	Contractor Perspective	Overall Perspective
Inefficient and improper planning and scheduling	Shortage of skilled resources	Shortage of skilled resources
Shortage of skilled resources	Shortage of staff with required experience	Shortage of labour power
Shortage of staff with required qualification	Shortage of staff with required qualification	Employee turnover
Political influence	Shortage of labour power	Shortage of staff with required experience

Client Perspective	Contractor Perspective	Overall Perspective
Employee turnover	Employee turnover	Inefficient and improper planning and scheduling
Financial difficulties of the contractor	Equipment breakdown	Shortage of staff with required qualification
Poor communication and coordination among parties	Financial difficulties of the contractor	Financial difficulties of the contractor
Equipment breakdown	Organisation's rules which delays decision/control	Equipment breakdown
Lack of motivation for human resources	Cash flow problems	Political influence
Shortage of staff with required experience	Geographical distribution of the project	Poor communication and coordination among parties

4.4. IMPORTANT PROJECT MANAGEMENT CHALLENGES

The results of analysis showed that there were several important project management challenges that should be identified in implementing foreign funded water supply projects in Sri Lanka.

Table 3: Most Important Project Management Challenges

Client Perspective	Contractor Perspective	Overall Perspective
Inefficient and improper planning and scheduling	Shortage of skilled resources	Shortage of skilled resources
Political influence	Shortage of staff with required qualification	Shortage of labour power
Shortage of skilled resources	Shortage of staff with required experience	Employee turnover
Shortage of labour power	Shortage of labour power	Shortage of staff with required experience
Employee turnover	Employee turnover	Shortage of staff with required qualification
Financial difficulties of the contractor	Equipment breakdown	Inefficient and improper planning and scheduling
Poor communication and coordination among parties	Lack of motivation for human resources	Political influence
Equipment breakdown	Financial difficulties of the contractor	Equipment breakdown
Lack of motivation for human resources	Organisation's rules which delays decision/control	Financial difficulties of the contractor
Delays in commissioning other related projects	Cash flow problems	Lack of motivation for human resources

The degree of agreement between the two parties regarding the importance of the project management challenges was tested using spearman's rank correlation coefficient. Low value of 0.59 of rank correlation coefficient indicated low agreement between the parties.

5. CONCLUSIONS

The key project management challenges in implementing foreign funded water supply and sanitation projects were related to human resource. Shortage of skilled and unskilled labour force, shortage of technical staff with required experience and qualification, employee turnover and lack of motivation for human resource were among them. Political influence was also another factor. Equipment breakdown, inefficient and improper planning and scheduling, financial difficulties of the contractor were also top project management challenges in implementing foreign funded water supply and sanitation projects in Sri Lanka.

Human resource challenge will be the critical challenge we have to face as a nation in near future. National policies shall be introduced, modified, altered and diversified towards building a skilled human resource, which is the demand of the world economy. People challenge will be more and more challenging with the aging workforce, in whose skills, knowledge and experience that we are depending on. Training of skilled human resources will be the gateway to the success of the nation considering the in-house demand and the global trend.

By adopting more attentive project management procedures, enhancing continuous coordination and direct communication among the parties, effective and proper planning and scheduling and strictly following the prepared realistic schedule, enhancing the human resource of the employees, motivating the employees, managing the knowledge, the NWSDB will be able to overcome the project management challenges in water supply and sanitation sector.

In addition, this paper will provide an opportunity not only to NWSDB, but also its contractors to forecast possible scenarios of critical project management and thereby will be a help to identify common pitfalls so as to eliminate the avoidable and highlight them to management to avoid a recurrence of such phenomena. Further, the management and staff allocated to settling and dealing with such situations will be reduced. Moreover, it will facilitate the NWSDB and/or its contractor to overview the project management challenges in other parties perspective and help each other with their strengths to overcome the other's weakness, since project management, at the end of the day, is a team work.

Project Management with a thorough identification of possible project management challenges and a proven ability to toggle with the challenges leads a project to its success.

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