

EVALUATION OF TURNKEY PROJECTS IN URBAN WATER DELIVERY IN GHANA

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ABSTRACT

Due to the essential role the Ghana Water Company Limited (GWCL) plays in urban water delivery, construction projects are undertaken by the institution. It is necessary to conduct research into the various forms of delivery methods. The research aimed at investigating the implementation and management of turnkey projects by GWCL. Through interviews, questionnaires and literature review the study revealed that, turnkey contracts may be awarded and based on complexity of project. The study further revealed that the criteria for evaluating turnkey contracts include the financial position and experience of the contractor, technology involved etc. The research concluded that the choice of a contractor for a turnkey project depends on the financial status, experience, and cost involved in the project. Efficient and fair procurement practices aid in the success of the project. The study recommended that post contract evaluation and training of operatives and support staff should be undertaken.

Keywords: Turnkey, Water, Contract, Delivery, Project, Management

INTRODUCTION

Contracting is a highly regulated activity and once a contract is awarded, there are rules governing the ethics of interactions between the parties to the contract. Despite these constraints, contract managers must develop and put in place organizational strategies that reach into the behaviour pattern of parties to the contract.

There are some basic types of contract used in the construction industry. These include:

1. Lump sum
2. Measurement
3. Reimbursement

The construction industry has been searching for the most effective project delivery systems to maximize project performance over the past decades. Some forms of project delivery systems are:

- a) Design, Bid and Build (D B B).
- b) Design and Build (D B).
- c) Design, Build, Operate and Transfer (DBOT)
- d) Build, Operate and Transfer (B O T).

Currently, no single project delivery system is most appropriate for any kind of project. Instead, combinations of different strategies are used for different circumstances (Gordon 1994). Design/build is the



oldest approach that is regarded as a new and alternative delivery method. During ancient times in Mesopotamia and Egypt, the master builder was responsible for the design and construction of the entire project.

This continued to be the most commonly used project delivery method until the late 19th century, when advances in science and technology allowed the fields of architecture and engineering to become two different professions (Songer and Molenaar, 1996). The contractor usually has the task of assembling a group of designers and constructors to perform the job for this type of delivery method.

Design, Build and Turnkey

Design, Build Project

The Design/Build concept of project delivery has become one of the most widely favoured in the engineering construction industry. Though the method is not appropriate for all projects, when the right projects are selected, the design-build may offer significant benefits for both parties to the agreement.

The Design-Build method is a method of project delivery in which a client executes a single contract with one entity (the Design-Builder) for design and construction services to provide a finished product. It is the duty of the client to describe output rather than on the process of obtaining the defined outcome.

It is very important for the client in a design-build contract to define the basic objectives of the project in the early stages of the project. This includes physical components, operational requirements, performance expectations and public service. It is necessary to describe the project in such a way that the Design-Builder has enough information to deliver the intended project.

Turnkey Projects

Turnkey project is the American version of Design and Build or commonly called **Packaged Deal**. It is usually described as a development project in which the contractor assumes all risk until a certain point has been reached, usually at completion of the project or where the structure is ready for use. Permanent financing by a take-out lender can be arranged at that point, provided certain conditions are met.

Turnkey project is also a development in which a developer completes the entire project on behalf of a buyer; the developer turns over the keys to the buyer at completion. Many government-owned public housing projects are turnkey projects. A private developer undertakes all activities necessary to producing the project, including land purchases, permits, plans, and construction, and sells the project to the housing authority (Business Glossary 2006).

The turnkey contract usually involves the entire process of design, specifications, construction, commissioning and operation of facilities. For some instances, the contract includes the maintenance of facilities by the contractor for a period extending beyond the retention period (Greenwood, 1988).

Evaluation and Control of Contracts

The project manager has a role of evaluating and controlling the activities of a contract. These activities are essential in keeping the project on track. Depending on the size of the project, control and



evaluation would be simple or complex. Project controls help in preventing disputes and conflicts (Passenheim, 2009).

The aim of this study is to evaluate turnkey contracts awarded by the Ghana Water Company Limited. This study is intended to help investigate the implementation and management of turnkey projects. Evaluation and control of projects and contracts are part of the project manager's core functions and it helps the project to be on track and also aids the client to achieve its set targets.

To achieve the aim of the study, the following activities were carried out:

1. Analysed turnkey projects
2. Identified the criteria for evaluating turnkey contract delivery.
3. Identified success factors for turnkey contracts in the construction industry.
4. Identified risk management and dispute resolution measures during project implementation.
5. Recommendation of factors for turnkey contract or project evaluation.

Research Methodology

The research is based mainly on the project management activities undertaken by the Ghana Water Company Limited (GWCL).

Project Management Structure of Ghana Water Company Limited

The Project Management Structure of GWCL is shown by the organogram in figure 1 below:

The GWCL has a chief manager who is in charge of project planning and development. He oversees the operations of the contract manager, investment manager, the project quantity surveyors and other support staff. It is the duty of the Project Team to oversee all projects being undertaken by the GWCL.

Ghana Water Company Limited Operations

In 1995, a stakeholder meeting was held to consider options for Private Sector Participation (PSP) in the water sector. The meeting opted for management contract arrangements which were endorsed by the government. The management contract was implemented within the framework of the urban water project. The World Bank has since then provided a grant of US\$103 million to supplement US\$5 million from the Nordic Development Fund and US\$12 million from the Republic of Ghana to support the Urban Water Project. In addition the Royal Kingdom of the Netherlands has provided US\$13million in support of the project bringing the total amount of financing to U\$133 million.

OBJECTIVES OF THE URBAN WATER PROJECT

The objectives of the Urban Water Project are:



- To expand the reliable supply of safe water in the urban areas.
- To ensure that low income consumers have access to potable water at affordable price.
- To ensure sustainability of the sector through cost recovery.
- To ensure steady flow of investment fund, with emphasis on low cost and concession financing.
- To support the introduction of the private sector into management and operation of the water supply systems.

COMPONENTS OF THE URBAN WATER PROJECT

The Urban Water Project comprises four components:

1. System Expansion and Rehabilitation

This component is to support:

- Increasing the amount of treated water for sale,
- Extending service to low income areas,
- Rehabilitating existing network to reduce non-revenue water.
- Dam safety upgrades, procurement and installation of meters, and provision of engineering services, vehicles and equipment for Grantor's regional and district offices.

2. Public-Private Partnership Development

This component supports the payment to the operator under the Management Contract as well as payment to Technical and Financial Auditors to measure the Operator's performance.

3. Capacity Building and Project Management

This component mainly includes training of seconded staff and technical assistance. Also included under this component are allocations for training at GWCL's headquarters, vehicles, office equipment, support for the Project Management Unit and the PURC as well as provision for environmental safeguards.

4. Severance Programme

This component was designed to finance the severance programme undertaken by Ghana Water Company Limited.

Services undertaken by GWCL may be categorised as follows:

- Rehabilitation of existing water supply schemes to bring them up to their designed capacities;
- Provision of operational support equipment;
- Limited extensions and improvements to existing systems;
- Construction of new water schemes



To be able to provide answers for the research questions posed above and achieve the set objectives of the research, the following research methodologies were employed:

Literature and research works done by other scholars relating to the topic were reviewed. This gave information on the research and the methods employed by these scholars. Also, the findings and challenges of these researchers were assessed and incorporated into the final analysis. The literature review was a good source of secondary data that proved to be very essential in achieving the objectives of the research.

Interviews were conducted with contractors and consultants who work on projects for GWCL and the project team of GWCL using a structured questionnaire as a guide. These provided the required information from the interview sessions and also go into specific areas.

A structured questionnaire was distributed to stakeholders who were not reached for the interview sessions. Purposive sampling method was used in selecting the stakeholders.

Both primary data from field and secondary data from literature were analysed. Descriptive statistics were used in the analysis. Salient conclusions and recommendations were provided.

Results and Discussion

To be able to achieve the objectives of this research, seventy (70) questionnaires were sent out to stakeholders. The stakeholders were top level management in the water industry, consultants and other professionals involved in contracts and project delivery. Sixty-two (62) of the respondents returned their questionnaires and fifty-five (55) were used for analysis.

The respondents had ages ranging from twenty (20) years and above. Table 1 below shows the age distribution of respondents. It can be deduced from table 1 that about seventy-five percent (75%) of the respondent have ages of forty and above.

About eighty-five (85%) of the respondents have at least five years of experience in their field of work, especially on issues relating to contract delivery in the construction industry.

Results from the field data indicate that about 64% of the respondents have used turnkey contracts in their operations. Table 2 shows the respondents that have used turnkey contracts.

This therefore shows that slightly above a third of the respondents have come across turnkey products in their operations for this while.

Analysis of Turnkey Projects

The project management team of the GWCL indicated that they prefer turnkey mode of contract delivery when there is an emergency situation for the award of a contract and at a reasonable price. Also, the project team of the GWCL pointed out that, turnkey contract delivery helps to prevent multiple entities on a single project. According to the consultants, the start and completion of the project as well as the technical requirements makes it expedient to use the turnkey.



Criteria for evaluating turnkey contract delivery

The criteria for the evaluation of turnkey contract delivery by the GWCL project team and consultants are based on the financial position and capabilities of the bidder, experience in similar projects, the ability of the bidder to undertake feasibility study, design and preparation of appropriate specification.

Success factors in turnkey contract delivery

The success of turnkey contracts depends on a number of factors. The respondents – GWCL project team, Consultants and some contractors indicated that, prompt handing over of sites to the contractor, swift payment of completed works and claims by the contractor and provision of relevant information related to the project process is very necessary.

Coordination with other stakeholders such as government agencies, safety of site, tax exemptions and visa for expatriate contractors and consultants and the conduct of fair procurement practices contribute to procurement success.

Project delivery and risk management

All the respondents indicated that they have encountered various forms of risks in the discharge of their duties. About seventy-eight percent (78%) of the respondents said that the contracts they have worked on provided avenues for managing risks arising from the project delivery process. About twenty-two percent (22%) of the respondents said that there were no risk management avenues.

Some of the risks that were encountered by the respondents are

- Financial management related
- Expensive maintenance risk for unnecessary oversized project
- Unforeseen activity beyond scope of project
- Executing projects that do not have budgets
- Engagement of non-competent team to deliver
- Non – monitoring of project implementation
- Not rationally and objectively evaluating a delivery system
- Not understanding the prerequisites for the successful use of a given delivery system

Project delivery and dispute resolution measures

From the study, about 70% of the respondents indicated that they have encountered some forms of disputes and conflict while about 30% have not had any form of disputes or conflicts in their operations. The disputes and conflicts arise as a result of the following factors:

- Client's unwillingness to bear the costs of the delays and alterations
- Problems with land acquisition and compensation
- Delays in release of funds and payment certificates
- Weather variations
- New technologies that were not incorporated in the initial contract
- Difficulty evaluating bids
- Lack of control by employer on quality
- Unfair procurement practices



In resolving the conflicts and disputes, the following are some of the conflict resolution methods employed by the respondents:

Experiences of the GWCL

The use of turnkey contract in the GWCL has led to improvements in the infrastructural base of the company.

Out of ten (10) turnkey contracts awarded over a period of eight years (2004 – 2011), the following are some of the experiences from the GWCL contained in tender documents:

1. About 10 - 15% of the total project price goes into Costs Associated with Financing. The cost associated with project financing is very high considering the Ghanaian economy. The said amount could have been channelled into other sectors of the Ghanaian economy if the Ghana government had funded the project from its own resources.
2. The Engineering costs associated with the projects accounted for 7 - 10% of the total project price. This could have been reduced considerably if Ghanaian Engineers are well trained and involved in the entire project life cycle to enhance their learning and adequate preparation for future projects.
3. Some of the designs that are submitted by expatriate consultants and engineers, who are party to the turnkey contract, are unable to make provisions for changing environmental condition e.g. water pollutions. Example, during the operation of the facilities at the Sekyere-Hemang Water treatment plant in the Central Region of Ghana, the Water Quality Assurance Department reported some major challenges. Illegal gold mining activities is on the increase upstream. The major tributaries of River Pra – River Offin and River Birim have become the major hub of illegal gold miners. The plant should therefore be fitted to treat heavy metals i.e. mercury and cyanide used in the gold business.
4. In the implementation of the ten projects under consideration, there was provision for the training of operatives and technical personnel. According to the personnel that went through the training, the depth and period for training was not adequate and personnel were not resourced enough to undertake design, management and maintenance of future projects.

CONCLUSION AND RECOMMENDATIONS

From the study above, the following are the conclusions drawn

1. The turnkey contract involves the entire process of design, specifications, construction, commissioning, operation of facilities and sometimes maintenance for a period of time.
2. The choice of a contractor for a turnkey project is dependent on the following factors:
 - a. The financial position and experience of the contractor
 - b. The technology involved in the project delivery
 - c. Time, quality and cost involved in the project
 - d. The complexity and technicalities required for project delivery.
3. The success factors of a turnkey projects are:
 - a. Efficient and fair procurement practices
 - b. Provision of relevant information



- c. Developing of projects to its implementation stage
 - d. Coordination of the stakeholders involved in the project
 - e. Paying for completed works, that is the prompt payment of claims
 - f. Conformance to specifications and expectations
4. Risks involved in project delivery are
- a. Unforeseen activity beyond the scope of work
 - b. Engagement of incompetent project team
 - c. Non-monitoring and evaluation of projects
 - d. Risk of cost exceeding the price lying entirely with the contractor
 - e. Changes in government during the contract period
 - f. Changes in foreign exchange
5. Disputes in project delivery arise as a result of the following conditions
- a. Client's unwillingness to bear the costs of the delays and alterations
 - b. Problems with land acquisition and compensation
 - c. Delays in release of funds
 - d. Weather variations and technological changes
 - e. Difficulty evaluating bids based on same criteria
 - f. Lack of control by employer on quality

To be able to obtain maximum benefits from turnkey projects, the following recommendations may be noted:

1. Post contract evaluation should be undertaken. Details to be assessed during the post contract evaluation process should be well documented in the contract documents.
2. Training of operatives and support staff should be adequate enough to help them handle the operation and maintenance of the facility concerned.
3. Local engineers and technical personnel should be well-involved in the project delivery process – from inception to commissioning.
4. Proper communication lines between all stakeholders involved in the project under consideration.
5. Educational institutions should be used in organizing training of the staff. This makes it easier to organizer refresher courses for the personnel when the need arises.

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TABLES AND FIGURES

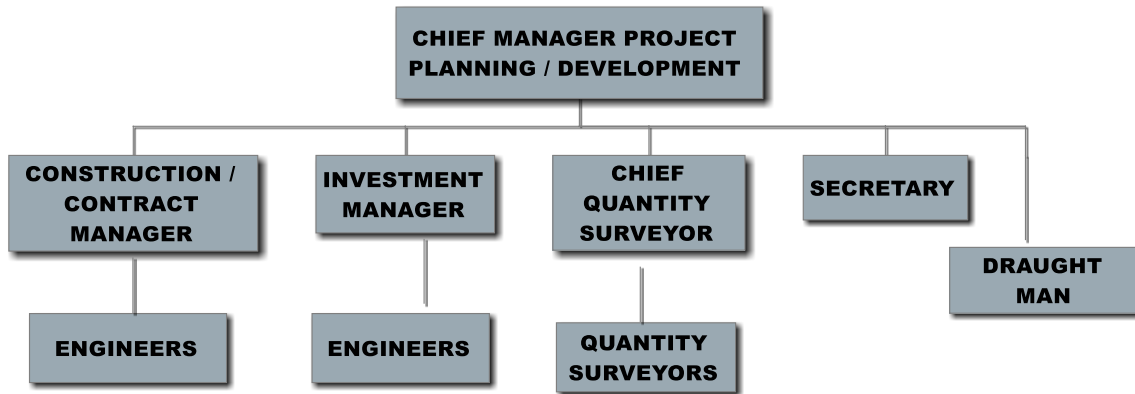


Figure 1: Project Management Structure of GWCL

Age	Number of Respondents	Percentage (%)
20 - 29	4	7.3
30 - 39	8	14.5
40 - 49	25	45.5
50 and Above	18	32.7
Total	55	100

Table1: Age of Respondents

Response	Number of Respondents	Percentage (%)
Yes	35	63.6
No	20	36.4
Total	55	100

Table2: Respondents that have used turnkey



Dispute resolution method	Number of Respondents	Percentage (%)
Diplomacy	24	28.6
Advocacy	10	11.9
Negotiation	34	40.5
Counselling	5	6.0
Prayers	9	10.7
Others	2	2.4
Total	55	100

Table 3: Methods for Dispute Resolution

